March 12, 1940. T. C. SCHENK 2,193,078

METHOD OF MAKING FORM TIES

Filed Aug. 25, 1938

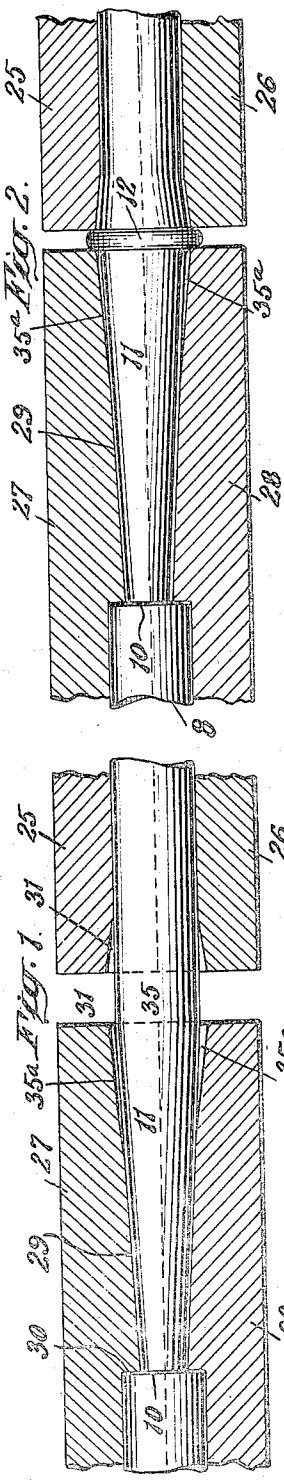


Fig. 1.

Fig. 2.

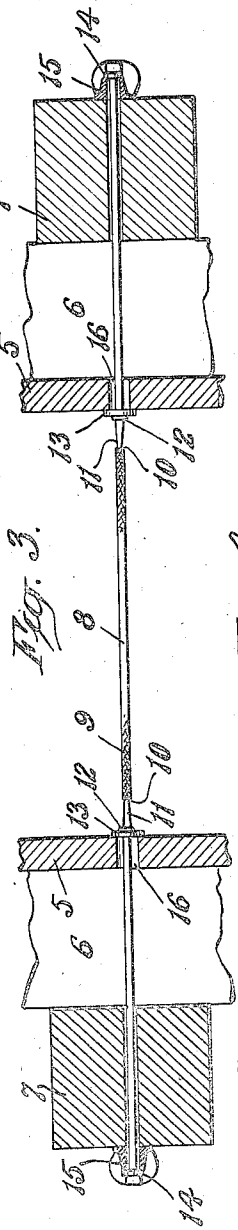


Fig. 3.

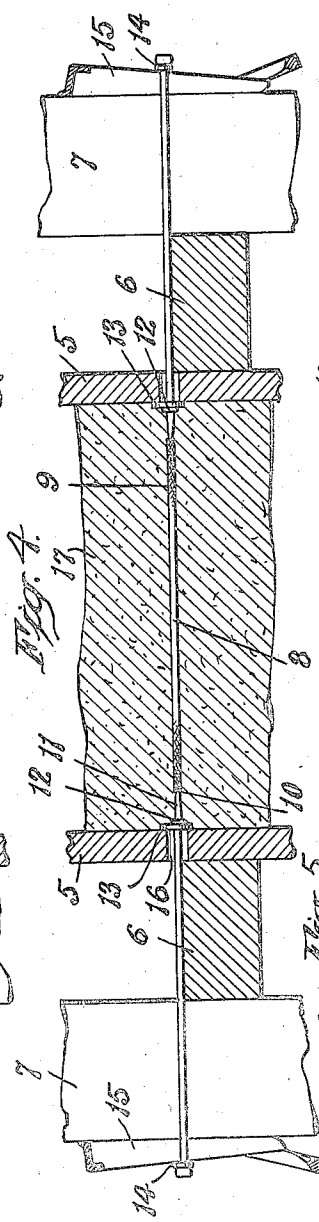


Fig. 4.

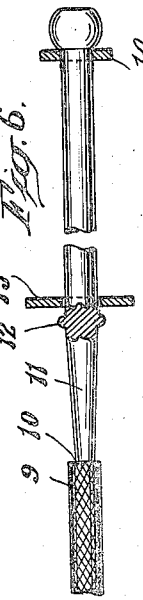


Fig. 6.

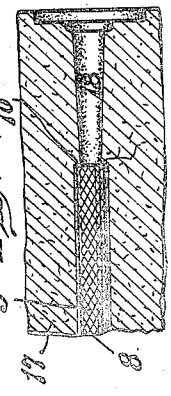


Fig. 5.

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METHOD OF MAKING FORM TIES

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2 Claims. (Cl. 29—155)

This invention relates to an improvement in form ties for concrete construction, and has for its object to provide a simple form tie which will be cheap to manufacture, easy to use and completely satisfactory in service.

Another object of the invention is to provide a new method by which a form tie rod of the novel construction hereinafter described, may be speedily and accurately made from a single section of round metal rod.

The type of form tie to which this invention relates is in the form of a one-piece metal rod provided with weakened points which are located within the concrete structure after the wall has been poured, the rod being then twisted to cause it to break off at these weakened points, leaving the portions of the rod located between the weakened points remaining within the wall and covered by the concrete after the wall has been pointed.

The primary object of this invention is to provide means by which the breaking off of the form tie at the weakened points is facilitated, and by which the removal of the tie rod ends after the same have been broken off is facilitated. In some of the types of form ties in use at the present time, it has been found very difficult to twist the tie, break it off, and then pull out the broken-off end portions of the tie from the concrete wall. This difficulty has been caused by the adherence of the concrete to the broken-off end parts of the tie, and the present invention seeks to correct this difficulty.

More particularly, the invention consists in providing integral conical portions on the tie adjacent to the break-off points, which permit the easy withdrawal of the broken-off ends of the tie after the tie has been broken.

I am aware that prior to the present invention, efforts have been made to produce a form tie in which the rod forming the body of the tie has been provided with weakened or break-off points which were located within the wall structure after the pouring of the concrete so that the protruding parts of the rod could be broken off within the wall. An example of such a structure is shown in my prior Patent No. 2,020,912. I am also aware that prior to the present invention efforts have been made to simplify and expedite the removal of form tie rods as a whole, from the hardened concrete structure by the employment of cones or conical elements secured on the rods by being threaded thereon. Prior to the present invention however, no one has produced a one-piece tie rod having break-off points, stop-collars and conical formations between the collars and break-off points, all of these elements being integral and being produced by a novel method forming part of the present invention.

In the accompanying drawing, Fig. 1 is a sectional view through the forming dies, showing the rod gripped thereby and the dies about to be moved toward one another; Fig. 2 shows the dies in final position with the formed rod between them; Fig. 3 is a plan view, with parts in section, of a wall showing one of the form ties in position in readiness for the pouring of the concrete; Fig. 4 is a sectional view at right angles to that of Fig. 3 after the wall has been poured; Fig. 5 is a sectional view of a part of the wall showing a portion of the broken section of the form tie remaining in the wall with the broken-off end of the tie removed; and Fig. 6 is a view, with a part in section, of a portion of the form tie.

The improved form tie is adapted for use in any suitable concrete form which may consist of longitudinally extending form-boards 5, reinforced by horizontal beams 6, and uprights 7, all of which may be used in the conventional manner. The form tie 8 made by the improved method hereafter described, consists of a section of metal rod, preferably, although not necessarily, having its central part roughened or knurled at 9 to resist turning or rotative movement of this central part of the tie within the concrete wall structure during the breaking off of the end portions of the tie. The tie is provided with spaced weakened break-off points or shoulders 10, which are located within the concrete structure after the wall has been poured. Extending from the weakened break-off points or shoulders 10 are conical portions 11 having their ends of least diameter located at the weakened points or shoulders 10. At the outer ends of the conical portions 11 the rod is provided with integrally formed spaced collars 12, each of which forms a fixed stop against which a washer 13 abuts and is held by the pressure of the form boards 5.

At each of its ends, the form tie is provided with an enlarged head or washer 14, against which a wedge 15 is employed to draw together the parts of the form. Pressure of the two wedges 15 at the opposite ends of the tie holds the form parts in position and presses the form boards 5 against the washers 13, holding the washers firmly against the collars 12. The form boards are perforated at 16 to permit the passage of the form ties as clearly shown in Fig. 2.

It will be noted that the entire rod, which includes the break-off points or shoulders 10, conical portions 11 and stop collars 12, is of one piece. The importance of such integral construction is appreciated by those skilled in this art, and thus fully familiar with the careless and rough handling of these devices both during shipment and at the site of building operations, where threaded or like connections between parts often permit loss by separation of the parts, where exposure permits the threads to become rust-coated, or where the threads become clogged by concrete and in other cases often permit misalignment of the form boards by the parts being carelessly or improperly adjusted during form board placement.

A novel method by which these rods of the integral construction described, may be produced, is illustrated in Figs. 1 and 2 of the drawing. There two sets of dies are shown, one set comprising the two parts shown at 25 and 26, and the other set consisting of the two parts 27 and 28. The die elements 27 and 28 are formed with the tapered or conical passage 29 and the shoulder 30. These two die elements are placed over a rod of uniform diameter and brought together under pressure so that they compress the rod and form it with the shoulder 10 and conical portion 11, as indicated in Fig. 1. The dies 25 and 26 have a slightly tapered passage 31 and do not materially distort the rod except to permit it to expand laterally in passage 31 and grip it with considerable pressure. When both sets of dies are brought into position to shape and grip the rod in the manner shown in Fig. 1, they are then forced toward one another. The portion 35 of the body of the rod, located between the two sets of dies is forced out laterally between the dies, resulting in the formation of the stop-collar 12. Laterally shifting or flowing, the metal of the body of the rod moves into the tapered part 31 of the dies 25 and 26 as well as in the somewhat similar tapered part 35a of the dies 27 and 28. Thus, by compression of the rod, and a lateral expansion of a portion of it, a line of fracture is produced at 10, a conical portion is formed at 11, and a stop collar is produced at 12, all of these elements being an integral part of the rod. The rod is also very slightly increased in diameter at each side of the collar 12 by expansion of the metal during the forming operation, this tending to strengthen the rod at the point of form board pressure.

After the concrete wall structure indicated at 17 in Figs. 3 and 4 has been poured, the projecting portions or ends of the form tie are broken off by the use of a suitable tool which enables them to be held and twisted. The breakage of the rod occurs at the weakened points or shoulders 10 located within the concrete structure. After the rod has been broken, the end portions on which the conical parts 11 are formed, and the attached collar 12 and washer 13, are drawn out of the concrete structure. The conical ends 11 permit the relatively easy withdrawal of these parts from the concrete. Openings 18 are then filled with concrete.

What I claim is:

1. The method of making form ties comprising gripping a solid rod of uniform diameter at spaced points by gripping elements, some of which penetrate the body of the rod and form it into a conical portion, a shoulder portion of reduced diameter at the smaller end of the conical portion and at the shoulder, and then moving the gripping elements toward one another while said gripping elements are engaging the rod to cause them to distort laterally that portion of the rod which is located between them to form a collar on the rod at the larger end of the conical portion thereof.

2. The method of making form ties comprising gripping a solid rod of uniform diameter at spaced points by gripping elements, one of which penetrates the body of the rod and shapes it into conical formation and a shoulder at the smaller end of the conical formation adjacent to the point of penetration, moving the gripping elements toward one another to cause them to distort that portion of the rod located between them laterally to form a radially projecting collar at the larger end of the conical formation.

TAMIS C. SCHENK.