March 18, 1941. F. D. PARMENTER 2,235,442

SUPPORT FOR CONCRETE FORMS

Filed March 11, 1938

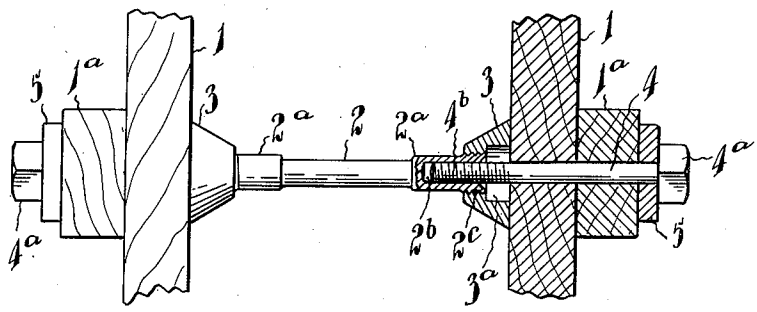


Fig. 1.

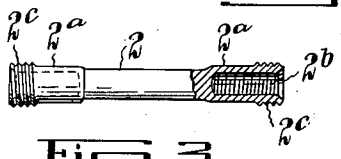


Fig. 3.

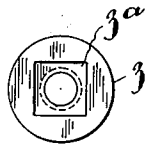


Fig. 2.

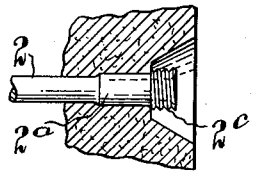


Fig. 4.

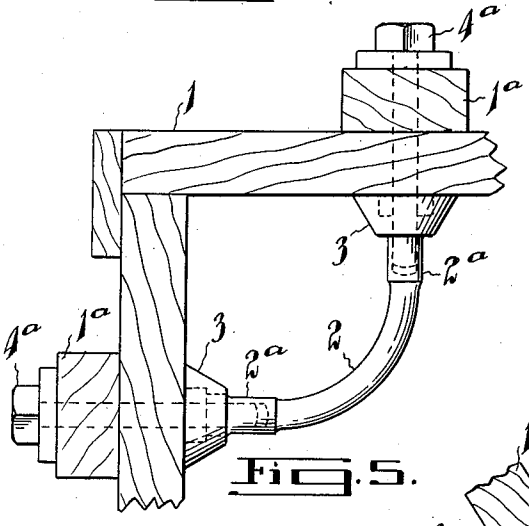


Fig. 5.

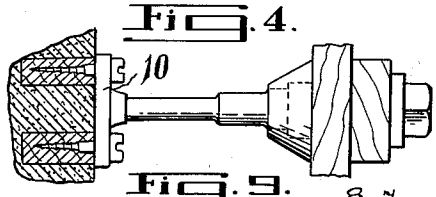


Fig. 9.

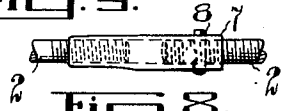


Fig. 8.

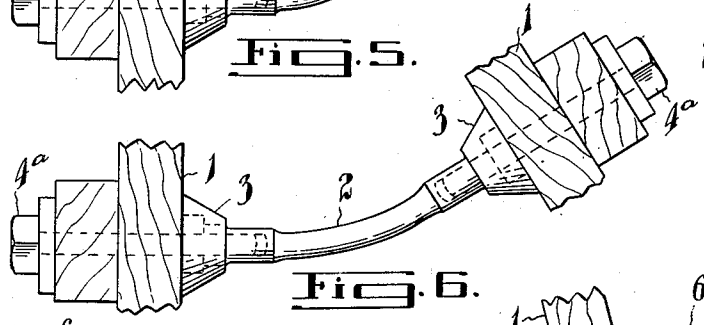


Fig. 6.

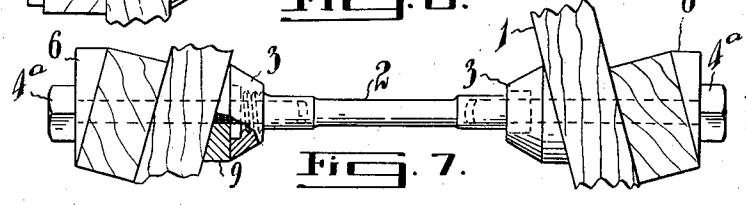


Fig. 7.

Inventor
F. D. Parmenter
By J. Edw. Maybee
ATTY

Patented Mar. 18, 1941 2,235,442

UNITED STATES PATENT OFFICE

2,235,442

SUPPORT FOR CONCRETE FORMS

Frank D. Parmenter, Toronto, Ontario, Canada

Application March 11, 1938, Serial No. 195,231

1 Claim. (Cl. 25—131)

This invention relates to supports for concrete forms, more particularly to a combined tie rod and spacer.

The common practice in building concrete walls is to construct wooden forms and pass wires commonly called tie rods between the sides of the forms which are bent or otherwise secured outside of the walls of the forms. To space the walls of the forms wooden blocks are frequently inserted between the walls. This method, while comparatively cheap and simple is not satisfactory and many efforts have been made to devise means for accurately tying and spacing the walls of concrete forms. Some of these have been objectionable as being too complicated, others are too expensive, and others have not the necessary strength and rigidity.

The object of this invention is to devise a support for concrete forms of the kind referred to above, which is free of the objectionable features of previously known devices and which is simple, effective and moderate in cost.

I attain my objects by means of a tie rod which is internally threaded at each end to receive a bolt for securing it to the walls of the form a collar is fitted over each end and co-operates with the bolt and tie rod to form a spacer. The collar forms a recess in the concrete around the end of the tie rod and the end of the bolt, and is removed when the concrete has set.

My invention is hereinafter more particularly described and is illustrated in the attached drawing in which

Fig. 1 is a plan view partly in section of my improved support secured to the walls of a form;

Fig. 2 a plan view of the base of the collar;

Fig. 3 a side elevation partly in section of the tie rod made in accordance with my invention;

Fig. 4 a section of the concrete wall, broken away, and showing the tie rod imbedded therein;

Fig. 5 a plan view of the support adapted for the corner of a concrete form;

Fig. 6 a plan view of the support adapted to a form having non-parallel sides or walls;

Fig. 7 a plan view of the support showing the use of bevel-faced washers at one end thereof and a bevel-faced collar at the other end thereof to adapt the support to a form having non-parallel sides;

Fig. 8 a modification of the support showing the tie rod in two pieces connected by a coupling, one end of the coupling being displaced to lock it in position and the other end being provided with a pin for the same purpose; and

Fig. 9 a horizontal section through a concrete wall and a form wall showing in plan view a modification of the support.

In the drawing like numerals of reference indicate corresponding parts in the different figures.

The sides or walls of the form 1 are normally parallel, but at their ends may be at right angles as illustrated in Fig. 5 or may be non-parallel as illustrated in Figs. 6 and 7. The support extends between two walls of the form, as is common, and includes a tie rod 2 having enlarged ends 2^a. The ends are cast or bored to form holes 2^b which are concentric with the axis of the tie rods and are internally threaded. The outer ends of each enlarged portion 2^a of the tie rod are threaded at 2^c, the threads being preferably of greater diameter than the rest of the enlarged portion of the tie rod and the diameter increasing slightly from the ends of the tie rod inwardly, so that the said outer threading 2^c is slightly tapered.

The tie rods 2 may be made of different lengths so that they may be adapted to the construction of walls of different thickness. They may be made of soft malleable metal so that they may be bent as illustrated in Fig. 5 to adapt them for use in bracing corners of forms, or may be slightly bent as illustrated in Fig. 6 to adapt them for use with forms, the walls of which run at an angle of less than 90°.

Nuts or threaded collars 3 are adapted to be screwed over the threads 2^c, as illustrated in Fig. 1. The tapering of the threads 2^c limits the distance that the collar may be screwed on the threads. Preferably the ends of the tie rod extend through the collar to a position substantialy flush with the bottom of the squared aperture or countersunk portion 3^a which is formed in the base of the collar 3. The portion of the collar surrounding the squared aperture thus extends beyond the end of the tie rod forming an extension thereof. This squared aperture is adapted to receive an instrument for screwing the collar on and off the end of the tie rod. The collar 3 is preferably of shallow truncated conical form, so that it may be readily removed when the concrete has set. The diameter of the aperture 3^a is greater than the diameter of the internally threaded portion of the rod 2.

A bolt 4 having a head 4^a and a threaded end 4^b is adapted to extend through the aperture 3^a in the collar 3 and to be screwed into the internally threaded part 2^b of the tie rod 2. As is customary, a suitable hole is bored through the walls 1 of the form as well as through the uprights or braces 1^a. A washer 5 is mounted on the bolt 4

between the head of the bolt and the brace 1a. When the sides of the form are not parallel a beveled washer 6 may be interposed between the head 4a of the bolt and the upright 1a as illustrated in Fig. 7. A further beveled washer 9 may be interposed between the side of the form 1 and the collar 3 as illustrated on the left-hand side of Fig. 7, or the base of the collar 3 may be beveled as illustrated on the right-hand side of Fig. 7.

The tie rod may be formed in two parts as shown in Fig. 8 connected by a coupling 7 whereby the length of the tie rod may be adjusted for different widths of wall. As shown in Fig. 8 the ends of the two parts of the tie rod 2 are externally threaded and the coupling 7 is internally threaded to receive the ends of the tie rod. When the ends of the tie rod are screwed into the collar to the desired distance, they may be locked in position by striking the outside of the coupling 7 with sharp hammer blows, which displaces the threads as shown on the left-hand side of Fig. 8. For this purpose the coupling 7 may be made of soft metal. In the alternative, the coupling 7 may be bored to receive a pin 8 as illustrated on the right-hand side of Fig. 8, the pin 8 passing through the threaded end of the tie rod 1, holding it in the desired position.

The form support described is used in the following manner. The threaded collars 3 are screwed on to the ends of the tie rod 2, which is then placed between the walls of the form. The washer 5 is applied to the bolt 4 and the end of the bolt is inserted in the hole which has previously been bored through the walls 1 of the form and the braces 1a. The bolt 4 is pushed through the aperture 3a in the collar 3, but does not engage the collar. The end of the tie rod 2 is beveled as illustrated in section in Fig. 1 so as to guide the end of the bolt into the threaded hole in the end of the tie rod 2. The bolt 4 is screwed into the tie rod 2 until the wall of the form is clamped firmly between the head 4a of the bolt and the collar 3 as illustrated in Fig. 1. The process above described having been completed with one end of the tie rod, the same process is carried out with the other end, with the result that the tie rod not only acts as a tie for preventing the spreading of the walls of the form, but also as a spacer to retain the walls at the desired distance apart. The concrete is then poured and allowed to set. The bolts 4 are then unscrewed and removed and the walls 1 of the form are taken down. The tie rods with the collars attached are left imbedded in the concrete. A suitable tool is then inserted in the squared recess or countersunk portion of the collars 3 and the collars are unscrewed from the ends of the tie rods. This leaves a plurality of recesses in the outer and inner sides of the wall, with the tie rod imbedded therein, as illustrated in Figure 4. The final step is to fill the recesses with concrete, thus making a smooth outer wall, with the ends of the tie rods protected from moisture.

The bolts 4, the washers 5 and the threaded collars 3 may be used repeatedly, the tie rods alone remaining in the wall, where they serve as reinforcements.

In the modification disclosed in Fig. 9, the support is used to secure a form to a cement wall for the purpose of constructing a retaining or supporting wall. In this modification one end of the support is constructed as already described but the other end is anchored to the cement wall in some suitable manner, for instance by means of a plate 10 which is screwed to the wall.

Various advantages of the construction above described may be enumerated as follows:

1. By suitable designing of the proportions of the tie rods and the bolts, the support may be made of uniform strength throughout its length. This is taken care of by the enlarged ends of the tie rod and by constructing the rest of the tie rod of substantially the same diameter as the diameter of the bolt.

2. Variations in the thickness of the walls of the form may be allowed for by making the internally threaded ends of the tie rods of sufficient length to allow for such variation. Furthermore, the internally threaded portion may be made of ample depth or length without weakening the construction and without affecting the size of the collar. In previously known constructions where a collar acts as a coupling between the tie rod and the bolt, a comparatively deep collar is required to get sufficient strength. This is objectionable, since it makes it more difficult to unscrew the collar after the cement has been poured and has set.

3. Owing to the fact that the bolt is screwed into the tie rod and the collar protects the end of the bolt, when the concrete has set there are no exposed threads to become blocked and prevent or make difficult the removal of the bolt and the collar.

4. The comparatively broad base of the collars enable the tie rod to be readily held in position between the walls of the form for insertion of the bolt, owing to the comparatively broad area of engagement between the base of the collar and the wall of the form.

5. There are no relatively movable parts, which by their movement would affect the length of the tie rod when it is being clamped in position.

6. The bolt may be of standard diameter, and no part of the apparatus except the bolt extends through the wall of the form, thus avoiding boring a large hole or opening in the walls which is necessary in some previously known devices.

7. The recess formed by the conical collar makes it possible to cover the ends of the tie rods leaving a smooth surface to the walls.

Other advantages are apparent from the description of the construction and the operation of the device.

What I claim as my invention is:

A support for concrete forms provided with side walls, comprising a tie rod internally and externally threaded at at least one end; a frusto-conical extension collar provided with an internally threaded hub adapted to screw on the externally threaded part of the tie rod, the internal thread on the collar and the external thread on the tie rod forming interengaging means for limiting the movement of the collar inwardly of the end of the tie rod and the collar being adapted to engage the adjacent wall of the form to space the end of said tie rod from the wall; and a bolt adapted to extend through the said side wall and collar and to screw into the internally threaded portion of the tie rod.

FRANK D. PARMENTER.