ART OF REMOVING FIBER FORMS FROM CONCRETE COLUMNS

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ABSTRACT OF THE DISCLOSURE
A fiber cylindrical form has a length of wire extending longitudinally along its inner surface, with one end of the wire anchored to one end of the form and with the other end of the wire accessible from the exterior at the opposite end of the form where it may be wound on an arbor to split the form longitudinally.

BACKGROUND OF THE INVENTION
Field of the invention
The present invention pertains to fiber forms which are used in the construction industry as forms for concrete columns, such columns being used in building of highway bridges, overhead roads, in supporting floors and beams, and for other related purposes.

Description of the prior art
Some twenty years ago the use of specially-wrapped paper tubes in various sizes was proposed as a concrete holding form to be employed in lieu of the metal tubes which had previously been employed. The metal tubing was objectionable in that it was expensive and subject to bending and distortion in handling. The fiber tube is used only once, is removed after the concrete cures, and is then destroyed. Fiber forms of the type above discussed are disclosed in U.S. Pat. Nos. 2,677,165 and 2,836,874. While fiber forms have become quite popular in the industry they have nevertheless been criticized because of the length of time it takes to remove a fiber form from the cured concrete column. It customarily takes a man one to two hours to strip off a fifteen-foot long fiber tube. Various methods have been attempted to try to expedite this procedure but all methods heretofore proposed have been time-consuming. The usual method is to use a combination of a knife and a wooden wedge, and a rotary saw type of cutter has been tried in lieu of the knife. Aside from being tedious, these procedures usually fail to cut the full thickness of the fiber tube or its full length and render removal slow and tedious, as care must be taken not to scar the concrete.

SUMMARY OF THE INVENTION
The present invention provides improvements in the art of removing fiber forms wherein a length of wire, which extends longitudinally along the inner surface of the cylindrical form is employed, one end of the wire being anchored to one end of the form and the other end of the wire being accessible from the exterior at the opposite end of the form where it may be wound on an arbor to split the form longitudinally.

A general object of the invention is, therefore, to provide, as a new article of manufacture, an improved fiber form having form-splitting means embodied therein.

A more specific object of the invention is to provide a cylindrical fiber form having a length of piano wire or equivalent strength wire extending along its inner surface, close thereto, with one end of the wire anchored to one end of the form and with the other end of the wire accessible from the exterior at the opposite end of the form, where the wire may be wound on an arbor to split the form longitudinally.

A further, more specific object of the invention is to provide a cylindrical fiber form as above described wherein each end of the fiber tube has a slot extending inwardly from the end, one slot being employed to anchor one end of the wire, and the slot at the opposite end of the tube permitting the other end of the wire to be passed therethrough, where it is accessible for winding, the slot also providing a directional start for the splitting operation.

A further object of the invention is to provide an improved method of removing forms from concrete columns.

Other objects of the invention are to provide a method and article which are relatively simple and inexpensive, which in no way interfere with the efficient use of the form, and which materially reduce the time and labor required to remove a form from a cured column.

With the above and other objects in view, the invention consists of the improvements in the art of removing fiber forms from concrete columns, and all of its parts, combinations and steps, as set forth in the claims, and all equivalents thereof.

BRIEF DESCRIPTION OF THE DRAWINGS
In the accompanying drawings, illustrating one complete embodiment of a preferred form of the invention, in which the same reference numerals designate the same parts in all of the views.

FIG. 1 is a front elevation view of a fiber form equipped with the present invention and surrounding a concrete column, showing how power such as that supplied by an electric drill may be employed to wind the splitting wire on the arbor, part of the form being broken away and shown in section;

FIG. 2 is a fragmentary top view of a cast column with a form therein which is about to be removed;

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2, part of the column and form being broken away;

FIG. 4 is a fragmentary view of the inside of the form, taken approximately on the line 4—4 of FIG. 3;

FIG. 5 is a perspective view showing a form which has just been removed from a concrete column; and

FIG. 6 is a view like FIG. 4 showing a modification.

DESCRIPTION OF THE PREFERRED EMBODIMENTS
Referring more particularly to the drawings, the fiber form is preferably of the type shown in Pat. No. 2,677,165, dated May 4, 1954, which comprises a tubular paper body 10 formed from spirally-wound paper and having sufficient rigidity to support a column of concrete mix 11 which has been poured therein. In the form of the above-identified patent the fiber body is coated internally with a film of polyethylene to prevent adhesion to the cured concrete. It will be noted that the spirally-wound paper layers are built up to a required thickness for the particular situation, the tube being relatively dense and hard. By way of example, for an eighteen-inch diameter column the thickness T (FIG. 2) of the fiber form is preferably about five-sixteenth of an inch. Inasmuch as the diameters will vary substantially, depending upon the specifications, the thickness T will vary accordingly.

In accordance with the present invention the ends of the fiber form are cut inwardly to provide the short upper end slot 12 and lower end slot 13. One of these slots usually the lower one, is employed to anchor one end of the splitting wire 14, although such ends may be anchored in various other ways than by use of the slot 13. Where the slot 13 is employed, the end of the wire 14 is attached to an anchoring piece such as the rod 15 positioned...
against the exterior of the tube, as is shown in FIGS. 1 and 3, the wire extending upwardly longitudinally of the tube close against its inner surface, as shown in FIG. 3. The other end of the wire 14, such as the top end e of the drawing, is passed through the slot 12 and is provided with a projecting end 16 which may be temporarily maintained in position in any manner while the tube is being transported and handled. Preferably each tube will be equipped with a metal rod or arbor 17, preferably about one-fourth of an inch in diameter, having a hole 18 through which the wire is thread as shown in FIG. 3. While it is not essential to employ retaining means for the wire, it is preferred to utilize some means for holding the wire close to the inner surface of the tube. A simple expedient is metal staples 19, or an adhesive type tape 19" as in FIG. 6.

It is important that a wire of sufficient gauge be employed so that it is capable of ripping through the relatively tough and thick fiber body without breaking, the exact gauge of wire depending upon the thickness of the fiber form. Where the form is suitable for an eighteen-inch diameter column and has a five-sixteen inch thickness, music wire or equivalent having a diameter in inches of .033-.035 has been found very satisfactory. The exact gauge is not critical, but it must be strong enough to do the job, but not too heavy to resist winding on the arbor. Where the inside diameter of the fiber form is between six to fourteen inches, wire having a gauge of .024-.026 of an inch is satisfactory. Where the inside diameter of the form is between sixteen and twenty-eight inches, wire having a gauge of .033-.035 of an inch is satisfactory. For forms having an inside diameter of thirty to thirty-eight inches, it is preferred to employ wire having a diameter in inches of .040, and for forms having a larger inside diameter, such as forty to eighty-eight inches, wire of .050 diameter in inches.

In carrying out the improved method, concrete is poured into the form with the wire positioned therein as in FIG. 1 and the concrete allowed to cure. After thorough curing, the arbor 17 is rotated and thus caused to travel longitudinally of the form while the wire is being wound thereon. As winding of the wire on the arbor is continued, the wire rips cleanly through the fiber material, ultimately splitting the tube longitudinally as shown at 18 in FIG. 5. The fiber form can then be readily spread apart and removed from the column 11 as also shown in FIG. 5. While any suitable means may be employed to rotate the arbor 17, it being practical to rotate the arbor by hand where the tubing is of minor thickness, nevertheless the operation is speeded up by the use of an electric or pneumatically powered winding instrumentality such as the standard electric drill 20 shown in FIG. 1. For most uses a one-half inch size drill is adequate and it is merely necessary to engage the end of the arbor 17 in the chuck of the drill, tighten the chuck, and then start the drill, it being necessary of course for the operator to move his hand in conformity with the progress of the splitting wire. The wrap of the wire onto the arbor tends to advance the splitting action of the wire until the opposite end of the tube is reached. The arbor must be long enough to accommodate all of the wire in the length of the paper tube. Inasmuch as the wire is originally located on the inside of the tube it obviously sever all of the layers of paper to aid in the easy removal of the form in the manner shown in FIG. 5. With prior methods there was always difficulty in cutting or prying through the innermost layers. Experience has shown that the time required to remove a fiber form can be reduced by 75% by use of the present invention. It is to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

What I claim is:
1. In a fiber cylindrical form for concrete columns, a length of wire extending longitudinally along its inner surface, means anchoring one end of the wire to a first end of the form and a windable member at the exterior of the second end of the form to which the opposite end of the wire is connected, power driven means for rotating the windable member, whereby the form may be split longitudinally.
2. A form as claimed in claim 1 in which there is a slot extending inwardly at said second end of the form through which said other end of the wire extends so as to be exteriorly accessible, said slot serving as a directional start for the splitting operation.
3. A form as claimed in claim 1 in which said first end of the form has a slot extending inwardly therefrom and in which the adjacent end of the wire extends through said slot, and in which there is an external anchoring member disposed transversely of the slot to which the wire is connected.
4. A form as claimed in claim 1 in which there is means for maintaining the wire in close contact with the inner surface of the form.
5. A method of using fiber forms for concrete columns comprising disposing a length of wire longitudinally against the inner surface of the form, anchoring a first end of the wire to a first end of the form, directing the second end of the wire externally of the form at the second end of the latter, pouring concrete mix into the form, allowing the concrete to cure, winding said last mentioned end of the wire on an arbor positioned against the outer surface of the form, and causing the arbor to move longitudinally of the form as the wire splits the latter.
6. A method as claimed in claim 5 including the following steps carried out before the concrete mix is poured: cutting a slot to extend inwardly from said first end of the form, and passing the adjacent end of the wire through the slot and connecting it to an external anchoring member disposed transversely of the slot.
7. A method as claimed in claim 5 which includes the following steps carried out after the concrete mix is poured: cutting a slot inwardly from said second end of the form, and passing the adjacent end of the wire through said slot where it is connected to said winding arbor.
8. A method as claimed in claim 6 which includes the step of cutting a slot inwardly from said second end of the form, and passing the adjacent end of the wire through said slot where it is connected to said winding arbor.

References Cited

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