United States Patent [19]

Kowell

[11] **3,764,066**

[45] **Oct. 9, 1973**

[54] **CONCRETE RAILROAD TIE PRODUCT**

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[21] Appl. No.: **266,429**

Related U.S. Application Data

[62] Division of Ser. No. 82,638, Oct. 21, 1970, Pat. No. 3,685,782, which is a division of Ser. No. 716,516, March 27, 1968, Pat. No. 3,557,274.

[52] **U.S. Cl.** **238/84,** 52/698, 238/265, 238/371, 249/86, 264/271

[51] **Int. Cl.** **E01b 3/32**

[58] **Field of Search** ..... 238/83, 84, 87, 91, 238/29, 370, 371, 373, 377, 265; 52/704, 698, 701; 249/86, 91, 96, 97; 264/35, 271, 275, 278; 18/DIG. 10; 25/131 RR, 131 V, DIG. 9, DIG. 7

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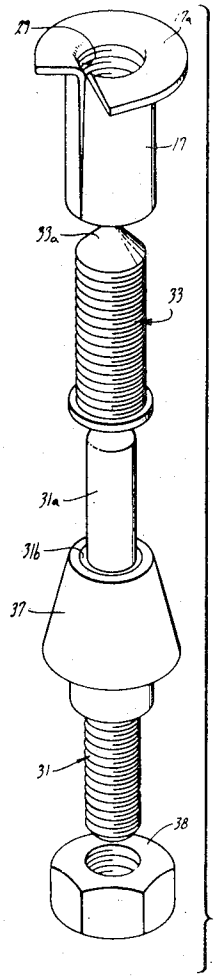
[57] **ABSTRACT**

An improved concrete product formed with an attachment device of a type having female threads adapted to cooperate with the threaded ends of bolts or the like inserted thereto. The threads are continuously protected by a sealed plug until ready for use. The interior of the plug serves further the purpose of readily releasing the precast body of concrete from its pouring form. Thus, when the product is ready for use, it is a simple matter to merely drive a screwdriver into the plastic sleeve and unscrew same from insert 17.

5 Claims, 9 Drawing Figures



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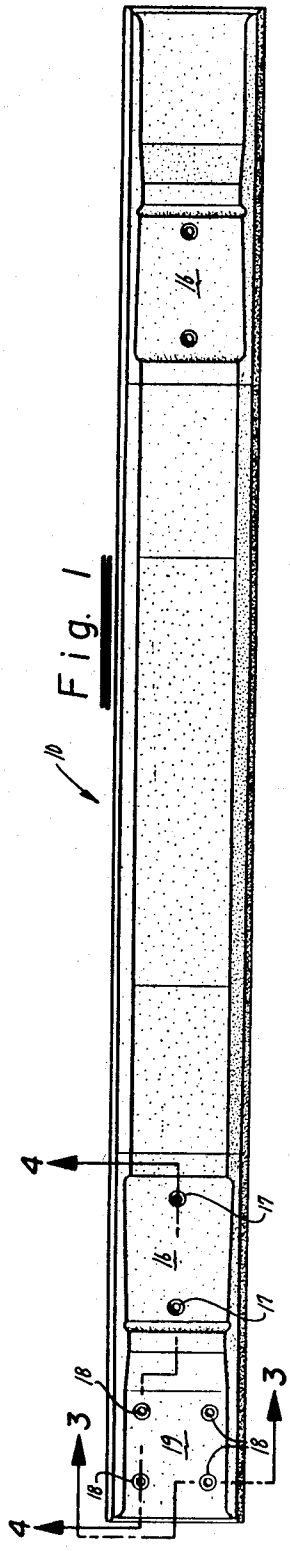


Fig. 1

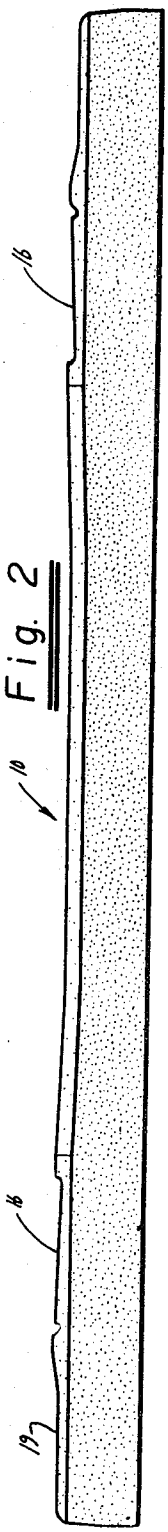


Fig. 2

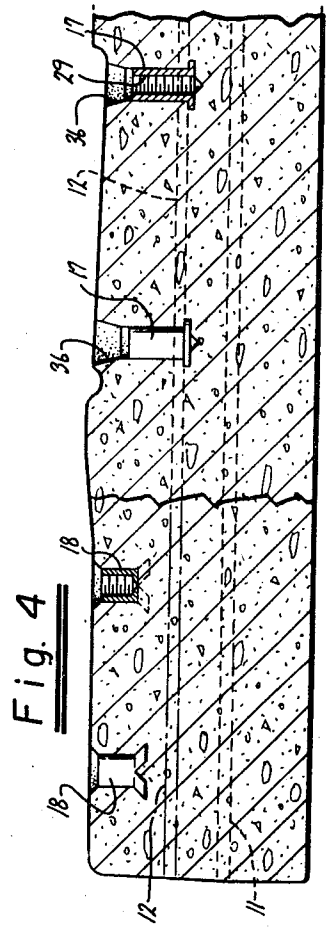


Fig. 4

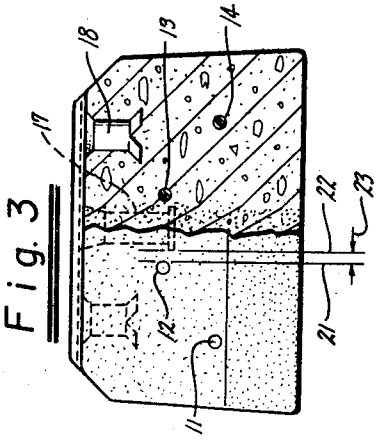


Fig. 3

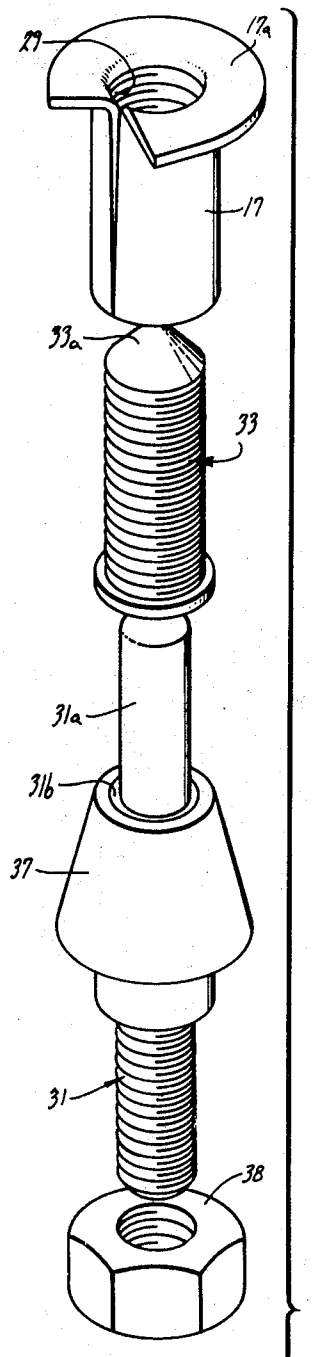
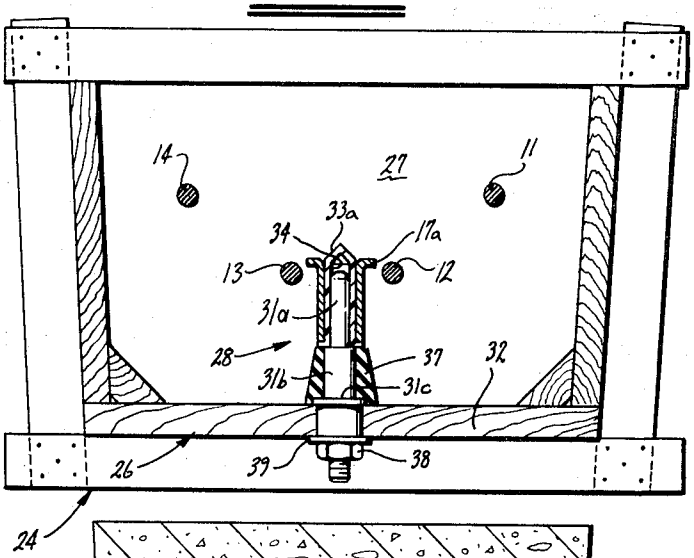


Fig. 6

Fig. 5



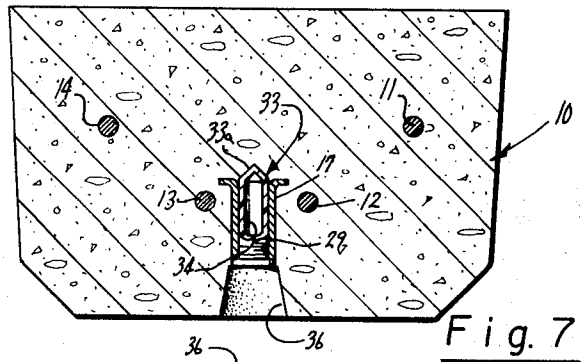


Fig. 7

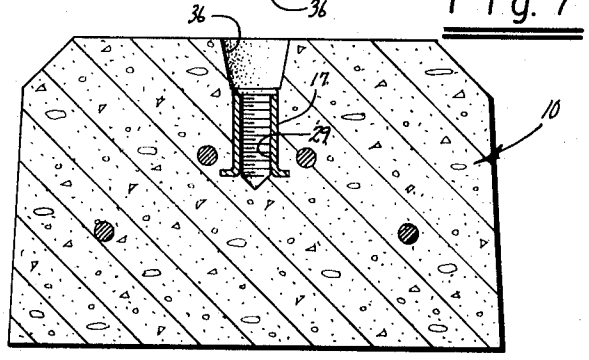


Fig. 8

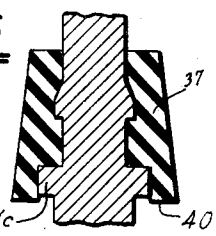


Fig 9

CONCRETE RAILROAD TIE PRODUCT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a division of U.S. application Ser. No. 82,638, filed Oct. 21, 1970, now U.S. Pat. No. 3,685,782 dated Aug. 22, 1972, and entitled CONCRETE POURING FORM ACCESSORY which application was itself a division of U.S. application Ser. No. 716,516, filed Mar. 27, 1968, now U.S. Pat. No. 3,557,274 dated Jan. 19, 1971, and entitled METHOD FOR MOLDING A CONCRETE RAILROAD TIE.

BACKGROUND OF THE INVENTION

This invention pertains to a concrete product which has particular utility as concrete railroad ties of a type, for example, as employ prestressing elongate tendons carried under tension therein.

As disclosed herein, a concrete pouring form accessory has been provided for casting concrete products containing an anchored insert embedded in the concrete. The accessory comprises a support post adapted to be fixedly positioned to a pouring form in a manner so as to project inwardly from a wall portion of the form. A protective tubular sleeve formed with positive engagement portions, such as exterior threads formed around the outside of the sleeve, is slidably positioned onto the distal end of the support post. An anchor element of a type adapted to receive and hold bolts to be coupled or threaded thereto when embedded in concrete is carried by the sleeve mounted on the post. Thus, the anchor element is carried in readily releasable positive engagement with the sleeve whereby unscrewing the sleeve from the anchor element serves to expose the threads for use with bolts of a type adapted to attach railroad rails to the ties.

Each anchor element is, in general, provided with laterally protruding portions which serve to develop a positive holding anchored engagement with concrete upon hardening of the concrete in which it is submerged. Thus, a flange is formed about the anchor element. Further, means are carried by the support post which serve to preserve sufficient clearance axially behind the sleeve and behind the post which is effective during placement of concrete poured about the accessory to preserve the ready removal path of the post from the sleeve and also later the sleeve from the insert.

SUMMARY OF THE INVENTION AND OBJECTS

In general, there has been provided herein a concrete body particularly useful as a railroad tie or sleeper comprised of a body of concrete containing an anchoring insert element embedded therein for forming a point of attachment to the body. Laterally protruding portions of the insert serve to provide positive holding of the insert to the concrete body against axial movement of the insert within the body. Positive engagement means, such as threads, are formed interiorly of the insert and a readily removable protective sleeve is disposed axially within the insert in cooperative engagement with the positive engagement means so as to protect the latter from the surroundings during storage and handling.

In addition, the invention contemplates a cooperative disposition of certain of the anchored insert elements with respect to tensioned tendon members in the tie whereby restraint against axial movement of the embedded insert elements is partially derived directly from the tensioned tendon elements.

In general, it is an object of the present invention to provide an improved precast concrete product, particularly usable as a railroad tie.

It is another object of the invention to provide such a tie product characterized by an anchor insert of a type having internal threads and wherein the threads are arranged in protected, sealed condition until ready for application of rails to the tie.

These and other objects of the invention will be more readily apparent from the following detailed description, when taken in conjunction with the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIGS. 1 and 2 are respectively plan and side elevation views of a railroad tie formed according to the invention;

FIGS. 3 and 4 are respectively enlarged elevation section views respectively taken along the lines 3—3 and 4—4 of FIG. 1;

FIG. 5 is a schematic end view, in section, showing a pouring form accessory;

FIG. 6 is an enlarged, exploded, isometric view of a pouring form accessory;

FIGS. 7 and 8 are each transverse end section views showing a concrete product according to the invention respectively in a state immediately following removal from the pouring form shown in FIG. 5 and shown in position ready to receive the application of rails thereto; and

FIG. 9 is an enlarged elevation section view of a central portion of the casting accessory assembly 28.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIGS. 1 and 2, a concrete railroad tie 10 of a type employing prestressing tensioned tendons 11, 12, 13 14 includes molded or cast portions for supporting railroad rails and ballast portions adapted for contact signal supports. Thus, the mutually inwardly and downwardly sloping rail pad portions 16 are adapted to receive the lower flanges of railroad rails (not shown) in conventional fashion for attachment by means of threaded bolts (not shown) which cooperate with interiorly threaded inserts 17 embedded in the concrete. Additional inserts 18 embedded in the concrete in a ballast zone 19 serve to cooperate with the threaded ends of bolts employed for attachment of additional railroad equipment in the form, for example, of the contact signal type.

From the foregoing, it will be readily apparent that each of inserts 17, 18 as embedded in the concrete of the body of railroad tie 10 form anchoring points of attachment with tie 10 for coupling forces acting along the axis of inserts 17, 18 to the body of concrete.

In order to enhance and derive improved holding action and thereby increase the restraint with which the concrete of each tie 10 holds inserts 17, which are subjected to the great forces applied by trains travelling on rails supported upon pad portions 16, it has been found advantageous to dispose tendons 12, 13 relatively closely adjacent the sides of inserts 17. Thus, tendons 12, 13 have been disposed relative to inserts 17 in a manner whereby a pair of parallel planes 21, 22, disposed parallel to the axis of inserts 17 and respectively spaced laterally in a common direction from the axis of

inserts 17 may be defined on each side of the inserts 17. The parallel planes thus respectively lie contiguous to the bounding adjacent portions of tendons 12 or 13 respectively and inserts 17. The spacing 23 between the parallel planes 21, 22 is sufficiently narrow so as to cause the tendon 12 to contribute restraint to the axial movement of inserts 17 in the body of concrete under application of forces to the inserts, as by means of the applied forces experienced by trains carried on the rails thus supported.

In the method of forming the precast concrete railroad tie bodies, a frame, such as the box-like structure 24, open along the top, serves to hold a wooden pouring form 26 or mold of a type suitable for receiving the mixed concrete. Tendons 11, 12, 13 and 14 are supported by conventional means in each of the opposite end walls 27 of the pouring form structure.

A concrete pouring form accessory in the form of the casting assembly 28 serves to provide the concrete tie 10 with an embedded insert formed with female threads 29 for positively engaging the threaded end of a bolt, of a type as conventionally utilized in applying rails to pads 16. The threads 29 of each insert 17 remain sealed from exposure to damaging influences whereby at the point of utilization the threads are not clogged or rusted, or otherwise damaged.

Thus, a mounting post 31 is fixedly carried to project inwardly from the wall 32 of pouring form 26. An exteriorly threaded anti-friction sleeve 33 threadedly engages the interior threads 29 of annular insert 17. Sleeve 33 includes a smooth interior bore 34 for slidably positioning sleeve 33 onto the upper end portion 31*a* of post 31. Preferably, sleeve 33 consists of an anti-friction material such as various known plastics in order to facilitate its ready removal from post 31.

While only a single post 31 has been described above, it will be evident that a number of such mounting posts 31 shall be utilized in cooperation with the other inserts 17, 18 and the provision of the anti-friction sliding relation between the interior of sleeves 33 and the exterior of post portions 31*a* can thereby serve to aid in the releasing of each precast tie 10 from pouring form 26.

Post 31 includes an enlarged portion 31*b* serving to carry an annular resilient truncated cone element 37 surrounding post 31 and adapted to be coated with an application of anti-bonding material such as grease in order to provide ready removal thereof from the hardened concrete product.

Element 37 serves to define access passages 36 behind sleeve 33 and, together with post portion 31*b*, serves to define the access passage behind post portion 31*a* whereby the post portion 31*a* may be readily withdrawn from the concrete body upon hardening of the concrete.

Accordingly, it will be readily apparent that element 37 and post portion 31*b* serve to preserve sufficient clearance axially behind sleeve 33 and post portion 31*a* during placement of concrete so as to permit ready removal, first of the post from the sleeves, and later of the sleeve from insert 17 when rails are ready to be secured to the tie 10.

After post 31 has been loosely secured to the wall 32 of form 26, as by means of the nut 38 and washer 39, sealing element 37 is slidably positioned onto post portion 31*b*. The insert 17, carrying sleeve 33 threaded thereto, is slidably placed onto the smooth cylindrical upper post portion 31*a*. Sleeve 33 includes a closed end portion 33*a* whereby the inner end of insert 17 shall be sealed against entry of concrete. Subsequently, nut 38 is taken up tightly to draw post 31, and particularly the radially protruding flange portion 31*c* thereof tightly against the opposite side of wall 32. The skirt 40 of element 37, then compressed, forms a tight seal around the base of assembly 28.

The inner end of each insert 17 is formed with a radially outwardly projecting flange portion 17*a* forming laterally protruding portions serving to develop a positive holding anchored engagement with the hardened concrete in which it is submerged. Having completed the foregoing steps, it is then only necessary to pursue the final steps of pouring hardenable concrete-forming material into mold form 26 while sealing the mold form at the outer end of sleeve 33 and post 31 in a manner preserving the access clearance behind both of these elements for later backing them out of the body of concrete after it has hardened.

Subsequently, after permitting the poured material to harden, each tie body is pulled relatively away from the posts 31 to slidably remove posts 31 from their respective sleeves 33. Sleeves 33 are left in place until the tie 10 is ready for use. At that time sleeves 33 are unscrewed from their respective inserts 17 in order to expose the interior threads 29 for attachment to suitable threaded bolts as employed for attachment to rails to be laid upon ties 10.

From the foregoing, it will be readily evident that there has been provided an improved concrete product formed with an attachment device of a type having female threads adapted to cooperate with the threaded ends of bolts or the like inserted thereto. The threads are continuously protected by a sealed plug until ready for use. The interior of the plug serves further the purpose of readily releasing the precast body of concrete from its pouring form. Thus, when the product is ready for use, it is a simple matter to merely drive a screwdriver into the plastic sleeve 33 and unscrew same from insert 17.

I claim:

1. In a concrete railroad tie of a type formed as an elongate, generally rectilinear concrete body, the improvement comprising a plurality of longitudinally extending tensioned tendons, an elongate insert embedded in said body between said tendons, the axis of the insert lying generally normal to a common plane through said tendons, said insert serving to form an anchoring point of attachment with the tie and serving to couple forces acting along the axis of the insert to the body of concrete of the tie, the tendons being disposed on each side of the insert in planes closely adjacent thereto whereby on each side of the insert a pair of planes disposed parallel to the axis of the insert and spaced laterally in a common direction from said axis lie respectively substantially contiguous to the bounding adjacent portion of one of said tendons and of said insert, the spacing between said parallel planes being sufficiently narrow to cause the tendons to contribute restraint to axial movement of the insert in said body under application of forces to said insert, said insert including female threads therein and an elongate, hollow sleeve threadedly engaging the interior of said insert and forming a readily unscrewable element engaging and protecting said female threads.

2. In a concrete railroad tie according to claim 1 wherein the hollow interior of said sleeve is formed

with a relatively smooth bore therein closed at the inner end thereof to seal said insert and protect the threads of same.

3. In a concrete product to be secured to an attached device, a body of concrete, an anchoring insert element embedded therein for forming a point of attachment to the body, laterally protruding portions of the insert serving to provide positive holding of the insert to the concrete body against axial movement of the insert in the body, positive engagement means interiorly of the insert for retaining said attached device, and a readily removable sleeve having a bore formed to include a closed inner end thereof and disposed axially within the insert in protective engagement with said positive engagement means.

4. In a concrete product, the construction defined in claim 3 wherein said positive engagement means comprises female threads formed about the interior of the insert and said sleeve includes male threads exteriorly thereof for engaging the first named threads.

5. In a concrete product, a body of concrete, an anchoring insert element embedded therein for forming a point of attachment to the body, laterally protruding portions of the insert serving to provide positive holding of the insert to the concrete body against axial movement of the insert in the body, positive engagement means interiorly of the insert and a readily removable protective sleeve axially within the insert in cooperative engagement with said positive engagement means, the sleeve being further formed with an antifriction, smooth bore therein closed at the inner end thereof to seal said insert and protect the threads of same.

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