Nov. 19, 1940. T. C. SCHENK 2,222,339

FORM TIE

Filed May 21, 1938

Fig. 1.

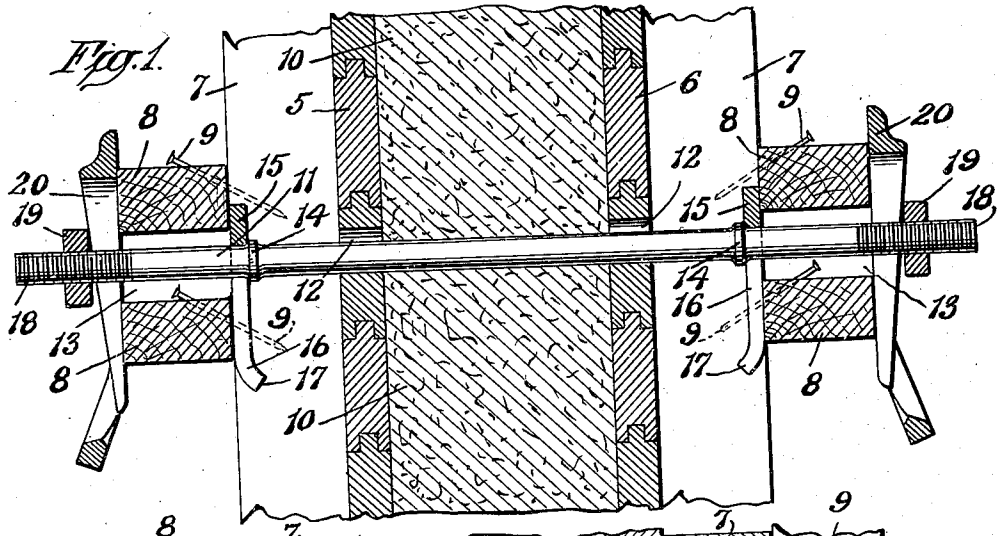


Fig. 2.

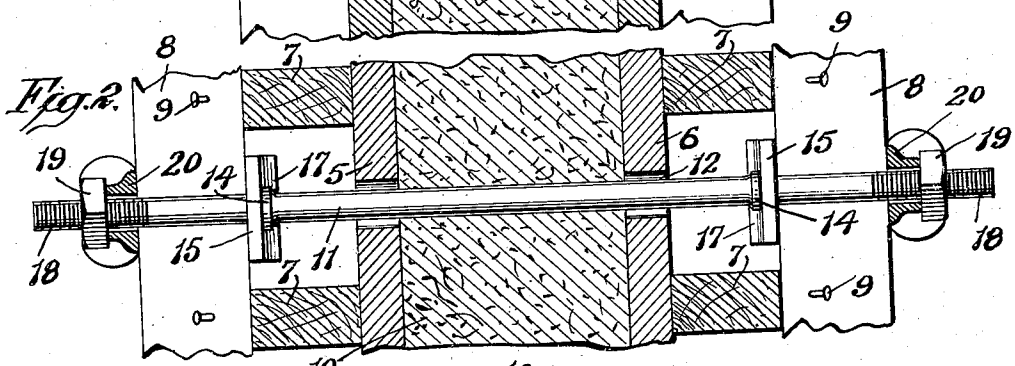


Fig. 3.

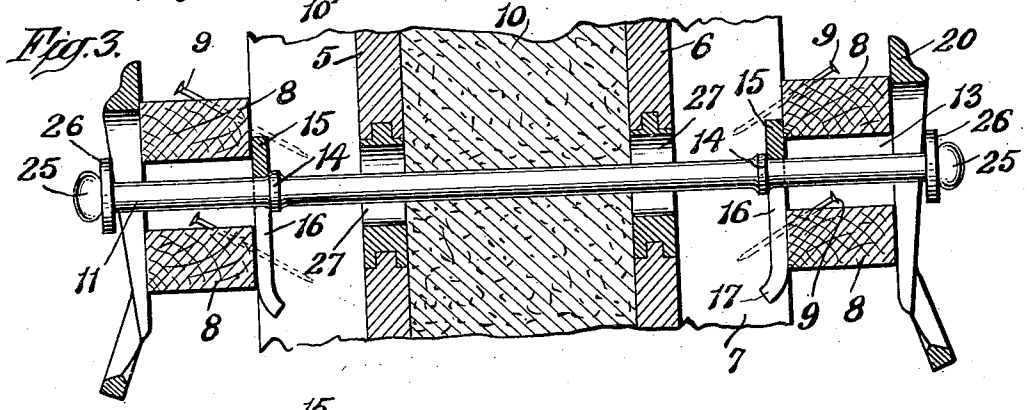
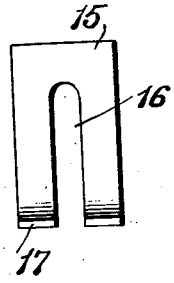


Fig. 4.



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FORM TIE

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Application May 21, 1938, Serial No. 209,246

1 Claim. (Cl. 25—131)

This invention relates to form ties for the maintenance of concrete forms in proper position during the pouring of concrete and subsequent setting of the same, and has for its object the provision of an effective tie of this character wherein the formation of relatively large openings through the concrete and recesses at the faces of the concrete by the form tie will be avoided. In connection with so-called "architectural" concrete work, it is highly desirable to produce the concrete structure unmarred by relatively large openings, recesses or depressions such as are ordinarily created by the use of many types of form ties and which, after the forms are removed, must be patched. The patching or filling of such openings or recesses in the concrete structure is, in work of this kind, decidedly objectionable primarily because of the perceptibility of the patching, and accordingly, efforts are being constantly made to initially produce concrete work of this character as flawless as possible by the pouring operation without subsequent patching.

The primary object of the invention therefor is to provide a form tie particularly adapted for use in production of the type of concrete work described; wherein the portion of the tie extending through the concrete structure shall be of small diameter rod of uniform thickness without enlargements or other elements tending to form relatively large openings through the concrete or recesses at the faces thereof.

Another object of the invention is to provide a form tie composed of a single section of rod and provided with integral, definitely spaced, stop members or spacers which, in the use of the tie in the set-up forms, are located wholly outside of the concrete structure and act to accurately locate the forms and provide a resultant wall structure of uniform thickness.

Another object of the invention is to provide a tie capable of performing the functions above set forth and being also capable of removal from the poured concrete structure without first requiring the removal or dismantling of the forms.

In the accompanying drawing, wherein an embodiment of the invention is shown, Fig. 1 is a vertical sectional view through a concrete structure and form therefor, showing the improved tie rod in position; Fig. 2 is a horizontal sectional view through the same; Fig. 3 is a vertical sectional view through a modified structure; and Fig. 4 is a front elevation of one of the spreader plates.

The improved form tie is adapted for use with the conventional type of concrete forms, which may consist of the spaced longitudinally extending form boards 5 and 6, supported and reinforced by the vertical beams 7, to which the horizontal beams 8 are secured by the nails 9. The concrete mass 10 is poured between the boards 5 and 6, the spacing thereof determining the thickness of the resultant concrete wall structure.

The body of the form tie consists of the rod 11 of relatively small cross section, said rod extending through the holes 12 in the form boards, and through the openings 13 between the horizontal beams 8. At predetermined, spaced-apart points in its length, the rod is formed with integral collars 14 constituting stops, said collars forming abutments for spreader plates 15, one of which is shown in detail, in Fig. 4. Each of these plates comprises a relatively flat section of metal, slotted from its lower edge as indicated at 16, said slot extending above the transverse center line of the plate so that the plate straddles rod 11 and hangs therefrom without exhibiting a tendency to drop off. The lower end of the plate is curved laterally to facilitate the placement and removal of the plate from its position on the rod to one side of the stops 14. One or both of the ends of the rod are threaded as shown at 18 to receive the nut 19, and when the form tie is in position, as hereinafter explained, slotted wedges 20 are forced between the nuts 19 and the beams 8 to hold the form in properly spaced position. If desired, only one end of rod 11 need be threaded, the other end in such case being provided with an integral head 25 such as shown in Fig. 3.

In placing the tie in position, rod 11 is thrust through openings 12 and 13, and the spreader plates 15 placed over the rod between the collars 14 and the inner faces of the horizontal beams 8. Next the wedges 20 are driven between the nuts 19 and the outer faces of the beams 8, such action spreading and holding the beams 8 apart to the extent permitted by the collars 14, the form boards attached to said beams being resultantly drawn apart and maintained in the proper spaced relationship as determined by the fixed integral collars 14 on the rod.

The concrete is now poured between the form boards and permitted to harden. To remove the tie, rod 11 is cut at any point between the outer side of the form boards 5 or 6 and adjacent beams 8. Spreader plate 15 at the opposite side of the form is now removed and the rod is then drawn out of the concrete while the forms are still in position. Since the forms remain in posi-

tion during the removal of the rod, breakage of the concrete around the rod hole, or so-called "spalling" does not take place and the removal of the rod leaves only a very small diameter hole extending through the concrete.

By the use of the fixed integral collars 14 on the rod at positions outside of the concrete structure and between the form boards and their reinforcing beams, enlargements of any kind within the concrete structure or near the faces thereof is effectively prevented. The result is that the concrete structure is provided with a clean, small diameter, hole through it which is not enlarge at the wall faces. Since the tie can be removed while the form boards remain in place, damaging of the wall during the removal of the tie is unlikely. Moreover, since the stops or collars 14 are fixed on the rod in definite, unchangeable spaced-apart relationship, accurate spacing of the form boards is automatic since the spacing thereof is governed by the relative positions of these stops. Consequently the use of these ties insures speedy and accurate form board erection, quick removal of the ties after the concrete has partly hardened without removal of the forms, and no defacement of the wall faces by recesses usually formed by stops or enlargements on the ties within the concrete structure.

In the embodiment of the invention shown in Fig. 3, the ends of the rod 11 are formed with enlarged heads 25 and washers 26, as a substitute for the threaded ends 18 and nuts 19 thereon, shown in Fig. 1. When heads 25 are employed instead of the removable nuts, the apertures 27 in the form boards must be large enough to permit the passage of one of these heads to enable the rod 11 to be inserted. If desired, the rod 11 of Fig. 1 may be provided at one of its ends with a head 25 and at its other end with the threads 18 and nut 19. Other modifications may obviously be made without departing from the spirit of the invention.

What I claim is:

A form tie particularly adapted for architectural concrete work comprising, a relatively small diameter, one piece rod having means for clamping portions of a form structure at positions outside of the form boards between which the concrete is poured, said means including definitely fixed and spaced, integrally formed collars on the rod located a fixed and predetermined distance apart and disposed outside of the form boards, whereby a form structure of conventional construction erected between the collars will result automatically in a uniform predetermined spacing of the form boards without the disposition of stops operative against the form boards, said collars comprising stop means behind which spreader plates are disposed, said spreader plates comprising split washers of constant thickness to thereby avoid spreading apart of portions of the form structure and the misalignment of form board portions thereof, wedging means for engaging with the rod adjacent its ends and beyond the form structure, the portion of the rod disposed between, connecting and passing through the form boards being of uniformly small diameter and without obstructions from one of the collars to the other, whereby the rod may be severed between the form boards and collars and drawn out of the concrete structure leaving no openings at the surfaces of or through the concrete structure of greater diameter than the body of the rod.

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