Jan. 22, 1957 H. J. KRUEPER, JR 2,778,087

TIE FOR CONCRETE FORMS

Filed Sept. 8, 1953

Fig. 1.

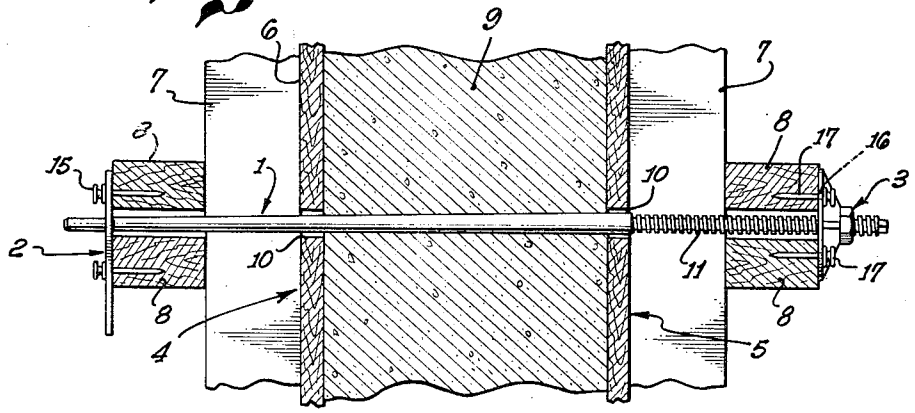



Fig. 2.

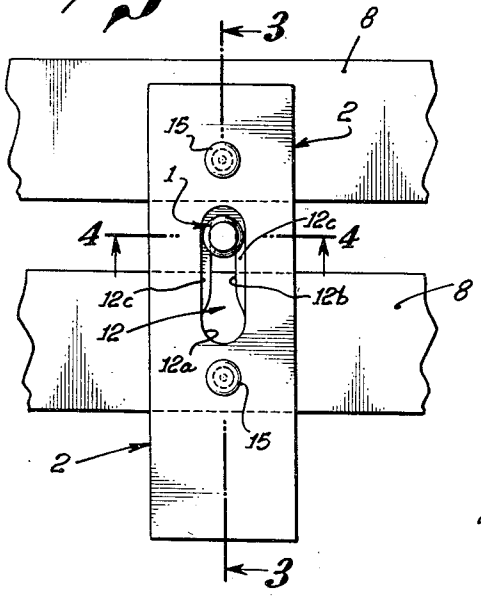



Fig. 3.

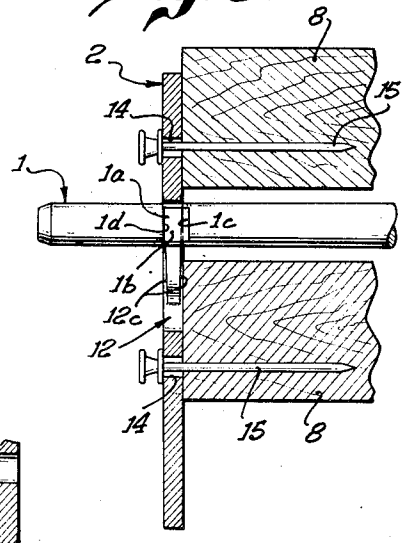



Fig. 4.

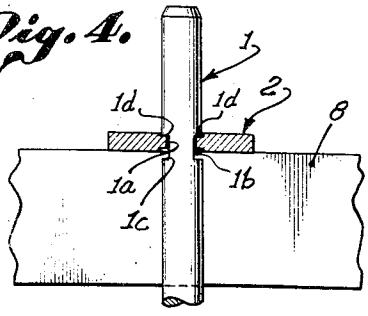
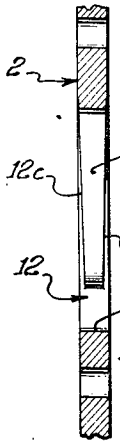



Fig. 5.




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# TIE FOR CONCRETE FORMS

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6 Claims. (Cl. 25—131)

This invention relates to clamps or ties for holding concrete forms against spreading under the weight of the concrete.

More particularly the invention relates to improvements in concrete form clamps or ties of the type shown in the U. S. Letters Patent No. 2,365,563, issued December 19, 1944, to Harry J. Krueper. As shown in this patent, the tie comprises a tapered steel rod extended through opposed walls of a concrete form and fastened thereto to hold the walls against spreading under the weight of the concrete. The rod is fastened at its ends by means of nuts which bear against the outer sides of the form walls. The taper of the rod facilitates removal thereof in stripping the forms.

It is an object of the present invention to provide a form tie such as described which may be installed and removed with greater ease and in less time than ties heretofore available.

It is another object of this invention to provide a tie such as described which eliminates the use of screw threads and a nut as heretofore employed on the tapered end of the rod.

It is another object of this invention to provide a novel key plate fastening means for detachably securing one end of the rod to one of the walls of the form without the use of screw threads.

It is a further object hereof to provide a key plate fastening means having a formation making it possible quickly to fasten the rod in place and as quickly release the rod.

It is another object to provide a tie such as described which is more reliable in operation and more effectively distributes the stresses applied thereto by reason of the aforesaid key plate fastening means.

It is an additional object to provide a tie such as described wherein the key plate is constructed and arranged so that in the event it becomes partly embedded in the wood of the form walls it may be readily released and moved to position for removal from the rod by a hammer blow.

It is another object to provide an improved tie such as described which may be repeatedly used without likelihood of damage or distortion of the rod and fastening elements associated therewith.

It is a further object to provide a key plate fastener having each side of like formation whereby the plate may be quickly installed on the rod with either side disposed to engage the outer side of the adjacent form wall.

It is an additional object to provide a form tie wherein the pressure or load on the key plate will be released upon striking one end of the plate, the plate then moving relative to the rod into a position whereby it may be readily removed for withdrawal of the rod.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of one embodiment of the invention. For this purpose there is shown a form in the drawings accompanying and forming part of the present



specification. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Referring to the drawings:

Fig. 1 is a fragmentary vertical sectional view taken through a concrete structure and the form therefor, showing in elevation a tie embodying the present invention as applied to walls of the form;

Fig. 2 is a fragmentary view of the structure shown in Fig. 1, showing the key plate in elevation on one end of the tie rod;

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2;

Fig. 4 is a cross sectional view taken on the line 4—4 of Fig. 2; and

Fig. 5 is a fragmentary vertical section taken through the key plate as removed from the tie rod.

One embodiment of the present invention as shown in the accompanying drawings, generally comprises a tapered steel rod 1, a key plate 2 adapted to be detachably mounted on one end portion of the rod and a nut 3 axially adjustable on the other end portion of the rod.

The rod is adapted to be applied to a concrete form, for example as shown in Fig. 1. This form comprises opposed walls 4 and 5 made up of the usual sheathing 6, studs 7 and wales 8. The concrete shown in the form is designated 9.

Holes 10 are provided through the sheathing 8 so that the rod 1 may be inserted to extend between the studs and wales with the end portions of the rods projecting beyond the wales.

The key plate 2 is constructed so that it may be readily locked on and removed from one end portion of the tie rod 1 in less time and with less manipulation and effort than is possible where a nut or similar fastening is threaded on the rod. It is only necessary to form the rod with a simple reduced portion providing recesses and shoulders, to accommodate the quick locking and removal of the key plate. Thus, only one end portion of the rod 1 is formed with screw threads 11 to provide for axial adjustment of the nut 3 as necessary to adapt the tie to forms of different thickness and to tighten the tie as desired.

As here shown, the key plate is rectangular and provided with a rod-receiving slot 12 extending longitudinally between the ends thereof. The length of the plate is such that it will span a pair of the wales 8 when mounted on the tie rod.

In order that the key plate 2 may be releasably locked on the rod 1, the plate 2 and the rod are provided with interengaging portions. Accordingly, the slot 12 is of the key-hole type, having at one end an enlarged somewhat circular portion 12*a* of greater width or diameter than that of the smaller end portion of the tie rod 1; also an elongated reduced portion 12*b* of less width than the diameter of the tie rod and extended from the portion 12*a* to the other end of the slot.

The tie rod 1 at a point adjacent the smaller end thereof is reduced as at 1*a* to form on opposite sides of the rod a pair of notches or recesses 1*b* as well as inner and outer pairs of shoulders 1*c* and 1*d*. The reduced portion 1*a* of the rod is adapted to slide into the reduced portion 12*b* of the slot 12 so as to dispose the shoulders 1*d* on the rod in overlying and locking contact with the outer surface of the plate.

It should be noted that the key plate 1 may be applied with either of its two flat faces opposed to the wales 8 on one of the form walls and that the space between the shoulders 1*c* and 1*d* is greater than the maximum thickness of the key plate 1. Thus, the inner shoulders 1*c* do

not contact the inner face of the plate when the plate is moved into the final locking position shown in Figs. 2 and 3. However, the shoulders 1c of the innermost pair act as guides during the movement of the reduced portion 1a of the rod into the reduced portion 12b of the slot 12 as well as serve as stops to limit inward movement of the plate axially of the rod.

The key plate 2 is constructed and arranged to make it possible to quickly release the pressure thereon and move the plate into position for a quick removal from the rod, as by striking an end of the plate with a hammer or similar tool. Accordingly, those portions of the opposite faces of the plate which are adapted to be engaged by the outer shoulders 1d on the rod 1, are relieved to provide inwardly offset surfaces 12c that taper or incline inwardly from the remainder of the opposite faces of the plate toward the larger end of the slot, being substantially equal in length to that of the reduced portion 12b of the slot.

Openings 14 are provided in the key plate 2 whereby nails 15 may be employed for fastening the plate to the wales 8 of one wall of the form to prevent rotative movement of the plate. Likewise, the nut 3 is provided with openings 16 whereby nails 17 may be driven therethrough to restrain rotation of the nut.

In installing the tie with the nut 3 thereon, the rod 1 is inserted through the holes 10 in the sheathing until the smaller end projects beyond the adjacent wales. The key plate 2 is then applied by moving it with either face toward the wales on the adjacent wall of the form, to cause the smaller end of the rod to pass through the large portion 12a of the slot 12 and to bring the reduced portion 12b of the slot into registry with the reduced portion 1a of the rod. The plate is either released so that it will drop at right angles to the rod or is moved by the operator in this manner to cause the reduced portion 1a of the rod to slide into the narrower portion 12b of the slot. The shoulders 1d on the rod will then overlie the inclined surfaces 12c and lock the plate on the rod with the inner face of the plate opposed to the adjacent wales. Next, the plate is nailed to the wales and the nut 3 is then tightened to clamp the plate against the wales, after which the nut is nailed to the wales, thereby completing installation of the tie.

When it is desired to withdraw the tie rod 2 from the form, nails are removed from the plate and the nut and the key plate 2 is struck by a hammer or similar tool, or the end of the plate adjacent the larger portion 12b of the slot 12, thereby driving the plate at right angles to the rod and releasing the clamping pressure on the plate and rod, it being unnecessary to loosen the nut 3. When the plate is moved in this manner by the hammer blow, the inclined offset portions 12c engaged with the shoulders 1d on the rod cause the plate to move axially outwardly on the rod so that the inner face of the plate moves away from the wales, thereby releasing the clamping pressure on the plate. A single hammer blow is all that is required to release the plate and move it so that the rod 1 is or may be disposed in the larger portion 12b of the slot whereby the plate may be quickly removed from the rod and the rod withdrawn from the form.

It should be noted that the key plate 2 makes it possible to install and remove the tie in a much easier and satisfactory manner than would be possible with the use of a nut similar to the nut 3. The fact that the key plate 3 is reversible is also time saving and advantageous. The tapered or inclined portions of the plate which are engaged by the shoulders on the tie rod assure that the plate may be quickly and easily released and removed responsive to a hammer blow on one end of the plate after removing the nails 15.

I claim:

1. A tie for preventing spreading of the opposed walls of a concrete form, comprising: a tie rod adapted to be passed through the form; a key plate for releasably securing one end portion of said rod to one of said walls; said plate having a slot; said slot having a portion of less width than the diameter of said rod and a wider portion greater than the diameter of the rod; said rod having a reduced portion of less width than the reduced portion of said slot and engageable therein; said reduced portion of said rod defining shoulders engageable with portions of one face of said plate which extend along opposite margins of said slot; said plate having plane surfaces on opposite sides thereof parallel with one another except for portions engageable by said shoulders; the portions of said one face engageable with said shoulders being inwardly offset from said plane surface on said one face of the plate and inclined from one end of the slot toward the other end of said slot; and means for securing said rod to the other of said walls.

2. A tie for preventing spreading of the opposed walls of a concrete form, comprising: a tie rod adapted to be passed through the form; a key plate for releasably securing one end portion of said rod to one of said walls; said plate having a slot said slot and plane parallel faces between the slot and edges of the plate; said slot being greater width than the diameter of said one end portion of said rod; said slot having a portion of less width than the diameter of said rod; said rod having a reduced portion of less width than the reduced portion of said slot and engageable therein; said reduced portion of said rod defining shoulders engageable with a face of said plate; opposite faces of said plate being inwardly offset along the sides of said slot and inclined inwardly from one end of said slot towards the other end of said slot whereby either face of the plate may be engaged with said shoulders; and means on the other end portion of said rod engageable with the other of said walls.

3. A clamping plate for use with the tie rod of a concrete form tie; said plate having a slot therein; said plate having plane parallel faces between the slot and edges of the plate except portions which extend immediately along opposite edges of said slot; said slot having one end wider than the remainder thereof; said portions being inwardly offset and inclined from one end toward the other end of the slot.

4. A clamping plate for use with the tie rod of a concrete form tie; said plate having a slot therein and plane parallel faces between the slot and edges of the plate except portions which extend immediately along opposite edges of said slot; said slot having one end wider than the remainder thereof; the portions of opposite faces of the plate along opposite edges of the narrower part of the slot being offset inwardly from the remainder of said opposite edges and inclined from one end toward the other end of the slot for interlocking engagement with said rod.

5. A clamping plate for use with the tie rod of a concrete form tie; said plate having a slot therein and plane parallel faces between the slot and the edge of the plate; said slot having one end wider than the remainder thereof; the portions of opposite faces of the plate along opposite sides of the slot being offset inwardly from the remainder of said opposite sides for interlocking engagement with said rod; said portions being inclined from one end toward the other end of the slot.

6. In a tie for preventing the spreading of opposed walls of a concrete form, a rod member, an elongated plate member engaging the rod member at one of said walls, and means on the rod member engageable with the exterior of the other of said walls, said plate member having a keyhole slot and plane parallel faces between the slot and the edges of the plate, said slot having a reduced portion of less width than the diameter of an end portion of the rod member and a wider portion greater than the diameter of said end of said rod member, a marginal edge of said slot being inwardly offset from the plane face of said plate member at the reduced portion of the slot, the inwardly offset portion tapering

inwardly from said reduced portion of said slot towards said wider portion, said rod having a reduced portion of less width than the reduced portion of said slot to provide a shoulder on said rod in contact with the tapered marginal edge of said slot which is inwardly offset from the plane outer face of said plate.

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