

Jan. 8, 1963

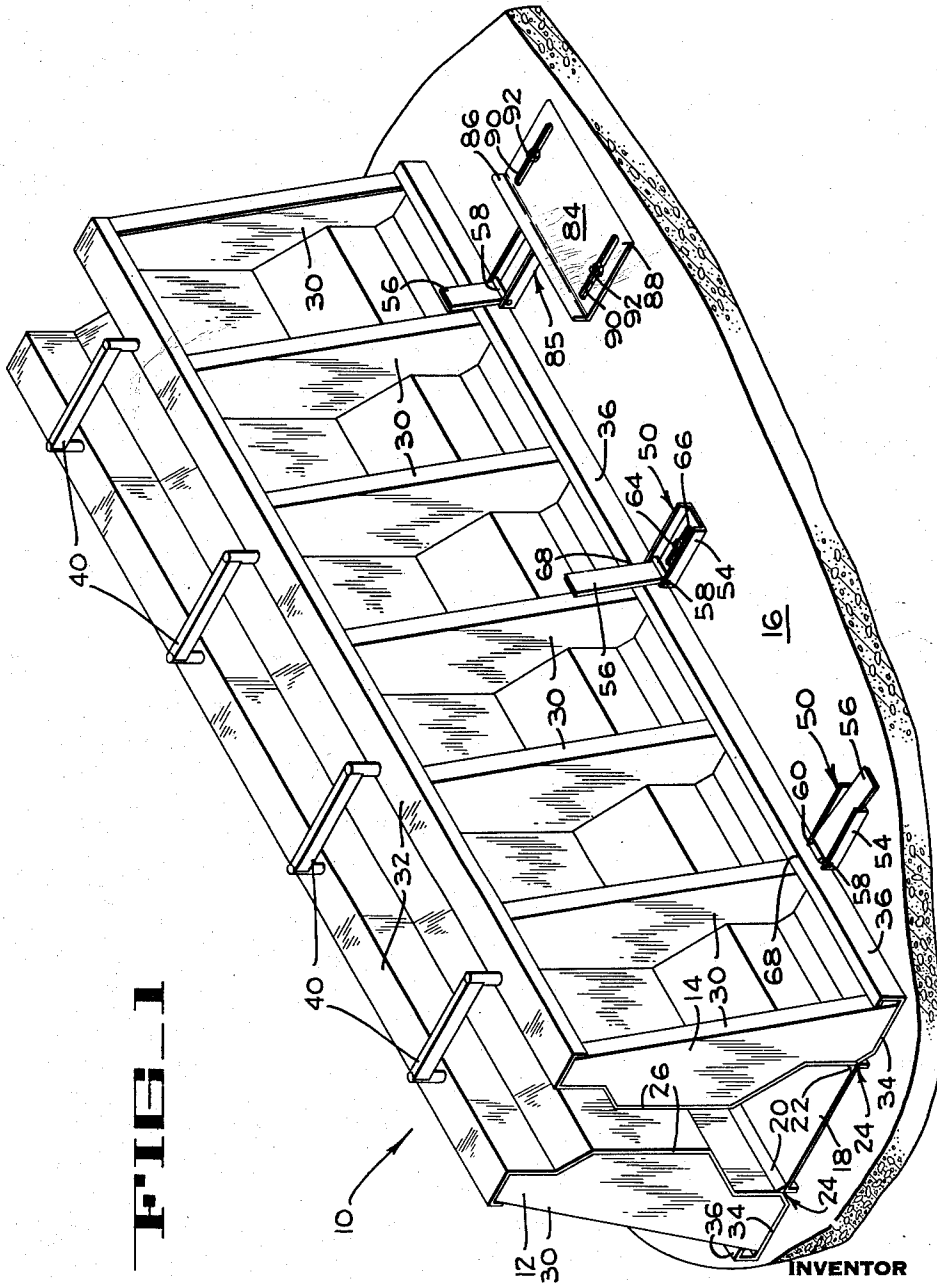
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3,071,835

CONCRETE FORMING APPARATUS LOCK

Filed March 28, 1960

3 Sheets-Sheet 1



**FIG. 1**

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FIG. 1

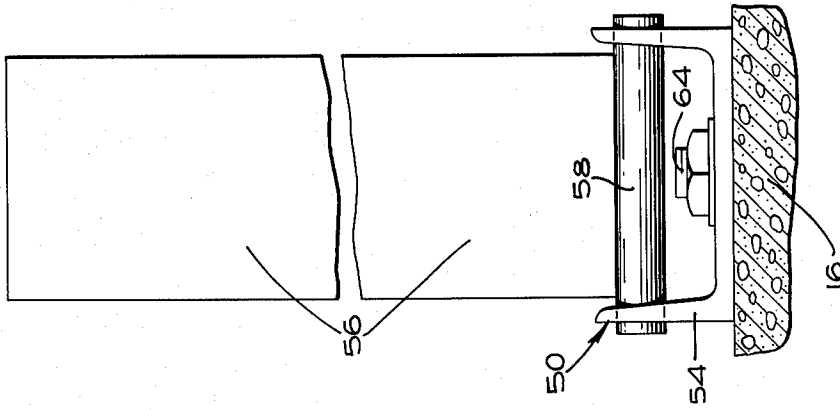


FIG. 2

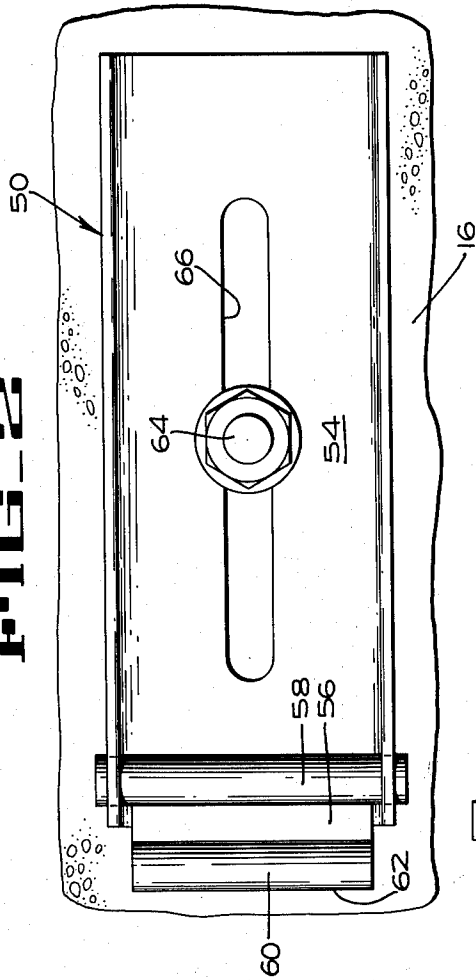
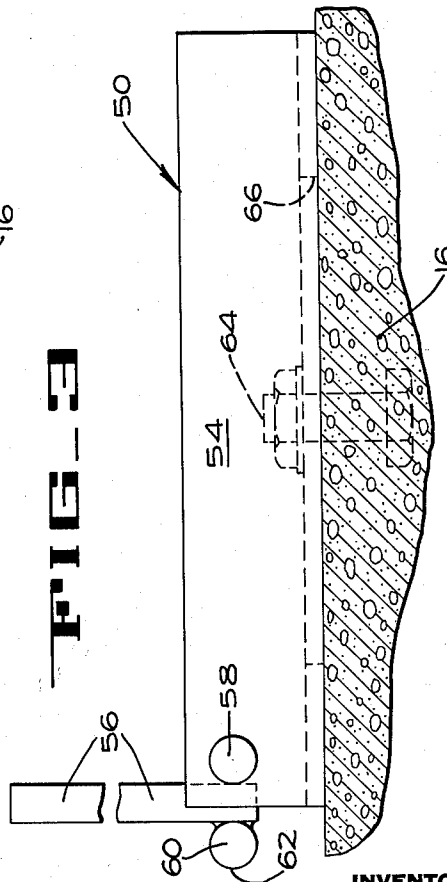


FIG. 3



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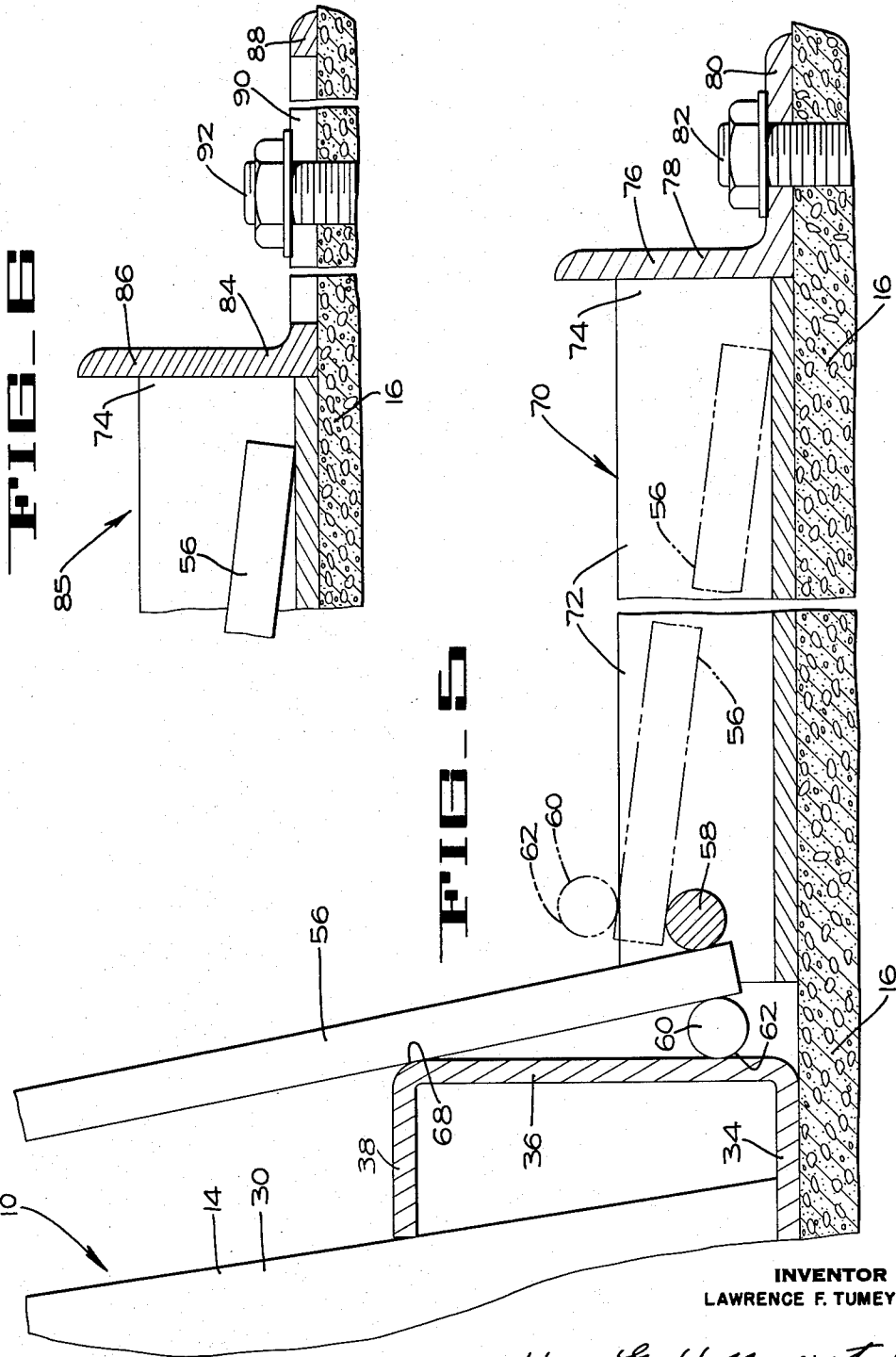
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3 Sheets-Sheet 3



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3,071,835  
**CONCRETE FORMING APPARATUS LOCK**  
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 FMC Corporation, a corporation of Delaware  
 Filed Mar. 28, 1960, Ser. No. 18,035  
 1 Claim. (Cl. 25—121)

This invention pertains to concrete forming apparatus and more particularly relates to locking mechanisms for use with the movable side forms of such apparatus.

Forming apparatus for yard casting of concrete structural members such as beams generally comprises three basic parts. The bottom or base, commonly called the pallet, supports the concrete product and determines the width dimension of the product. To side forms longitudinally coextensive with the pallet about the lateral edges thereof to seal the bottom of the apparatus so as to prevent leakage of the fluid concrete mix. The side forms are usually removable and are stripped from beside the beam as soon as it has hardened sufficiently to retain its shape. In most cases the side forms will be stripped from the product several hours after the fluid concrete mix is poured but before the beam has acquired enough strength to permit its removal from the pallet. When casting beams at a high production rate, a large number of pallets will be used for each set of side forms thus permitting a new beam to be cast in the same side forms every few hours. With conventional apparatus a large number of threaded fasteners or wedge devices are used to fasten each side form tightly against the pallet each time it is set up. It will be apparent that much time is apt to be consumed by workmen in tightening and loosening these devices and that great cost savings can be realized by making the locking devices simple and quick operating. Most of the locking devices now in use are fastened to the concrete casting bed upon which the apparatus rests and their permanent placement prevents any variation in the width dimension of a beam which can be cast in the apparatus. Frequently these permanently attached fasteners seriously impede workmen and mobile equipment.

An object of the invention is to provide an improved locking mechanism for a movable side form of concrete forming apparatus.

Another object of the invention is to provide a side form lock which is not connected to the forming apparatus or to the concrete casting bed and which, therefore, is readily movable and reusable with the side forms each time the side forms are set up to cast a new beam.

Another object of the invention is to provide a side form locking mechanism which is adjustable through a wide range to permit variation in the width dimension of beams which can be cast in the apparatus.

Another object of the invention is to provide a side form locking mechanism which permits unlimited longitudinal movement of the side form relative to the locking mechanism.

These and other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings, in which:

FIGURE 1 is an isometric of concrete forming apparatus illustrating a side form and, in operative relation therewith, three of the side form locking mechanisms of the present invention, one of which is slightly different from the other two.

FIGURE 2 is a top plan of one of the side form locking mechanisms of FIG. 1.

FIGURE 3 is a side elevation of the locking mechanism of FIG. 2.

FIGURE 4 is an end elevation thereof.

FIGURE 5 is a partly broken away longitudinal section of the other form of the locking mechanism shown

in FIG. 1, illustrating a modified form of anchor for the device and showing the mechanism in operated position against a side form of the concrete forming apparatus.

FIGURE 6 is a fragmentary longitudinal section similar to FIG. 5 illustrating a further modified form of anchoring brace.

FIGURE 1 illustrates a concrete forming apparatus 10 comprising a first side form 12 and a second side form 14 which extend longitudinally along a concrete casting bed 16. The side forms 12 and 14 are placed on the casting bed without being attached thereto and are separated sufficiently to accommodate a pallet 18 therebetween. The pallet 18 rests on the casting bed and is longitudinally coextensive with the side forms 12 and 14. The pallet 18 includes chamfering strips 20 and 22 adjacent its lateral edges, which strips extend longitudinally of the pallet and are welded to the upper surface thereof. The chamfering strips 20 and 22 chamfer the lower edges of the concrete beams cast in the apparatus 10. The side forms 12 and 14 are adapted to slide laterally into engagement with the pallet's chamfering strips to form a joint 24 between the strips and the side forms. Each side form 12 and 14 (FIG. 1) comprises an elongate plate 26 which is shaped to impart the desired configuration to one side of a beam. A plurality of reinforcing gussets 30 are welded at spaced intervals to each of the plates 26 to suitably stiffen the same. The plates 26 each include an upper flange 32, a lower flange 34 adapted to rest on the casting bed 16, an upright contact flange 36 projecting upward from the outer edge of the foot flange 34, and an abutment flange 38 projecting inward from the upper edge of the upright contact flange 36. The abutment flange 38 engages the several gusset plates 30 at points spaced above the casting bed 16, and thus assists the lower flange 34 in spacing the contact flange 36 from the other parts of the associated side form and in transmitting lateral thrust from the contact flange 36 to the side forms. When the side forms 12 and 14 are in position adjacent the pallet 18 to receive fluid concrete mix, their upper flanges 32 are interconnected by a plurality of cross ties 40 which are connected to the upper flanges by any suitable means.

A plurality of locking mechanisms 50 of the present invention are employed to establish and maintain a sufficiently tight engagement at each joint 24 to prevent leakage of fluid concrete mix therepast. As shown in FIG. 1, the locking mechanisms 50 are adapted to engage the side forms and slide them into sealing engagement with the pallet 18. As best shown in FIGS. 2-4, each locking mechanism 50 comprises a base member which conveniently is a channel 54 and a locking lever 56 pivotally connected on a pivot pin 58 integral therewith to the upright sides of the channel 54 adjacent one end thereof. The locking lever 56 is welded or otherwise attached to the pivot pin 58 and a contact member 60 is rigid with the lever on the opposite side from the pivot pin 58. The contact member 60 advantageously comprises a short piece of a metal bar welded or otherwise secured to the lever; however, the precise nature of the contact member 60 is immaterial, provided only that it is in the nature of a projection having a rounded face 62. The lever 56 is adapted to be manually moved to an unlocked position (shown in phantom lines in FIG. 5) or moved to a locked position (shown in full lines in FIG. 5).

A bolt 64 (FIGS. 1-4) extending through a longitudinal slot 66 in the web of the channel 54 connects the channel to the casting bed 16 and permits a wide range of lateral adjustment of the locking mechanism adjacent the associated side forms 12 and 14. A wide range of adjustment of the base member 54 is desirable to permit pallets of various widths to be used between the side forms. When the side forms of the forming apparatus

10 have been placed or set up beside the pallet, each locking mechanism 50 is slid along its bolt 64 toward the center of the apparatus. The locking mechanism 50 must be in its unlocked position when thus adjusted to a position adjacent the vertical contact flange 36 of the respective side form. When the mechanism is thus adjusted, the bolt 64 is tightened, fastening the locking mechanism 50 to the concrete casting bed 16 in selected position thereon.

After the several locking mechanisms 50 have been fastened to the casting bed, each locking lever 56 is pivoted about its pivot pin 58 in a counterclockwise direction as viewed in FIGS. 1 and 3, bringing the rounded contact face 62 of contact member 60 into engagement with the plane vertical face of the vertical contact flange 36. The lever 56 is pivoted to and slightly beyond a vertical position to the locked position illustrated in full lines in FIGURE 5. As the contact member 60 moves into the locked position it snaps over center with respect to the pivot pin 58 and the final position of the lever 56 is determined by contact of the lever 56 with an upper corner 68 of the vertical contact flange 36.

The hereinabove described toggle mechanism 50 is adjustably fastened to the casting bed 16. A modified form of adjustable locking toggle mechanism 70 is shown in FIG. 5. The locking mechanism 70 is not fastened to the concrete forming apparatus 10 and is not fastened to the casting bed 16. The locking mechanisms 70 are, therefore, readily removable and can be reused with the side forms 12 and 14 each time the side forms are set up to cast a new beam regardless of which casting bed 16 and which pallet 18 is to be used.

Each locking mechanism 70 (FIG. 5) comprises a channel shaped base member 72 and a locking lever 56 and its attached contact member 60. The lever 56 is pivotally mounted adjacent one end of the channel 72 by a pivot pin 58 in a manner similar to the mounting of the lever 56 upon the channel 54 of the locking mechanism 50.

The channel 72 rests on the concrete casting bed 16 and the end 74 of the channel 72 which is opposite the locking lever 56 abuts an upright flange 76 of an angle member or brace 78 whose horizontal flange 80 is fastened to the concrete casting bed 16 by a bolt 82. The upright flange 76 serves as an abutment engageable by the channel end 74 to prevent the channel 72 from shifting laterally when the locking lever 56 is rocked into locking position thus exerting sufficient pressure against the contact flange 36 to seal the side form against the pallet 18.

Another form of brace 84 (FIGS. 1 and 6) is employed in a third embodiment 85 of the locking mechanism of the invention, which otherwise is the same as the locking mechanism 70. The brace 84 includes an upright flange 86 which abuts the channel end 74 and a horizontal flange 88. Flange 88 has laterally extending slots 90 therein for receiving bolts 92. The bolts 92 may be loosened to permit lateral adjustment of the brace 84 to effect adjustment of the position of the locking mechanism 85 and the associated side form of the casting apparatus on the casting bed. With a brace constructed in this manner the advantages of adjustability are combined

with the advantages achieved by providing a locking mechanism that is not attached to the casting bed.

Precise longitudinal positioning of the side forms 12 or 14 adjacent the respective locking mechanisms 50 or 70 is not necessary because the vertical contact flange 36 presents a continuous plane vertical surface to each of the contact members 60 and therefore the locking mechanisms operate satisfactorily regardless of their position with respect to the side forms. With this construction, the side forms may be set up for casting a new beam without consuming additional time longitudinally aligning them with respect to each other and with respect to their locking mechanisms.

The several disclosed forms of a locking mechanism are adapted to effect a leak-proof joint 24 between the side forms and the edges of pallets of various widths. The locking mechanisms are inexpensive to make and can be locked and unlocked by one man without requiring the use of tools. The locking lever can be snapped over center to locked position in a very short time and the lock effected is positive and not subject to loosening due to vibration of the apparatus.

It will be understood that further modifications and variations of the invention disclosed herein may be made without departing from the scope of the present invention.

The invention having been described, that which is claimed as new and which is desired to be protected by Letters Patent is:

Concrete forming apparatus comprising a bed, a pallet supported on said bed, a side forming member in sealing engagement with said pallet, a contact flange attached to said side forming member, a brace connected to said bed at a spaced distance from said contact flange, a base member adapted to fit between said contact flange and said brace and rest freely upon said bed abutting said brace, a locking lever pivotally mounted on said base member, and a rounded projection rigidly connected with said lever adjacent the pivot thereof so as to project forward of said base upon rotation of said locking lever thereby urging said side forming member into sealing engagement with said pallet and upon further rotation of said locking lever to snap over center so as to lock said side forming member in sealing engagement with said pallet.

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