July 28, 1970 H. C. LAMBORN 3,521,644

ANCHOR BLOCK ASSEMBLY

Filed Aug. 27, 1968 3 Sheets-Sheet 1

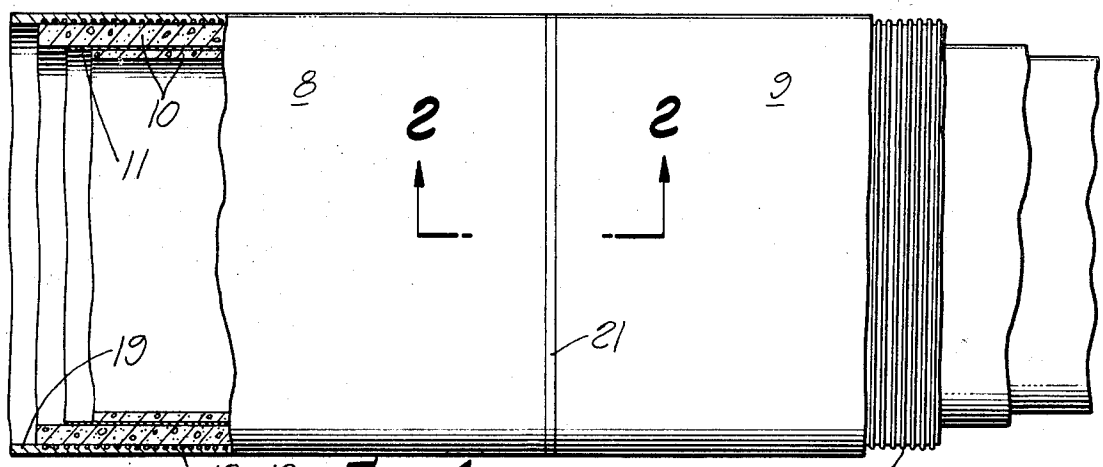


FIG. 1.

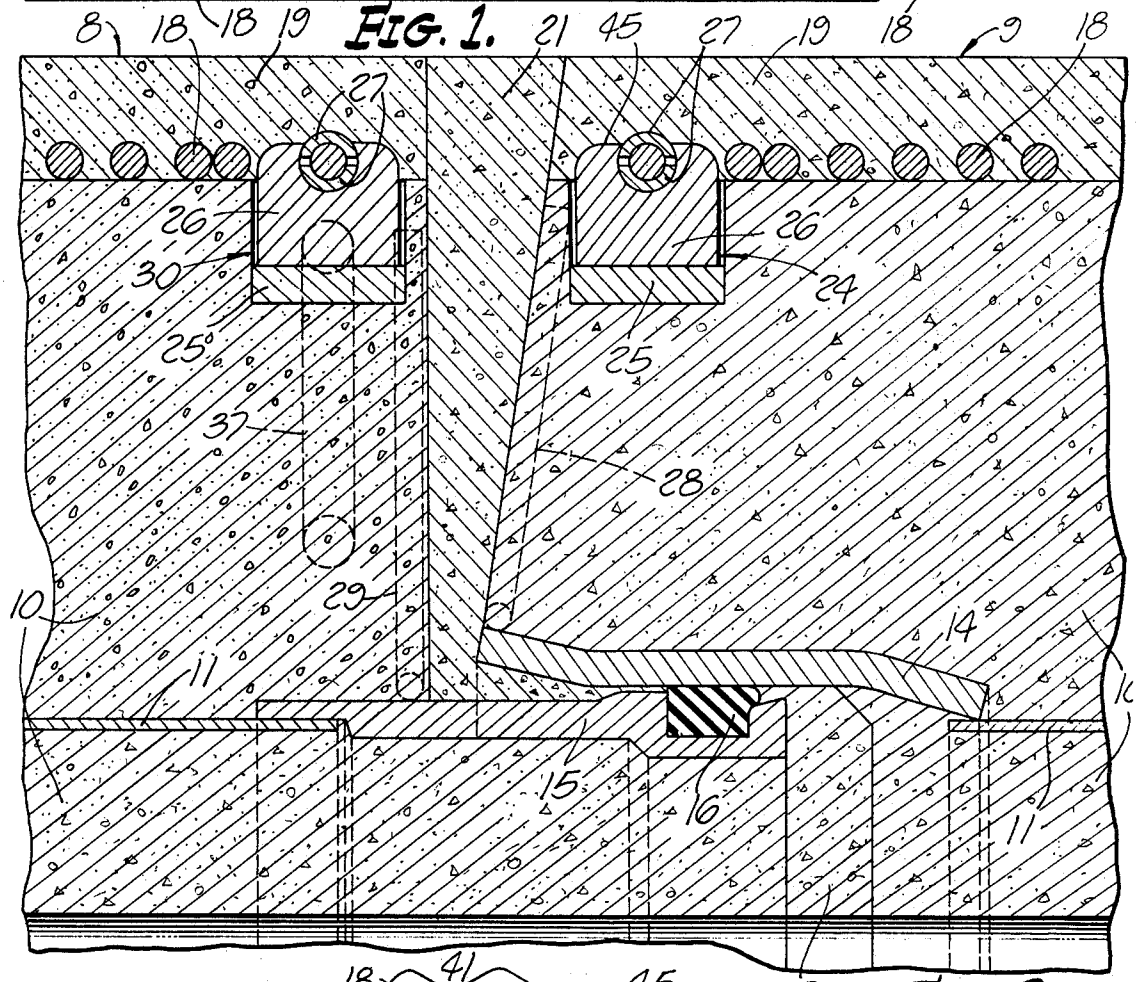


FIG. 2.

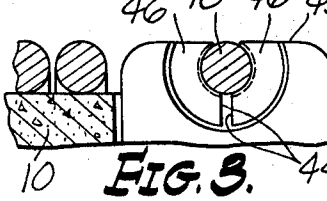


FIG. 3.

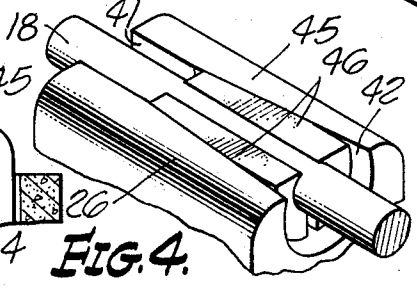


FIG. 4.

INVENTOR.
HOMER C. LAMBORN

BY Lyon & Lyon

ATTORNEYS

July 28, 1970 H. C. LAMBORN 3,521,644

ANCHOR BLOCK ASSEMBLY

Filed Aug. 27, 1968 3 Sheets-Sheet 2

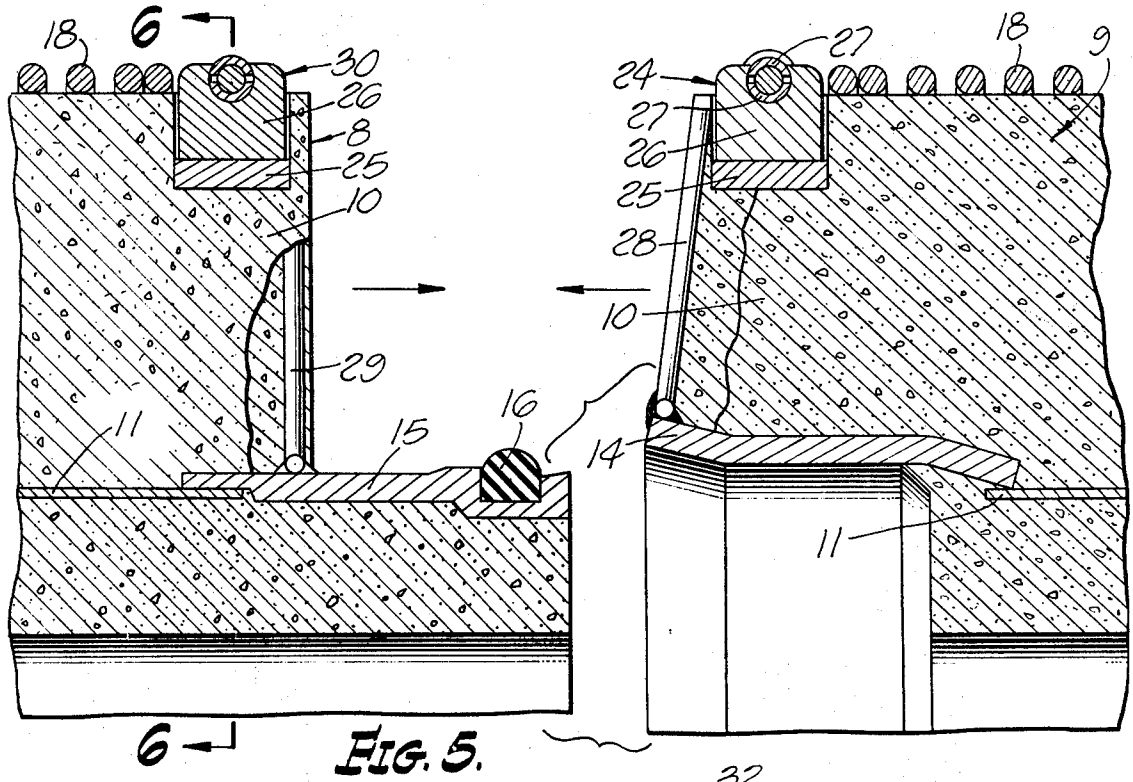


FIG. 5.

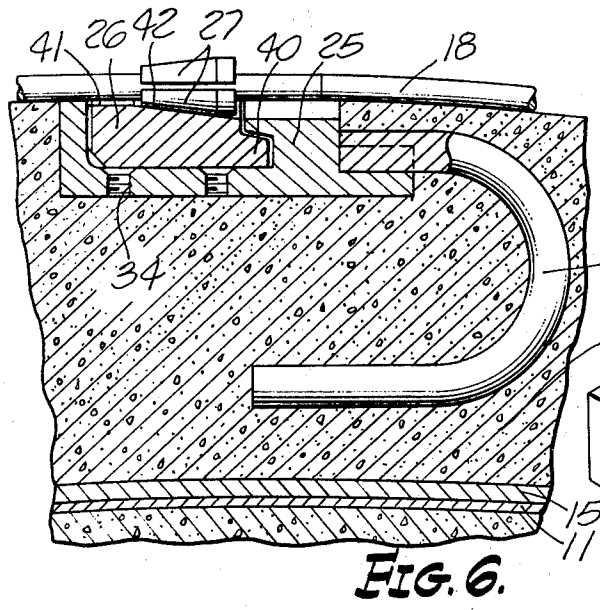


FIG. 6.

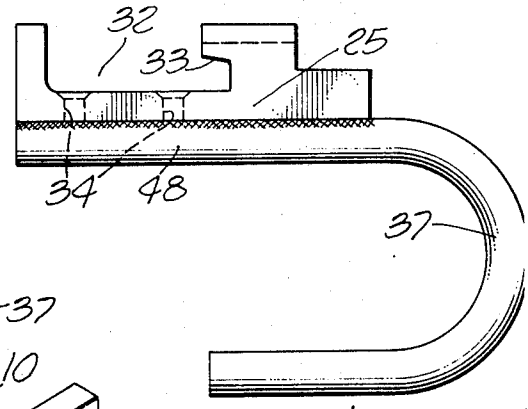


FIG. 7.

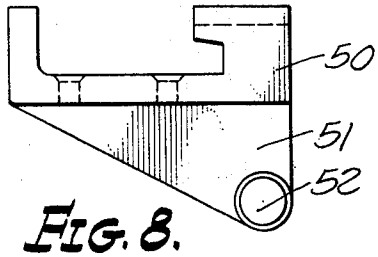


FIG. 8.

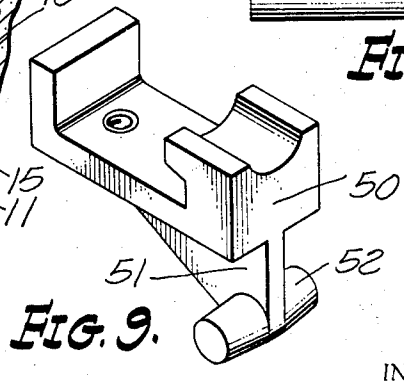


FIG. 9.

INVENTOR.
HOMER C. LAMBORN
BY Lyon & Lyon
ATTORNEYS

July 28, 1970 H. C. LAMBORN 3,521,644

ANCHOR BLOCK ASSEMBLY

Filed Aug. 27, 1968 3 Sheets-Sheet 3

FIG. 10.

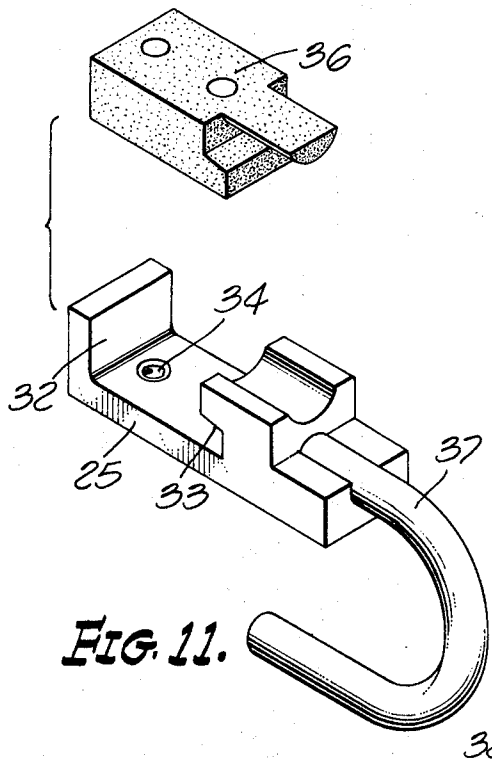


FIG. 11.

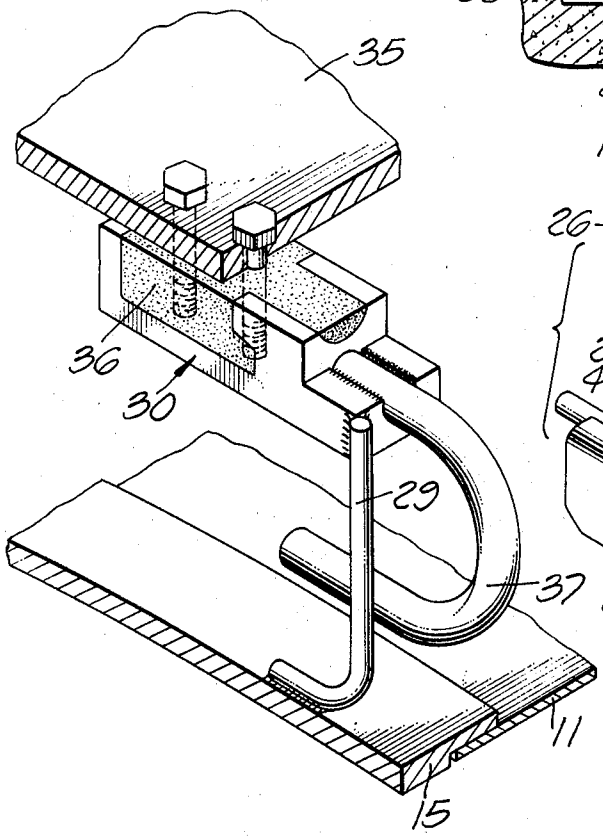


FIG. 12.

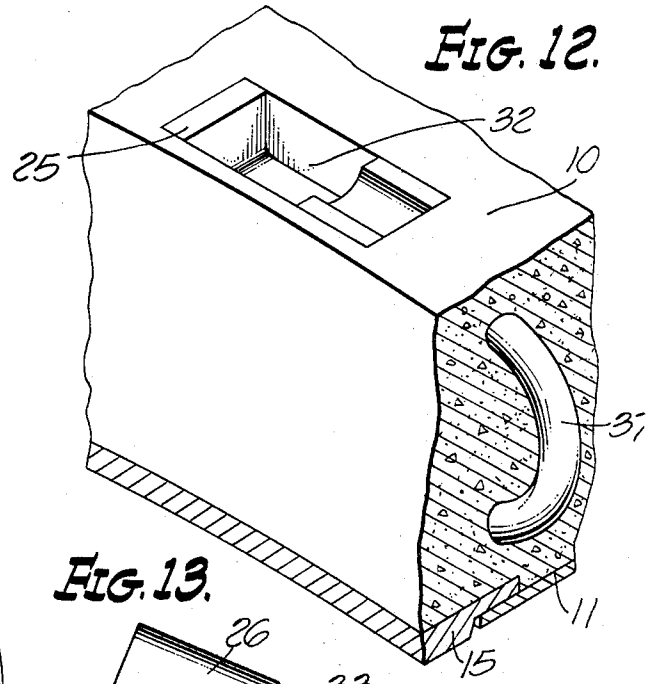


FIG. 13.

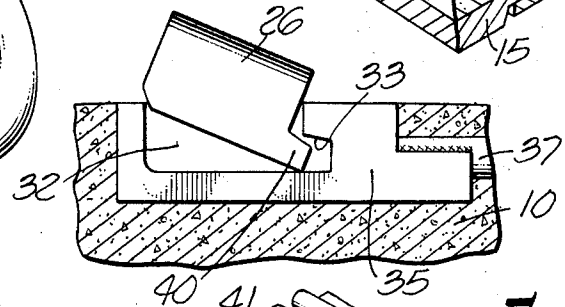
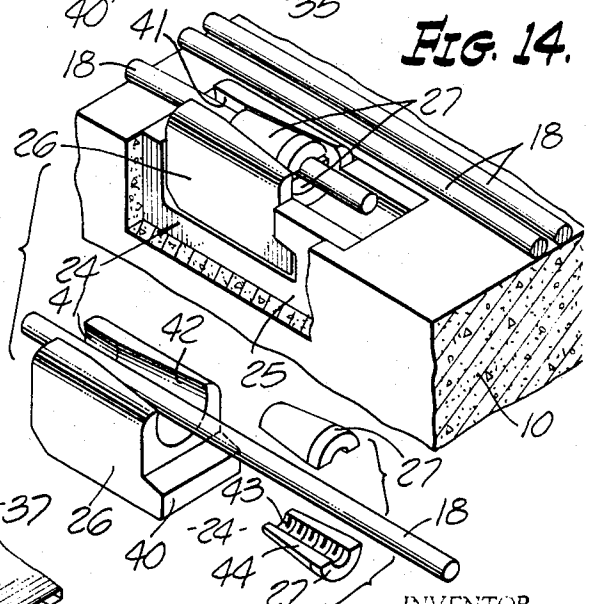


FIG. 14.



INVENTOR.
HOMER C. LAMBORN
BY Lyon & Lyon
ATTORNEYS

United States Patent Office 3,521,644 Patented July 28, 1970

3,521,644

ANCHOR BLOCK ASSEMBLY

Homer C. Lamborn, Glendora, Calif., assignor to United Concrete Pipe Corp., Baldwin Park, Calif., a corporation of California

Filed Aug. 27, 1968, Ser. No. 755,530
Int. Cl. F16l 9/00
U.S. Cl. 138—176 10 Claims

ABSTRACT OF THE DISCLOSURE

An anchor block assembly for use in retaining the ends of high tensile wire wrap in prestressed concrete pipe. The block assembly includes an embedment plate which is embedded within the concrete core of the pipe, and an anchor block which mates with and is retained by the embedment plate. Wire grips or jaws are fitted into an opening in the anchor block and grip the ends of the wire wrap. The construction of the block and jaws enables the same to be flush with, or only slightly higher than the periphery of the wire wrap. Several embodiments of the block assembly are disclosed.

This invention relates to prestressed concrete embedded cylinder or non-cylinder pipe and more particularly to a novel anchor block assembly for use in such pipe.

For purposes of discussion herein, cylinder pipe will be referred to although the present invention is equally applicable to non-cylinder pipe. Prestressed concrete cylinder pipe is well known and typically includes a cylindrical core of high quality concrete with a water tight membrane of lght gage metal cylinder embedded therein. Joint rings are affixed to the ends of the metal cylinder. High tensile strength stressing wire is wound on the periphery of the core, and the ends thereof are securely anchored at the respective ends of the pipe. After the wire is wrapped, a concrete encasement is applied over the wire.

Inasmuch as the wire is continuously wound on the concrete core at a very high tensile stress, for example one-hundred and fifty thousand pounds per square inch, it is necessary that suitable means be provided at each end of the pipe for securing the ends of the wire wrap. Over the years, various types of end fasteners have been devised, and each has had certain drawbacks. For example, one early type of end fastener included a metal block cast into the core, the metal block having a number of teeth for engaging the end of the wire. With such fasteners, it was necessary to force the wire into the teeth which in turn nicked the wire. An advantage of this type of fastener was that it could be mounted flush with the wire wrap, however, it could not be used with a large and higher stress wire because of wire breakage promoted by the nicks in the wire. Also, this device usually protrudes through the exterior pipe form creating problems in stripping the form from the pipe core. Another type of block included a block member having jaws which fit therein, the jaws having slight serrations to grip the end of the wire. The block member was welded in an embedment plate. This arrangement reduced wire breakage as a result of nicking the wire, but because of the bulkiness of the block required to provide sufficient strength, the same extended considerably above the periphery of the wire wrap. This necessitated a substantial concrete covering over the block and an attendant bulge in the exterior of the pipe. Additionally, several different arrangements have been provided for securing the block in the concrete core, but many of these have been relatively bulky or have not provided a sufficient anchor with the concrete core.

Accordingly, it is a principal object of this invention to provide an improved anchor block assembly for use in prestressed concrete pipe.

It is another object of this invention to provide an anchor block for use in prestressed concrete pipe for retaining the ends of the wire wrap thereof and wherein said anchor block is substantially flush with the periphery of the wire wrap while still providing sufficient structural strength.

Another object of this invention is to provide an improved embedment plate assembly for retaining an anchor block in prestressed concrete pipe.

These and other objects and features of the present invention will become better understood through a consideration of the following description taken in conjunction with the drawings in which:

FIG. 1 is a side elevational view, partially in section, of two joined lengths of prestressed concrete cylinder pipe;

FIG. 2 is a cross-sectional view taken along a line **2—2** of FIG. 1 and illustrates an embodiment of an anchor assembly according to the present invention;

FIGS. 3 and 4 are fragmentary cross-sectional and perspective views, respectively, of another form of anchor block assembly according to the present invention;

FIG. 5 is a cross-sectional view illustrating the manner in which the ends of two pipes are joined;

FIG. 6 is a cross-sectional view taken along a line **6—6** of FIG. 5 illustrating an embodiment of the anchor block assembly of the present invention;

FIG. 7 illustrates a modification of the embedment plate shown in FIG. 6;

FIGS. 8 and 9 illustrate another embodiment of an embedment plate; and

FIGS. 10 through 14 are views illustrating the various steps in placing an embedment plate, casting the pipe, mounting an anchor block, and securing a wire wrap.

Turning now to the drawings, FIGS. 1 and 2 illustrate two joined lengths of prestressed concrete cylinder pipe **8** and **9** each having a concrete core **10** with a metal cylinder **11** embedded therein. A bell ring **14** is welded to the metal cylinder **11** of the pipe **9**, and a spigot ring **15** is welded to the end of the cylinder **11** of the pipe **8**. A round rubber gasket **16** is mounted between the rings **14** and **15** to provide a seal therebetween.

Each pipe **8** and **9** includes a high tensile wire wrap **18** and a concrete encasement **19** thereover. After the ends of the pipe **8** and **9** are joined in the field, cement mortar is placed as shown at **20** and **21** in a conventional manner.

The manufacture of such pipes is well known, and typically steel sheets are rolled into segments to form the cylinders **11**. The rings **14** and **15** are welded to the ends of the cylinders **11**. Concrete of predetermined thickness is cast on both sides of the cylinder **11** in a suitable form. Prior to casting, an embedment plate is mounted and cast into the core. The core is placed in a tension winding machine, and one end of a coil of high tensile steel wire is firmly anchored to the embedment plate. The core is revolved and the wire is wound helically around the core under a constant and uniform tension. The other end of the wire then is similarly anchored. The exterior of the pipe is then provided with the concrete encasement **19** to protect the metal parts from corrosive action. Each length of pipe **8** and **9** typically may be eight to twenty-four feet long and have a diameter of several feet. A seventy-eight inch inside diameter pipe may have a typical core **10** thickness of approximately seven and one-half inches, and an encasement **19** thickness of approximately one and three-fourths inches.

Turning again to the drawings, an anchor assembly **24** according to the present invention includes an embedment plate **25**, an anchor block **26** and wire grips or jaws **27**. A metal grounding rod **28** is welded to the anchor assembly **24** and to the bell ring **14**. A similar

rod 29 is welded between the anchor assembly 30 and the spigot ring 15. FIGS. 2, 6 and 10 illustrate in various views the embedment plate 25. This plate may be cast from steel to provide a receptacle or cavity 32 having a shoulder 33 for mating with and retaining the anchor block 26. Threaded openings 34 are provided for securing the plate to an outer form 35 (note FIG. 11) for the concrete core. As can be seen from FIGS. 10 and 11 a rubber, or other flexible material, filler block 36 is mounted in the receptacle 32 and this assembly is bolted to the form 35 prior to casting of the concrete core. The embedment plate has welded thereto a curved rod 37 which serves as an anchor rod for the embedment plate to provide a firmer bond between the plate 25 and concrete core 10.

The anchor block 26 is cast from steel and is substantially rectangular and includes a foot 40 as best seen in FIGS. 13 and 14. The block 26 has a flared opening therethrough including a cylindrical portion 41 and a conical portion 42. The wire jaws 27 have tapered exterior surfaces for fitting within the tapered portion 42 of the block 26. Typically, the slope of the tapered portion 42 of the block is approximately five degrees, and the exterior slope of the jaws is approximately five and one-half degrees thereby causing the serrations to penetrate the wire the least depth at the point of highest wire stress and the greatest depth at the point of lowest wire stress. Both of the jaws are provided with serrations or threads 43 (FIG. 14) to grip the wire. The faces 44 of the jaws which engage the wire may be oriented in several ways, but preferably vertical as shown in FIGS. 3 and 4.

After the core 10 is cast, the rubber block 36 is removed exposing the receptacle 32 in the plate 25. The block 26 then is inserted into the receptacle 32 of the embedment plate 25 as illustrated in FIG. 13. The wire 18 is laid into the opening in the block 26, and the jaws 27 are applied thereto and secured within the block as illustrated in FIG. 14. The wire 18 then is wrapped upon the periphery of the core 10 in a conventional manner as noted earlier.

It will be seen from FIGS. 2 through 4 that the upper surface 45 of the block 26 is flush, or substantially so, with the periphery of the wire wrap. The jaws 27 may be full jaws as illustrated in FIGS. 2 and 14 or may be machined down to provide partial jaws 46 as shown in FIGS. 3 and 4. It has been found that either arrangement provides sufficient structural strength for retaining the ends of the wire wrap, and either substantially reduces the necessary concrete covering required over the anchor block assembly. The arrangement illustrated in FIGS. 3 and 4 is preferred inasmuch as no additional concrete covering or encasement whatsoever is necessary while still providing sufficient structural strength to retain the ends of the wire wrap. As noted earlier, the anchor rod 37 affixed to the embedment plate 25 serves to provide a more secure anchor for the plate. The arrangement illustrated in FIG. 6 is suitable for five-sixteenths inch ASTM 227 Class II wire, but the arrangement of FIG. 7, wherein a longer rod 48 is welded along the bottom of the plate, is preferred for a larger diameter wire or higher class wire.

An alternative embodiment of an embedment plate is illustrated in FIGS. 8 and 9 which obviates the necessity of welding an anchor rod to the plate. This arrangement includes an embedment plate portion 50 having a depending web 51 and a cross bar 52 all cast of steel as a single unit. The bar 52, as will be apparent, serves to provide secure engagement with the concrete core.

As a typical example, the embedment plate 25 may be approximately four and three-fourths inches long, one and nine-sixteenths inches wide, and one and one-fourth inches high. The block 26 is approximately two inches long, one and one-half inches wide, and has a height from bottom to the center line of the opening therethrough of one and one-sixteenth inches, with the top thereof being dimensioned to be flush with the periphery of the size of wire used in the wire wrap.

The present embodiments of this invention are to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims therefore are intended to be embraced therein.

What is claimed is:

1. An anchor block assembly for use in retaining an end of the wire wrap around the core of a prestressed concrete pipe including a concrete covering over the periphery of the wire wrap, comprising

an embodiment plate having a receptacle therein, said embedment plate having a top surface which is adapted to be secured to a form during casting of the core of said pipe,

an anchor block configured to fit within said receptacle of said embedment plate for mounting said block and plate together, said anchor block having a tapered opening therethrough, said anchor block having a top surface extending above the top surface of said embedment plate when the two are mounted together the top surface of said block being substantially flush with the periphery of said wire wrap,

jaw means having an outer periphery for mating with the opening through said anchor block, said jaw means having an inner surface for gripping an end of said wire wrap, and

coupling means depending from said embedment plate for firmly securing the same within the core of said pipe.

2. An assembly as in claim 1 wherein

the periphery of said jaw means has a flat portion which is substantially flush with said top surface of said anchor block when said jaw means is mounted about said end of said wire and coupled within said opening in said anchor block.

3. An assembly as in claim 1 wherein

said coupling means includes a web depending from said embedment plate terminating in a bar member.

4. An assembly as in claim 3 wherein

the periphery of said jaw means has a flat portion which is substantially flush with said top surface of said anchor block when said jaw means is mounted about said end of said wire and coupled within said opening in said anchor block.

5. An assembly as in claim 1 wherein

said coupling means includes a curved rod welded to said embedment plate.

6. An anchor block assembly for use in retaining an end of the wire wrap around the core of a prestressed concrete pipe including a concrete covering over the periphery of the wire wrap, comprising

a rectangular embedment plate having an opening therein and a shoulder defining a notch, said embedment plate having a top surface which is secured to a form during casting of the core of said pipe,

a rectangular anchor block configured to fit within said opening in said embedment plate and having a foot for engaging the notch therein for mounting said block and plate together, said anchor block having a tapered opening therethrough in the longitudinal direction of said plate when the two are mounted together, said anchor block having a top surface extending above the top surface of said embedment plate when the two are mounted together, the top surface of said block being substantially flush with the perpihery of said wire wrap,

a pair of jaws having a tapered outer periphery for mating within the opening through said anchor block, said jaws having respective serrated inner surfaces for gripping an end of said wire wrap, and

said embedment plate including coupling means de-

pending therefrom which extends into the core of said pipe for firmly securing said embedment plate within said core.

7. An assembly as in claim 6 wherein

the outer periphery of said jaws have a planar surface which is substantially flush with said top surface of said anchor block when said jaws are mounted about said end of said wire and coupled within said opening in said anchor block.

8. An assembly as in claim 6 wherein

said coupling means includes a web depending from said embedment plate terminating in a cross bar member.

9. An assembly as in claim 6 wherein

the outer periphery of said jaws have a planar surface which is substantially flush with said top surface of said anchor block when said jaws are mounted about said end of said wire and coupled within said opening in said anchor block, and

said coupling means includes a curved rod welded to said embedment plate.

10. An assembly as in claim 8 wherein

the outer periphery of said jaws have a planar surface which is substantially flush with said top surface of said anchor block when said jaws are mounted about said end of said wire and coupled within said opening in said anchor block.

References Cited

UNITED STATES PATENTS

2,887,130	5/1959	Kell	138—176
3,164,874	1/1965	Reark	138—176 X
3,206,851	9/1965	Smith	138—176 X
3,243,153	3/1966	Kelly	248—226
3,258,033	6/1966	Ohnstad	138—176
3,355,529	11/1967	Easterday	138—176 X

HERBERT F. ROSS, Primary Examiner

U.S. Cl. X.R.

52—224