

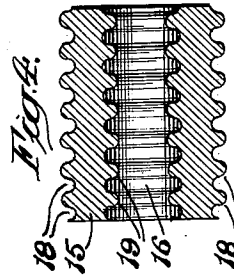
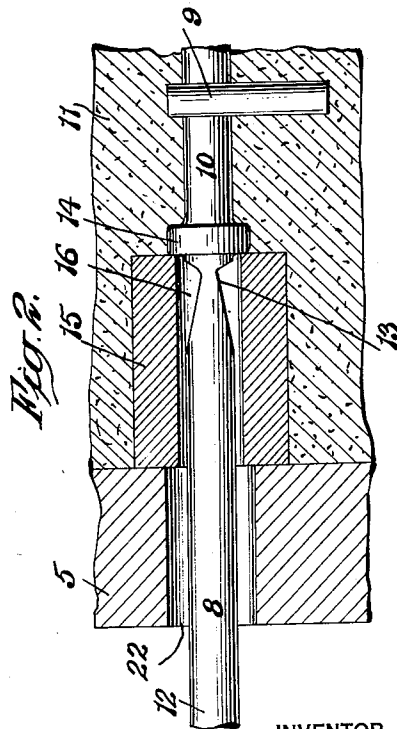
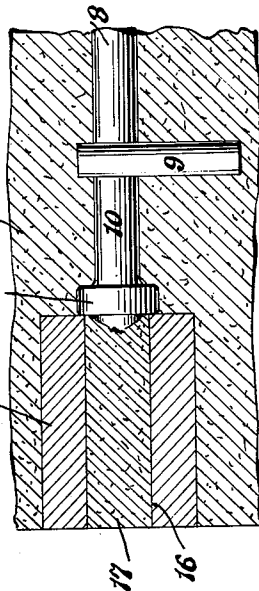
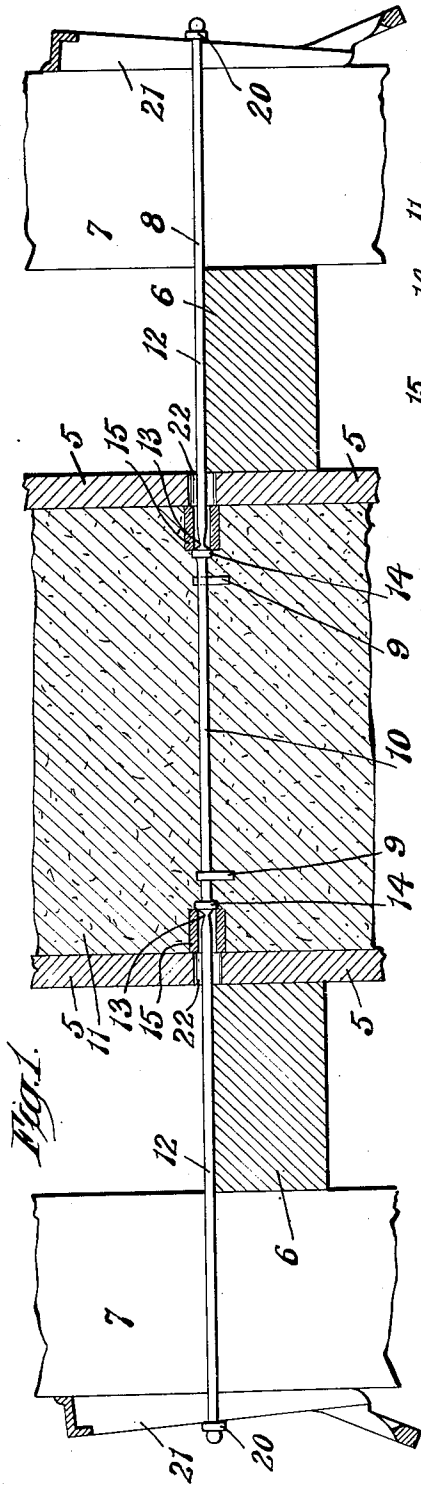
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FORM TIE

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FORM TIE

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1 Claim. (Cl. 25—131)

This invention relates to form ties for concrete structures, and has for its object to provide a simple form tie which will be cheap to construct, easy to use and entirely satisfactory in service.

More particularly, the invention relates to a type of form tie of the general character disclosed in my Patent No. 2,020,912 dated November 12, 1935, wherein the body of the tie comprises a lengthy rod which, after the concrete has been poured and has hardened, is broken off by twisting, at points within the wall near the opposite faces thereof. With such an arrangement, the broken-off end sections of the rod are pulled out of the wall, leaving an intermediate section of the rod remaining therein. One of the difficulties generally encountered in connection with tie rods of the so-called "break-off" type is due to the extraordinary adherence of the concrete to the rod so that even after the end portions of the rod have been twisted within the concrete to sever them from the central portion of the rod, these end portions are very difficult to pull out of the concrete due to the adherence of the concrete to the parts of the ends of the rod which are in the concrete and due also to the wedging action produced by loosened particles of concrete against the surfaces of the embedded portions of the broken-off ends of the rod.

The present invention contemplates the provision of means by which the removal of the broken-off end portions of the rod from the concrete is greatly facilitated; by which also the holes or openings at the opposite faces of the concrete wall are but slightly larger than the diameter of the rod, and by which adherence of the concrete, or the wedging action of particles of the same, upon the embedded portions of the broken-off ends is prevented.

In the accompanying drawing, wherein an embodiment of the invention is disclosed, Fig. 1 is a side elevation of a wall structure with the form tie in position; Fig. 2 is an enlarged sectional view of a portion of the tie showing one of the spacing members and one of the break-off points in the tie rod; Fig. 3 is a similar section showing one of the end portions of the tie rod broken off and the passage through the spacing member filled or pointed with concrete; and Fig. 4 is a sectional view of a modified form of spacing member.

The improved tie is adapted for use with any suitable concrete form which may consist of the horizontally extending form boards 5, reinforced

by horizontal beams 6 and uprights 7, all of which may be used to provide a form for a wall or other concrete structure in the conventional way. The form tie consists of a single section of round metal rod 8 preferably but not necessarily provided with short, spaced crossbars 9 welded or otherwise secured to the rod for the purpose of preventing rotation or turning of the central part 10 of the rod within the concrete structure 11 while the end portions 12 of the rod are being twisted to break them off at the weakened points 13 provided in the rod. These weakened points 13 are located relatively close to the bars 9 and adjacent to collars or stop members 14 which are preferably integrally formed on the rod 8.

Cylindrical spacing members 15 are utilized to hold the form boards 5 on each side of the concrete structure 11 in proper spaced relationship, each one of these spacing members consisting of a cylindrical element loosely mounted on the rod 8 and having one end held against one of the collars 14 by the form boards, and its other end disposed against the inner face of the form boards.

At each end the form tie rod is provided with an enlarged head or washer 20 against which a wedge 21 is employed to draw together the parts of the form. The pressure of the two wedges 21 holds the form parts in position and presses the form boards 5 against the spacing members 15, holding their opposite ends against the stop collars 14. The form boards are perforated at 22 to permit the passage of the tie rod as shown in Fig. 1.

Each of the spacing members 15 is provided with a centrally located passage 16 of such diameter that the rod loosely fits through it. It will be seen that when each spacing member is in the position shown in Fig. 1, it extends over and encloses one of the weakened break-off points 13 of the rod. Thus, the concrete which is poured around the central portion of the rod and around the spacing members 15, does not come into contact with that portion of the rod located within the passage 16 of each of the spacing members 15 and so no concrete contacts or adheres to the portion of the rod adjacent to the weakened break-off points 13. After the concrete has been poured and has hardened sufficiently, the end portions 12 of the rod 8 are twisted to cause them to break off at the weakened points 13, leaving the central portion 10 of the rod remaining embedded in the concrete wall 11. Since the portion of the rod located within each of the spacing members 15 does not come into contact with the

poured concrete, it may be at once pulled out of the passage 15 without resistance and without requiring any particular effort to do so.

The spacing members 15 are preferably made of a material having characteristics approximating those of the concrete so that these spacing members may remain in the wall and form a permanent part of the same after the end portions 12 of the rod have been broken off and have had their ends drawn out of the spacing members. The spacing members may be made of such material as concrete, glass, porcelain, or of one of numerous thermo-plastic materials having the same co-efficient of expansion and other characteristics as concrete such as the hardness and lasting qualities thereof, so that they will remain securely within the concrete wall and form a permanent part of the same. After the end portions 12 of the rod have been removed, the central passage 16 extending through each of the spacing members 15 may be plugged or pointed with concrete as indicated at 17 in Fig. 3.

In Fig. 4 is shown a modification of the spacing member 15, the same having its outer surface irregularly formed, corrugated, or otherwise ribbed as shown at 18, such a surface acting to securely interlock the spacing member with the concrete poured around it. The surface of the passage 16 extending through the spacing member 15 of Fig. 4 may be similarly corrugated or otherwise irregularly formed as indicated at 19 so that the concrete pointing plug 17 will be securely anchored within the passage 16 after the broken-off ends of the rod 8 have been removed.

By the arrangement shown, the broken-off ends of the rod may be promptly and speedily removed since they are not engaged by adherent concrete and the removal of the form boards can progress with rapidity. The utilization of spacing mem-

bers of a nature permitting them to remain in the wall and form a permanent part of the same, results in the production of holes or openings in the wall only slightly larger than the diameter of the rods so that these holes can be easily filled and even if not filled, will not be particularly unsightly on the faces of the wall. The spacing members employed are preferably of non-metallic material so that the same are thus non-corrosive and will not stain or discolor the wall, but instead will blend with the surface of the wall and will, in use, be relatively unnoticeable.

What I claim is:

A form tie for concrete structures comprising a rod having a weakened point at which it may be broken after being embedded in a concrete structure, a spacing member of less length than the thickness of the concrete structure, said spacing member having a passage through which the rod loosely extends, means for positioning the spacing member on the rod whereby the spacing member extends over and covers the weakened point of the rod, the spacing member being of a non-corrosive material having characteristics of expansion and contraction approximating those of concrete whereby it may remain embedded in the concrete structure at one of its faces but not wholly through the concrete structure to form a permanent part of the same after the rod has been broken off at the weakened point and the broken-off end portion of the rod has been withdrawn from within the spacing member, the inner and outer faces of the spacing member being corrugated to facilitate the permanent anchorage of the spacing member within the concrete and to aid in the maintenance of concrete pointing material within the passage of the spacing member.

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