May 10, 1938. S. S. COLT 2,116,597

CONCRETE FORM TIE

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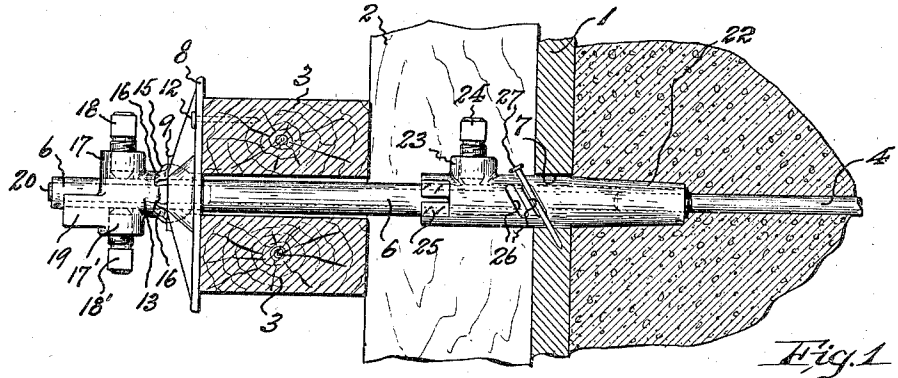


Fig. 1

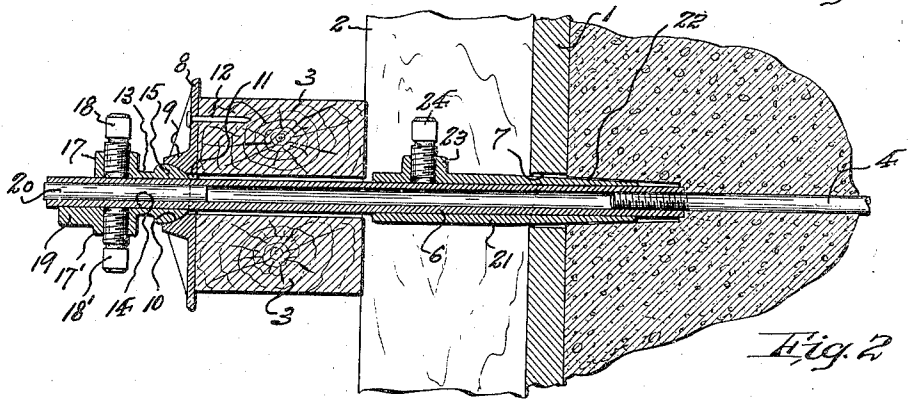


Fig. 2

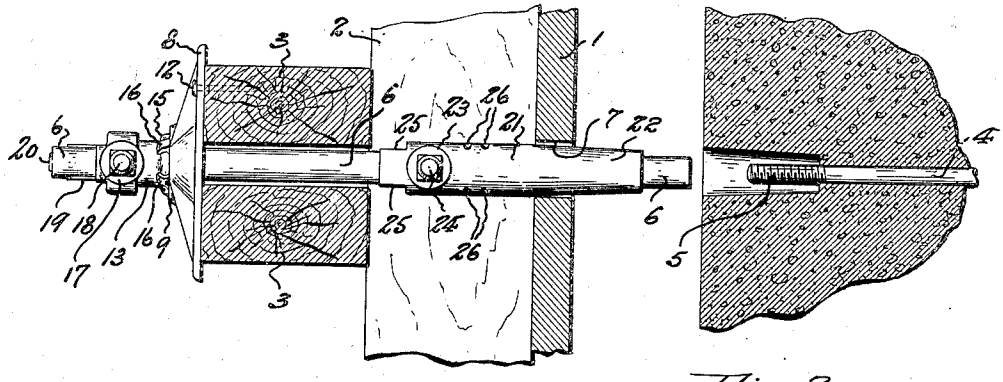


Fig. 3

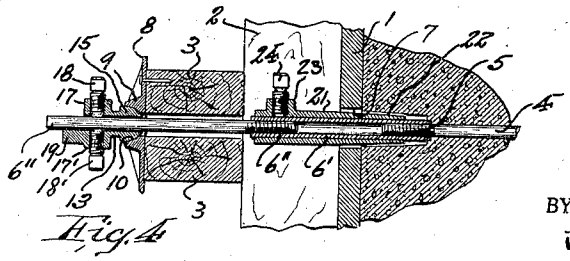


Fig. 4

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## CONCRETE FORM TIE

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1 Claim. (Cl. 25—131)

This invention relates to improvements in concrete pouring forms, and to releasable means for holding form walls in operative erected position subject to release for shifting to new positions of use as progress of concrete work is extended.

This invention has for its principal object to provide, in combination with form wall structures, means for tying opposed walls together in form producing relation; said means being releasable without necessity for detaching the same from the wall structures, whereby sections of the latter may be quickly released and thereupon moved to a new position of use and again reassembled without risk of losing the manipulatable elements provided for tying the form structure together.

Another object of the invention is to provide form locking and tying elements cooperative with internal tie-rod means, including a shield sleeve capable of being independently retracted by direct manipulation or by manipulation of the external locking means as a whole; said shield means being provided with means for securing the same to the external locking means against displacement therefrom and yet subject to the above mentioned manipulations.

Other objects of this invention, not at this time more particularly enumerated, will be understood from the following detailed description of the same.

Illustrative embodiments of this invention are shown in the accompanying drawing, in which:

Fig. 1 is a fragmentary vertical section through a form wall structure showing in side elevation the novel locking and tying means constructed and associated therewith in accordance with this invention; Fig. 2 is a similar view with the locking means in longitudinal section, and showing the shield sleeve retracted by direct manipulation thereof; Fig. 3 is a vertical sectional view showing the form wall structure released and removed from the side of the finished concrete ready to be shifted to a new place of use; and Fig. 4 is a sectional view, similar to that of Fig. 2, but showing some modification of the locking means.

Similar characters of reference are employed in the hereinabove described views to indicate corresponding parts.

In the drawing, the reference character 1 indicates a wall for a concrete pouring form, having battens or uprights 2 extending transversely across the outer face thereof, with walers 3 extending transversely across said battens or uprights, said walers being preferably arranged in pairs as shown. Ordinarily form wall structures thus constituted are arranged in transversely opposed spaced relation, a transverse tie-rod 4 being disposed to extend between such opposed walls. The tie-rod ends are threaded, as at 5, to enter and engage an internally threaded inner end of an external lock-rod 6, which extends outwardly through an opening 7 in the form wall 1, and thence projecting exteriorly between the spaced walers 3.

Cooperative with the exterior end of the lock-rod 6 is a locking means. This locking means comprises an abutment plate 8 adapted to abut the outer faces of the walers 3 so as to bridge across the space intermediate the latter. Abutment plate 8 is provided with a centrally disposed boss or hub 9, having therein an axially disposed substantially semi-spherical outwardly open socket or seat 10, from the bottom of which extends through the plate 8 an opening 11. Said plate 8 is preferably secured against displacement from walers 3 by one or more fastening nails 12 or the like which are driven into the walers. Operatively related to abutment plate 8 is a lock-piece 13 comprising a cylindrical body having a longitudinal axial bore 14 extending therethrough. Integrally formed on the inner end of said lock-piece 13 is a substantially semi-spherical exteriorly enlarged bearing head 15 which is rotatably fitted into said socket or seat 10. Integrally formed about the margins of said boss or hub 9 are spaced retaining lugs 16 which are bent inwardly around the major periphery of the bearing head 15, to thereby retain the lock-piece 13 and abutment plate 8 in mutually interconnected assembled relation, and thus secured against accidental separation with risk of loss or displacement of the lock-piece. At its outer end portion said lock-piece 13 is provided with laterally projected internally threaded necks 17 and 17', respectively extending in opposite directions. Threaded into said necks 17 and 17' are the respective lock or set screws 18 and 18'. Projecting from the exterior end of the lock-piece 13 is a longitudinal squared wrench receiving lug or head 19 off-set from the bore 14 thereof.

The lock-rod 6 is preferably of tubular form, the bore of which, when internally threaded, is of a size to receive the threaded end portion of tie-rod 4. The outer end portion of the tubular lock-rod 6 is preferably reenforced, against collapse under the biting pressure of the opposed lock or set screws 18—18' of the lock-piece, by means of an insert or core piece 20 suitably affixed in place.

Slidably mounted upon the lock-rod 6, inward-

ly of the locking means, is a shield sleeve 21, the same being preferably provided with a tapered or conical inner end portion 22. Adjacent to its outer end, said shield sleeve 21 is provided with a laterally projected internally thread neck 23, into which is threaded a lock or set screw 24. The outer extremity of said shield sleeve 21 is reduced in width or cut back to form a wrench engageable means having oppositely presented parallel flat faces 25. If desired, one or both sides of the shield sleeve 21 may be provided with oblique grooves or channels 26, so that when the shield sleeve is projected through the form wall opening 7 and into the form interior in covering relation to the inwardly projecting end portion of the lock-rod 6, the shield sleeve may be fixed in adjusted position relative to the form wall by driving a nail or like fastening 27 through a selected channel or groove 26 and into the form wall material. When the adjusted fixed position of shield sleeve 21 is thus determined, the same may be further secured directly to the lock-rod 6 by tightening home the lock or set screw 24 into biting or gripping relation to said lock-rod.

In setting up form wall sections and tying the same together, the lock-rod 6 is inserted through the bore 14 of lock-piece 13, and passed inwardly between walers 3 and through opening 7 of form wall 1, and thereupon screwed onto the threaded end 5 of tie-rod 4. When thus assembled, the lock or set-screws 18—18' are turned into biting or gripping relation to the lock rod, thus securing the same against displacement from the described connected relation to tie-rod 4. The shield sleeve 21 is now slid inwardly upon the lock-rod 6, to cover and shield the inner end portion thereof, which penetrate the form interior, against contact with the concrete which is poured into the form. The shield sleeve 21 may be fixed in this operative assembled position by the fastening nail 27 as above mentioned, and by screwing home the lock or set screw 24 to bind the shield sleeve to lock-rod 6. After the concrete has been poured and preferably before the concrete has set to final hardened condition (i. e. while the concrete is still somewhat "green"), the lock or set-screw 24 is loosened and nail 27 extracted, whereupon application of a proper wrench or other suitable tool may be made to the shield sleeve to sufficiently twist or turn the same as to loosen its conical end in the cast concrete whereupon the shield sleeve is slid outwardly on lock-rod 6, thus withdrawing the said conical or tapered end free from contact with the concrete mass (see Fig. 2). The shield sleeve is thereupon locked to the lock-rod 6 in such retracted position by tightening up the lock or set-screw 24. After the concrete is sufficiently seasoned to admit of safe removal of the form wall sections therefrom, the lock-rods 6 may be disconnected from the tie-rod 4. This is accomplished by turning with suitable wrench, the lock-piece 13, which, being secured to lock-rod by lock or set-screws 18—18', transmits its turning motion to said lock-rod, whereby the latter is turned off and disconnected from the tie-rod 4. When such disconnection is effected, the form wall section is released from the concrete mass, and may be wholly removed therefrom as indicated in Fig. 3, whereupon, by suitable hoisting or other conveying apparatus, the form wall section may be transported bodily to a new place of use and there erected for continuation of concrete pouring operations. Owing to the fact that the shield sleeve is capable of being affixed to lock-rod 6, and lock-rod 6 to lock-piece 13, none of these parts will be separated or lost during shifting of the form sections, and will be therefore always conveniently assembled for manipulation when the form wall sections are again erected. Another advantage of the arrangement above described lies in the fact that the lock-rod can be manipulated for connection or disconnection from a tie-rod either by turning the lock-piece 13, or by releasing the latter and then turning the shield sleeve 21 while the same is secured to the lock-rod 6 by lock or set screw 24.

In Fig. 4 of the drawing I have shown a modified arrangement of the lock-rod means, which will permit of various extend lengths thereof to be easily produced. This is accomplished by employing a short tubular lock-rod 6', into the outer end portion of which is threaded a lock-rod extension 6'' of any desired length. In other respects the elements of the form locking and tying devices is the same as already above described.

Having described my invention, I claim:

A means for supporting form wall structures relative to tie-rods extending wholly within the form interior, comprising a tubular lock-rod having an internally threaded inner end portion to penetrate the form wall structure from its exterior to engaged relation with an interior tie-rod, a reenforcing core affixed within the outer end portion of said lock-rod, a shield sleeve slidable on said lock-rod so as to be movable through the form wall structure into covering relation to the form penetrating end portion of said lock-rod, means to lock said shield sleeve to said lock-rod, and means on the exterior of the form wall structure to which said lock-rod is secured against longitudinal movement, said latter means comprising an affixed abutment plate, a lock-piece axially rotatable relative to said plate by means of a ball and socket connection therebetween and said lock-piece having an axial bore to receive the exterior end portion of said lock-rod, and opposed set-screws carried by said lock-piece to grip the reenforced outer end portion of said lock-rod.

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