LOCKING CONNECTION FOR CONCRETE FORMS

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This invention relates to metal forms used in making concrete structures and more particularly to a locking device for releasably connecting facing spaced walls of metal forms.

It is the object of the invention to provide an improved locking connection having a pin cooperating with a spreader tie to maintain facing walls of metal forms in a spaced relationship during the pouring and setting of concrete therebetween.

Another object of the invention is to provide an improved locking pin for a spreader tie.

A further object of the invention is to provide a releasable locking connection which when subjected to vibratory does not unlock the connection.

Another object of this invention is the provision of a locking pin movably from one position wherein it prevents a pair of devices from separating due to opposed forces, and is itself under a deforming type stress which renders difficult its removal from the position, to another position wherein its removal is easily accomplished.

An additional object of the invention is to provide a reliable and efficient locking connection which is rugged in construction and economical in cost.

Referring to the drawing, there is shown in FIG. 1 a concrete form structure indicated generally by the numeral 10; FIG. 2 an enlarged perspective view of the locking pin of the locking connection illustrated in FIG. 1; FIG. 3 is an enlarged longitudinal sectional view taken along the line 3—3 of FIG. 1; FIG. 4 is an enlarged sectional view taken along the line 4—4 of FIG. 2; FIG. 5 is an enlarged cross sectional view taken along the line 5—5 of FIG. 1 showing the locking pin in its working position; and FIG. 6 is a view similar to FIG. 5 with the locking pin rotated ninety degrees for withdrawal from its working position.

Referring to the drawing, there is shown in FIG. 1 a concrete form structure indicated generally by the numeral 10 comprising spaced pairs of concrete metal forms 11, 12 and 13 and 14 in assembled positions prior to receiving concrete therebetween. The forms are conventional, commercially available form units, each having a rectangular shape. Each form includes a flat base plate 16, peripheral end flanges 17 and side flanges 17a extended laterally outwardly from the base plate 16 and stiffening ribs 18 projected laterally of the base plate 16 in the same direction as the flanges 17a. The peripheral flanges 17 and 17a are formed with pairs of peripherally spaced transverse holes 19 which are circular in cross section. Adjacent forms 13 and 14 are locked together and aligned by a plurality of plate clamps 21, only one of which is shown in FIG. 1. The structure and function of the plate clamps 21 are described in detail in patent No. 2,870,516, issued January 27, 1959, and entitled “Form Unit.”

The concrete form structure illustrated has a pair of facing walls established by the base plates 16 of the respective forms 11, 12 and 13 and 14. The transverse space between the facing walls is maintained by a plurality of spreader ties 22, only one of which is shown in FIG. 1. The spreader ties 22 are releasably fastened at their opposite ends to the facing forms. Each spreader tie 22 is an elongated flat bar having side notches 23 formed therein adjacent each end. As shown in FIGS. 1, 5 and 6, each end of the spreader tie 22 has a circular opening 24 which has a diameter substantially equal to the diameter of the opening 19 in the end flange 17a.

To accommodate the spreader tie 22, the base plate 16 of a form is provided at each corner with a slot 26 of a size which enables the spreader tie 22 to extend therethrough. A pin retaining means 28 is secured to the base plate 16 and to the end flange 17 adjacent the slot 26. The pin retaining means 28 extends in a lateral direction from the base plate 16 and contains a circular hole 29 in axial alignment with one of the holes 19 in a side flange 17a. The cross sectional dimension of the hole 29 is substantially identical to the cross sectional dimensions of the holes 19 in the flange 17a.

The ends of the spreader tie extend through the slots 26 and are connected to the facing forms 12 and 14 by an L-shaped locking means 33. As shown in FIGS. 2 and 3, the locking means 33 comprises an elongated axially aligned body 34 having an elongated curved body 34 forming a first section 36 and a second section 37 which terminate in a tapered end 38. The second section 37 is about twice as long as the first section 36 and has a longitudinal axis which extends upwardly from the longitudinal axis of the first section at an angle of between three to six degrees. Integrally formed with the end of the first section 36 and projecting normally therefrom is an arm 39.

As shown in FIG. 4, the elongated body 34 of the locking means 33 has an oval or elliptical shape in cross section, with a major diameter A and a minor diameter B. The major diameter A is substantially equal to the diameter of the holes 19, 24 and 29 of the flange 17a, the spreader tie 22, and the pin retaining means 28, respectively. When the elongated body 34 is inserted through the respective holes, a snug fit or bearing engagement is had between the peripheral surfaces defining the major diameter A and the adjacent side walls which define the holes 19, 24 and 29 in the respective members.

In FIGS. 1 and 3, the locking means 33 is shown in the working position wherein the arm 39 projects through the slot 32 in the flange 31 and the elongated body 34 projects through the axially aligned holes 19, 24 and 29, respectively, in the form flange 17a, the spreader tie 22, and the plate 28. In this position the curved elongated body 34 frictionally engages an upper sector 41 of the hole 19 in the flange 17a and a lower sector 42 of the hole 29 in the plate 28, thereby frictionally holding the locking means 33 in the working position on the metal form 14.

In the working position, the frictional grip of the curved body 34 on the side walls of the hole 19 in the flange 17a and the side wall of the hole 29 of the pin retaining means 28 inhibits rotation of the body 34. In the pouring and leveling of concrete between the forms vibratory and shock forces are imparted to the metal forms. These forces tend to rotate the body 34 of the locking means 33 so that the arm 39 clears the slot 32. The longitudinal movement of the body 34 is minimized by the curved shape of the body as the frictional force between the body 34 and the side walls of the aligned holes 19 and 29 is increased upon longitudinal movement of the body 34. This increase in the frictional grip is caused by the angular shape of the body 34 which must be deformed or bent in order to remove the body from the metal form.

Referring to FIG. 5, where the locking means 33 is in the working position, the major diameter A extends paral-
I claim:

1. A locking connection for releasably connecting a mold form having a flange formed with a circular hole and a plate extended substantially parallel to the flange and formed with a circular hole positioned in axial alignment with the hole in the flange, whereby substantially all lateral stress on the elongated body in the plane of the force to provide a secure connection between the spreader tie and the associated metal form. In order to release the locking connection, the body 34 of the locking means 33 is rotated ninety degrees by applying an upward force to the arm 39 thereby moving the arm 39 out of the slot 32 in the flange 31 of the pin retaining means 28. The elongated body 34 is forced back out of the aligned holes 19, 24 and 29 respectively, by an impact blow by a hammer on the end 38. The locking means 33 is not destroyed in use and is repeatedly re-used in subsequent locking connections.

Although a preferred embodiment has been disclosed herein, the invention is not to be so limited as various modifications in form, and details of the apparatus illustrated may be made by those skilled in the art, without departing from the spirit of the invention. It is intended to be limited only as indicated by the scope of the following claims.

References Cited by the Examiner

UNITED STATES PATENTS
1,350,084 8/20 Schub 25--131
2,113,086 4/38 Jennings 25--131
2,151,210 3/39 Jennings 25--131

FOREIGN PATENTS
162,668 5/55 Australia.

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