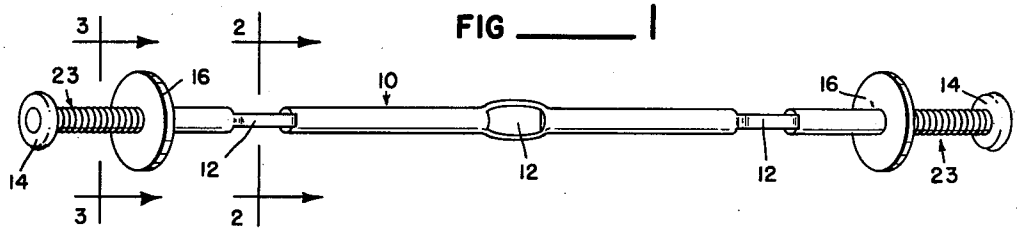
Jan. 29, 1963 F. E. BUYKEN 3,075,272

CONCRETE FORM TIE AND METHOD OF PRODUCING THE SAME

Filed Feb. 18, 1958

FIG 1



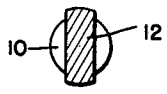


FIG 2

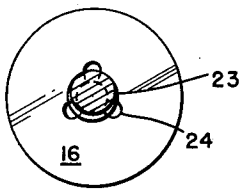
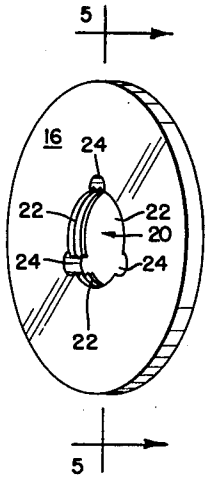
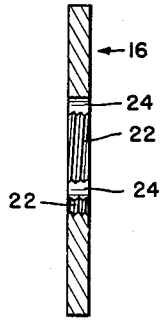


FIG 3

FIG 4

FIG 5





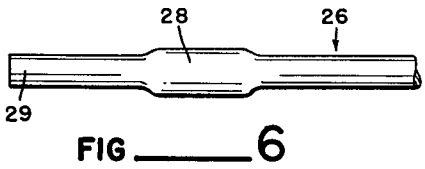


FIG 6

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CONCRETE FORM TIE AND METHOD OF PRODUCING THE SAME

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3 Claims. (Cl. 25—131)

This invention relates to improvements in the manufacture of a concrete form tie and, more particularly, to the provision of a flange on such ties to act as a stop when the tie is used to space apart or spread a pair of opposed form walls.

Briefly, a concrete form tie is usually a metal rod having buttons formed on the ends to receive wedges or other attachments at the outside of the form walls. Intermediately such a rod is provided with break points that weaken the rod to such extent that, when embedded in concrete and twisted, it will break within the wall and thus permit the removal of the protruding ends. It will be understood that the wall panels of the form are usually boards or plywood sheets provided with pre-located holes to receive the form ties. Between the button end and the adjacent break point such a rod must have stop means, preferably of flange shape, to abut the inner form face to permit spacing or spreading as between two forms.

It is among the salient objects of this invention: to provide an improved method of forming washers to be used to flange form ties and a method of attaching and locating such washers on the tie rods as required and desired; to provide a flanged form tie which is so arranged that the removal of the ends and flanges from the face of a concrete body and the breaking of the rod within the body is insured, is simple and certain, and which may be accomplished with a minimum of damage or disfigurement to the concrete face; to provide a form tie having stop washers secured thereto in such a manner that, even though the rod may be somewhat weakened during washer attachment, breakage of the rod at the desired break point is positive; and to provide a form tie which lends itself to modern high-speed manufacturing requirements to the end that volume production is economical and efficient using relatively unskilled labor and simple tool means.

Essentially the invention comprises forming a stop washer having an axial opening in which is formed thread-cutting elements such that, when a smooth rod end is inserted and relative rotational and longitudinal motion is obtained between the washer and the rod, the washer arrives at a desired location where it is positively held against normal longitudinal forces to provide its stop function in use.

The foregoing objects and others which will become more apparent are accomplished by the method and manufacture shown in preferred form in the accompanying drawings, in which

FIGURE 1 is a perspective view of a tie rod embodying the invention;

FIGURE 2 is a cross-section view on line 2—2 of FIGURE 1;

FIGURE 3 is a cross-section view on line 3—3 of FIGURE 1 and showing the face of a flange washer in place;

FIGURE 4 is an enlarged perspective view of a flange washer;

FIGURE 5 is an enlarged vertical section view of a washer in the plane indicated 5—5 of FIGURE 4; and

FIGURE 6 shows a tie rod blank which has been pressed endwise to swell or bulge a portion to receive a flange washer.

In FIGURE 1 is shown a tie rod **10** having break points **12** in its intermediate position and end buttons **14, 14.** The tie rod is usually cut from steel bar stock

to desired lengths. The steel is selected as to hardness to provide a desired tensile strength that, when twisted about its axis, it will readily fracture at the break points **12.** Typically such a rod is ¼" in diameter and is of low carbon stock. The break points are provided in this instance as flats resulting from striking the rod to compress and swage it as shown. This weakens the rod at local points, not so much tensilely as rotationally. A break point may be medial as shown but desirably they are at least two in number and are each spaced inward from the ends on each side of the center.

After being provided with break points **12**, the rod **10** next receives washers **16** suitably located inward of the end extremities which ultimately are headed to form end buttons **14, 14.** Heading is accomplished by securely gripping the rod and upsetting the material to swell it and form an integral button. Normally buttons **14** are of a size to easily pass through a preformed hole in a form panel, which hole is smaller than the washer flanges **16** which abuts the panel around the hole and closes it against leakage of watery concrete. Typically the washers are spaced 8" apart, outer face-to-outer face.

Referring to FIGURES 4 and 5, washer **16** is a flat metal disc, preferably of steel, having an axial opening **20** which is provided with arcuate thread-cutting elements **22** separated by interposed relief notches **24.** At least the thread-cutting elements have a hardness considerably greater than the rod hardness. Practical manufacture is obtained by forming the disc **16** of a low carbon steel to the shape described and then heating and quenching the same to provide it with an overall temper of the desired thread-cutting hardness.

Assembly of the washers **16** is accomplished before the rod **10** is headed at its extremities and while its ends are smooth as it comes from stock. Relative rotational and longitudinal movement is simultaneously obtained between the rod and the washers whereupon the washers thread their way onto the rod until each arrives at its desired location inward of an end. Preferably this operation is performed by placing the rod in a gripping jig and the washers in rotary gripping devices located at the rod ends. When the washers are spun and presented to the rod ends they immediately thread themselves by means of cutter elements **22** onto the rod moving longitudinally inward. Any metal particles cut from the rod escape through the relief notches **24.** Normally the cutter elements **22** cut a thread **23** about .003" in depth. This, of course, will reduce the strength of the rod outward of the washers **16** to a slight degree. There is no harm, however, because the rod is weakened at the flattened break points **12** to a greater extent than any weakening resulting from washer placement and upon twisting will break inward of the washer as desired.

In FIGURE 6 a variation is shown in which the rod is provided with a swelled portion **28** produced by intermediately upsetting or endwise pressing the rod in conventional manner. In this instance rod end **29** will be of a size to easily receive the washer opening **20** with the thread-cutting elements **22** sliding thereover until they reach the bulge **28** into which they cut as described.

In either instance, after the stop washers **16** are located securely, the rod ends are headed to form buttons **14.**

One of the difficulties that have occurred with prior form ties results from the fact that earlier manufacturing methods have required that the stop washers be non-rotationally attached to the rod. When the motor is cast about the rod in the form, the washer is firmly embedded in the hardened concrete at its outer face. As a result, any twisting of the headed rod end by use of a pipe wrench-like tool to fracture it within the wall was accompanied by a twisting or rotation of the washer. Due

to its being tightly embedded in the concrete, too often it was broken or sheared around the mouth in a manner that was unsightly and difficult to grout or patch.

With my form tie, when the rod end is twisted the washer need not turn because the threads come into action and apply a longitudinally outward force on the washer. This longitudinally unseats and slightly moves the stop washer out of the concrete without the occurrence of objectionable peripheral damage to the concrete wall face. Of course at the same time the rod is twisted inside the wall and breaks for easy removal of the protruding end.

Tie rods according to this invention can be broken "blind" while the form panels are still in place on the hardened concrete. This facilitates the removal of the form panels because when the ties are all broken their ends and the panels are easily removed. When the panel must be removed before the tie ends are broken away, unseating the panels from all the protruding, firmly held, and often bent or misaligned tie ends is a tedious and time-consuming task. This advantage is particularly traceable to the thread action between the washer and the rod shank.

Another feature of my form tie of advantage is that due to the threaded manner in which the washer is attached to the rod in the field workers may on occasion with simple tools move the stop washers 16 to vary the spacing slightly to meet unusual conditions.

From the foregoing it will be seen that by my method of manufacture, a form tie is simple inexpensively produced and such ties are easy to use in the production of cast concrete bodies having a minimum of facial dowage when the protruding ends are removed.

Having thus described my invention, I claim:

1. The method of forming a concrete form tie-rod with a form-abutting flange inward of an end, comprising: forming a washer with internal thread-cutting elements of a hardness greater than the hardness of a selected smooth-ended rod, inserting the end of said rod into said washer axially of said thread cutting elements and obtaining simultaneous relative rotation and longitudinal movement between the rod and washer whereby said washer threads its way onto said rod and becomes an inwardly disposed form-abutting flange affixed to said rod, and weakening said rod at a locality inward of said flange to a greater extent than said rod is weakened by the engagement of the washer thereon.

2. The method of producing annularly flanged form ties, comprising: selecing a cylindrical rod of predetermined strength and diameter; providing a washer with internal, thread-cutting elements of a hardness greater than the hardness of the selected rod and of a size to cut into and engage the rod; independently gripping the rod and washer and axially aligning an end of said rod with said thread-cutting elements and pressing the same together while obtaining relative rotation therebetween, whereby said washer is disposed on the rod inward of the rod end in flanging position; outward of the washer, forming an integral annular shoulder on said rod; and, inward of said washer, weakening the rod to greater extent than said rod is weakened by the thread-cutting elements.

3. A concrete form tie rod, comprising: a button-headed rod having a form-abutting washer threadedly secured thereon by mating thread elements, said thread elements comprising thread forming female elements in said washer and male thread elements rotatively formed on said rod by the rotary engagement thereon of said washer, said washer being located in spaced relation inward of the button-head on the rod, and said rod having a break point inward of said washer, said break point weakening said rod to a greater extent than the male thread elements thereon.

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