

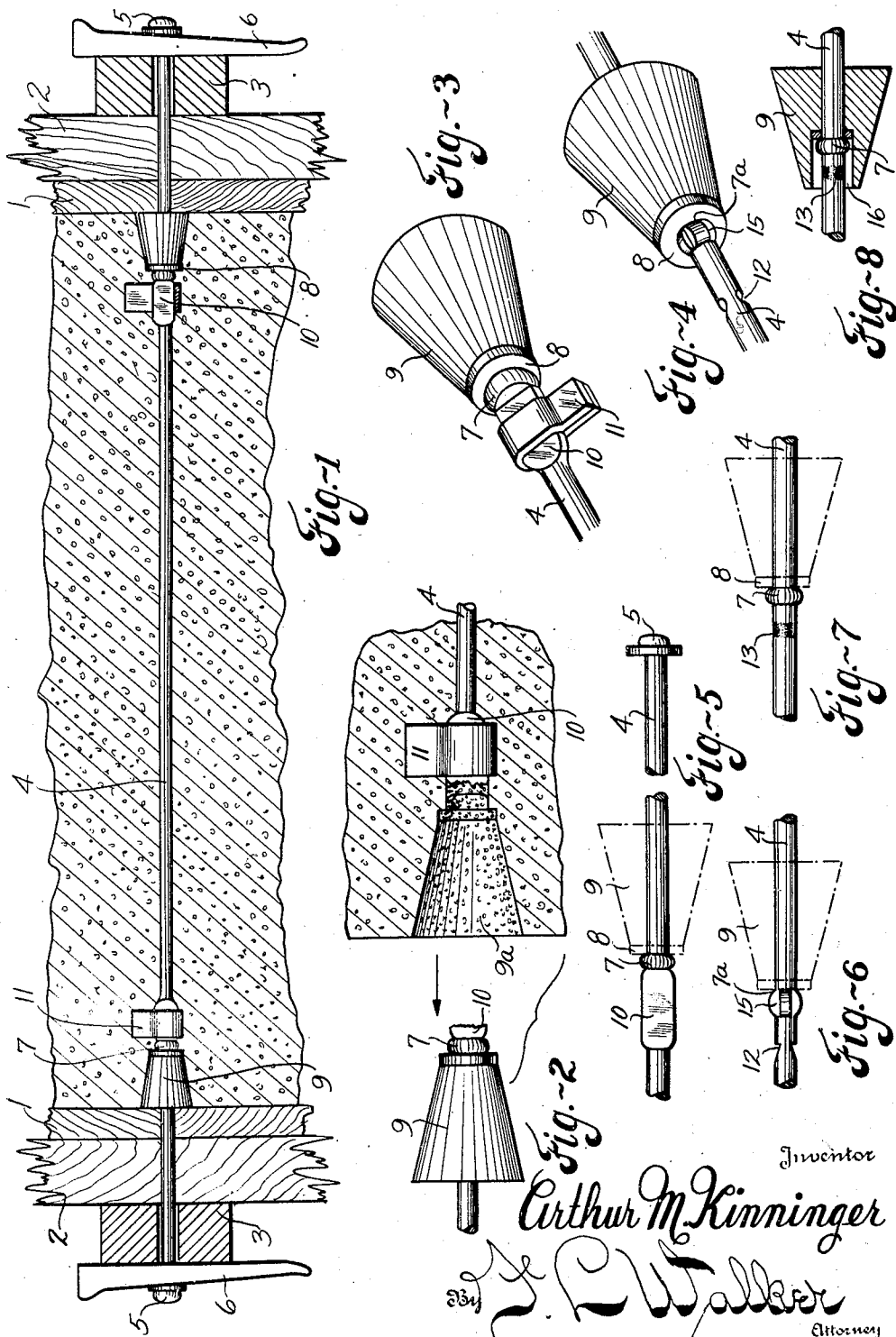
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WALL FORM TIE

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WALL FORM TIE

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This invention pertains to wall ties and hangers for concrete forms and removable inserts for concrete structures, and more particularly to "snap in" ties of which a portion is to be broken off within the concrete body and removed therefrom, leaving a continuing portion of the tie permanently embedded therein.

In the use of ties and hangers in concrete structures, it is now more or less common to string upon the ties, adjacent to the form walls, short cones or other form inserts to be temporarily embedded in the concrete structure. Such inserts are subsequently removed therefrom, leaving cavities or recesses to be pointed or filled with concrete or other material to permanently seal the opening from which a portion of the tie or hanger has been removed. The cones, or other shaped removable form bodies, are ordinarily of cast metal or of wood, but sometimes comprise stamped sheet metal cups. The breaking points of the "snap in" ties or hangers are usually substantially coincident with or somewhat beyond the inner ends of such inserts. The breakage and removal of the terminal portion of the ties, as heretofore performed, leaves the insert firmly embedded in the concrete structure.

Various methods of extracting the embedded inserts have been devised. However, heretofore in each instance a separate operation and the use of special tools were necessitated.

By the hereinafter described construction and mode of operation, the problem of removing the embedded inserts is solved coincident with the detachment and removal of the terminal portions of the ties or hangers. In the present disclosure the ties serve duofunctionally as form ties and as insert extractors, whereby the act of removing the detached portions of the ties also effects simultaneous removal of the inserts without further operation and without the use of special tools.

The object of the invention is to improve the construction as well as the mode of removal of concrete form wall ties and hangers whereby they may not only be economically manufactured, but will be efficient in use, capable of being readily broken within the concrete body for removal of terminal portions thereof, and adapted upon removal to leave cavities or recesses in the concrete body to receive bodies of sealing material.

An important object of the invention is to provide means and method of quickly and conveniently extracting from a concrete body embedded form inserts by which surface cavities or recesses are produced.

A further object of the invention is to provide a duofunctional concrete form wall tie and an insert extractor for removal of embedded inserts from the concrete structure.

A further object of the invention is to provide an improved method of procedure for removal of embedded form inserts from concrete bodies simultaneously with the removal of terminal portions of a related wall tie therefrom.

A further object of the invention is to materially reduce the cost of construction and the labor necessary for finishing concrete structures after wrecking of the forms.

A further object of the invention is to provide a wall tie for concrete forms possessing the advantageous structural features and inherent meritorious characteristics herein mentioned, and to provide the steps of procedure and method of operation herein disclosed for removal of embedded inserts from a concrete body.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawing.

In the drawing, wherein are shown preferred, but obviously not necessarily the only forms of embodiment of the invention,

Fig. 1 is a transverse sectional view of a concrete form and a body of concrete therein, through which is shown extended a wall tie embodying the present invention.

Fig. 2 is a fragmentary sectional view of a portion of a concrete body, illustrating the removal of an insert member therefrom.

Fig. 3 is a perspective view of a portion of a wall tie and insert body before embedment in a concrete body.

Fig. 4 is a similar view illustrating a modification.

Figs. 5, 6, and 7 are detail views illustrating different forms of fracture means and stop formations.

Fig. 8 is a detail sectional view of a modified construction wherein the fracture point of the rod is within the insert member.

Like parts are indicated by similar characters of reference through the several views.

Referring to the drawing, 1—1 are the form walls of a concrete form which are supported in spaced parallel relation by upright struts 2—2,

outside of which are horizontally disposed wales 3—3.

Extending transversely of the form structure is a wall tie comprising a rod 4, the opposite ends of which extend beyond the opposite form walls 1—1 and past the supporting struts 2 and through the wales 3. The ends of the rod beyond the wales are provided with heads 5, engaged by tightening wedges 6, which are slotted and straddle the rod intermediate the heads 6 and the wales 3. The rod 4 thus connected with the form structure resists, in tension, any tendency of the walls 1 to separate.

Intermediate the form walls 1—1, the rod 4 is provided with stops or lateral enlargements 7, against which abut washers 8 strung upon the rod at the outer sides of the stops or enlargements. Also strung upon the rod 4 at the outer sides of the stops 7 and washers 8, are conical inserts 9, the smaller ends of which abut upon the washers 8 and the larger or base terminals of which abut upon the inner sides of the form walls 1. These conical inserts, together with the limiting stops 7, initially comprise spacers which limit the approach of the form walls 1 toward each other and serve to maintain their predetermined spaced relation. The conical inserts 9 are ordinarily of cast metal, or of wood. They may, however, consist of cup shaped members formed from sheet metal. The particular material or character of the inserts, and in fact the shape thereof is not material, so long as the shape thereof is such that they may be subsequently withdrawn from the concrete body.

Intermediate the relatively spaced stops or lateral enlargements of the rod 4 and preferably, but not necessarily, in close relation thereto the rod 4 is flattened at 10, which flattened portion is surrounded by a yoke or anchor arm 11. Upon pouring a body of concrete intermediate the side walls 1—1, the rod 4 and its anchor arm 11 are embedded therein. The medial portion of the rod is held against rotation by the flats 10 and anchor arms 11. The insert members 9 also are embedded in the concrete with their base faces exposed coincident with the surface of the concrete.

The flattened portions 10 define fracture points upon which the rod will fail under torsional strain. Such flattened intervals are preferably formed by distortion of the rod without removing any material thereof and without reducing its tensile strength. However, for the present purpose, the rod may be physically weakened at points which will fall in inwardly spaced relation with the form walls 1, and hence in inwardly spaced relation with the side faces of the concrete structure formed therebetween. Such weakening may be by notches 12, formed by removal of rod material as shown in Figs. 4 and 6, or it may be achieved by locally heat treating the rod as at 13, Fig. 7 to afford a brittle zone wherein the resistance of the rod to torsional strain is reduced, preferably however, without materially reducing the tensile strength of the tie. In either event, upon twisting the exposed end of the tie, after wrecking the forms, the tie will fail and break at such fracture points in inwardly spaced relation from the face of the concrete body, thus freeing the exposed end of the tie for withdrawal from the concrete, leaving the medial portion thereof permanently embedded in the concrete body.

The stops 7 are located outwardly from the aforementioned fracture points, 10, 12 or 13, and

hence between such fracture points and the form walls 1 when the tie is assembled therein. The stops 7 comprise lateral enlargements which may be formed in various ways as by swedging, rolling or by a staking operation. As shown in Figs. 1, 2, 3 and 5, such lateral enlargement or stop 7 comprises an integral peripheral swell or convex bead entirely surrounding the rod. Such configuration is quickly and economically produced by swedging in a punch press. However, the same conformation may be made by rolling the rod under pressure. As an alternative method, illustrated in Figs. 4 and 6, the stop is formed by indenting the rod at 15 at peripherally spaced intervals whereby the intermediate segments of the rod are slightly expanded radially to afford an equivalent stop 7a.

Such stops or lateral enlargements are located at the outer sides of the fracture points, preferably, although not necessarily in close proximity thereto. The washers 8 are strung upon the extremities of the rod 4 beyond the stops 7 and abut upon the stops 7. The inserts 9 are preferably, although not necessarily, of conical form with their smaller ends directed inwardly and abutting upon the washers 8 against the resistance of the stops 7. In any event, they are of such contour as to permit their subsequent withdrawal from the concrete body.

The form inserts 9 of whatever shape are of sufficient length to extend from the stops 14 to the adjacent form walls 1 upon which they abut and serve as spacers prior to pouring concrete into the form, to prevent the inward collapse of the form structure.

Upon pouring the concrete into the form the inserts 9 become temporarily embedded therein and form cavities or recesses 9a in the concrete body when they are subsequently removed therefrom. Thereafter, these cavities are filled with concrete or other sealing material by which the embedded portion of the tie rod is sealed within the concrete body.

As before stated, the removal of such embedded inserts, subsequent to fracture and removal of the tie rod terminals, as heretofore practiced, has necessitated a separate operation and the use of special tools, which greatly increases the expense of construction.

In the present instance, the fracture points being inwardly disposed relative to the stops 7 and the stops being beyond the inserts 9 which abut thereon, the terminal portion of the tie when detached by twisting becomes an insert extractor. By outward axial pull upon the detached terminal portion of the tie, previously broken at the fracture point beyond the stop, the insert 9 is bodily withdrawn from the concrete body with the tie portion. Thus, operation of breaking and withdrawing the terminal portions of the tie rods also simultaneously effect extraction of the mold inserts 9, leaving the cavities 9a to be pointed or filled without further operation. In a building construction wherein hundreds of thousands of such ties may be used, the elimination of extra insert removal operations results in a great saving of labor and expense.

In the form of embodiment illustrated in Fig. 8, the fracture point is within the limits of the insert. The latter is counterbored at 16 to receive the abutment stop 7 and also that portion of the rod which contains the fracture point which is shown as a heat treated spot 13 but which may be a notch 12 or flat 10. The overhang of the insert encloses the stop and fracture point and

facilitates the subsequent detachment of the rod terminal.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. A tie rod for a concrete form including a rod, a stop thereon a fracture point on said rod at one side of the stop and a combined spacer and cavity form insert carried by said rod overhanging and enclosing the stop and fracture point and abutting the side of the stop opposite the fracture point, said combined spacer and insert being retractable from a concrete body in which the tie is embedded by breakage of the rod at the fracture point and retraction of the detached portion of the rod.

2. A combined tie for a concrete form and an extractor of a cavity form insert embedded in a concrete body molded in the form including a rod, a recessed cavity form insert mounted thereon and a fracture point on the rod disposed inwardly beyond the point of engagement of the cavity form insert with the rod, the construction and arrangement being such that the fracture point on the rod lies within the recess of the insert and breakage of the rod at the fracture point will free the detached portion of the rod and cavity form insert for unison withdrawal from the concrete body.

3. A combined tie for a concrete form and extractor for a cavity form insert embedded in a body of concrete molded in the form including a rod, a fracture point thereon so disposed as to be positioned in inwardly spaced relation with a form wall, and a cavity form insert embedded in the molded body of concrete enclosing the fracture

point of the rod and positioned to abut the inner side wall of the form, said rod including a detachable portion which when broken from the remainder thereof at the fracture point within the body of concrete molded in said form is engageable with the insert for extracting the insert from the concrete body.

4. A tie rod for a concrete form, including a rod, a stop so disposed thereon as to be in spaced relation with the side wall of a form structure in which the tie is incorporated, a recessed tapered sleeve on said rod enclosing the stop and abutting the side of the form wall, a fracture point on said rod to facilitate breakage of the rod after embedment in a body of concrete molded in the form, said fracture point being spaced away from the form wall a greater distance than the stop, and said stop being engageable with the tapered sleeve for extracting the tapered sleeve from the molded body of concrete after breakage of the rod at the fracture point.

5. A tie for concrete forms, including a rod, a stop so positioned on the rod as to lie a substantial distance within a body of concrete molded in the form, a weakened fracture point located at the inner side of the stop and an elongated cavity form insert loosely mounted on the rod in abutting relation with the stop at the outer side thereof, the abutting end of the insert being at least radially coextensive with the stop, and within which the stop carrying portion of the rod is revoluble to break the rod at its fracture point for unison withdrawal from the concrete body of the cavity form insert and the said terminal portion of the rod when detached.

6. A form tie, including a rod, a fracture point positioned thereon to lie a substantial distance within a body of concrete molded within the form, a stop on the rod at the outer side of the fracture point, a spacer sleeve of greater axial extent than its diameter loosely positioned upon the rod at the outer side of the stop and abutting at its inner end against said stop, the stop being of not greater radial extent than the abutting end of the sleeve for producing in a body of molded concrete an enlarged bore of greater depth than its width and within which the stop carrying portion of the rod is independently revoluble to effect breakage of the rod at its fracture point, whereupon the said sleeve may be extracted from the concrete body by withdrawal of the detached stop bearing portion of the rod with said stop in engaging relation with the inner end of the sleeve.

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