Sept. 27, 1966 D. A. HAUSMANN ETAL 3,275,040

OUTLET CONSTRUCTION FOR CONCRETE PIPE AND METHOD OF MAKING SAME

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Fig. 1

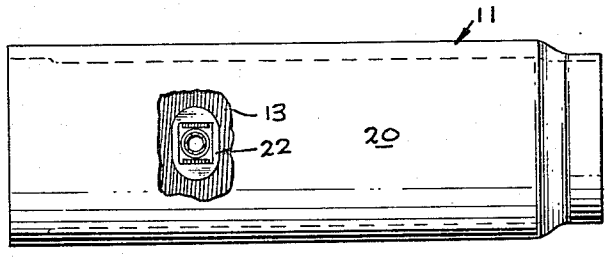
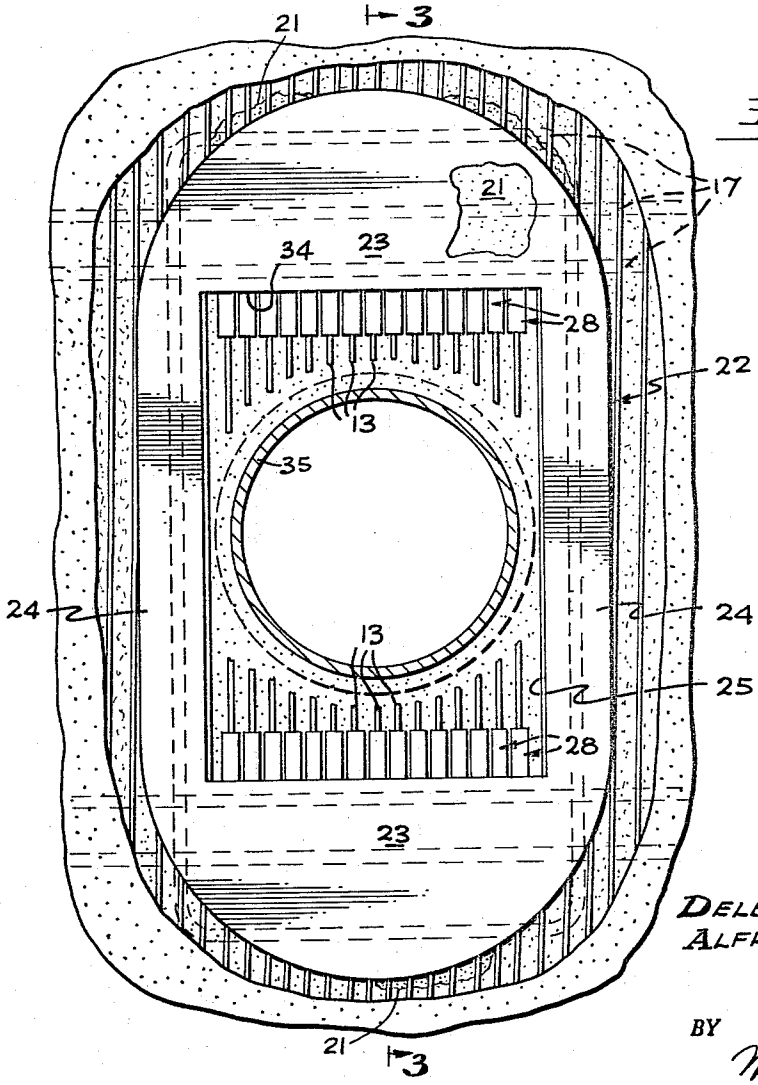


Fig. 2



DELBERT A. HAUSMANN
ALFRED B. SZULC
INVENTORS

BY Mason & Graham

ATTORNEYS

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Fig. 3

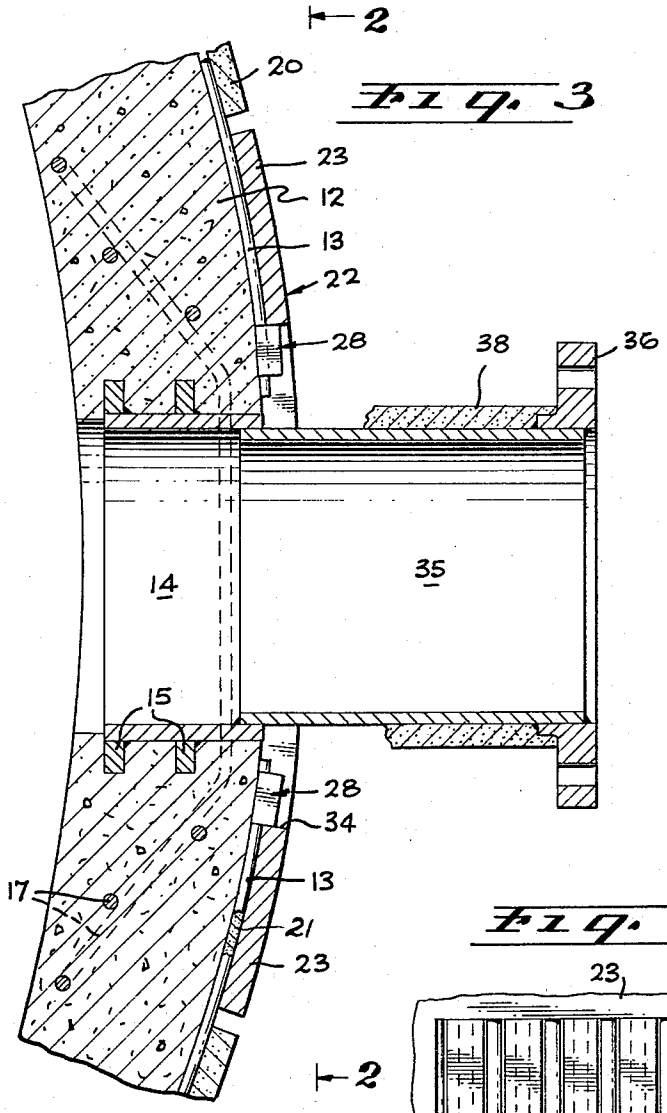


Fig. 4

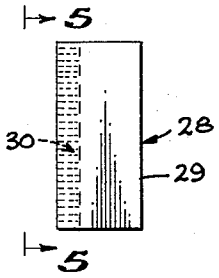


Fig. 5

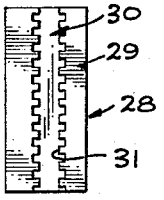


Fig. 6

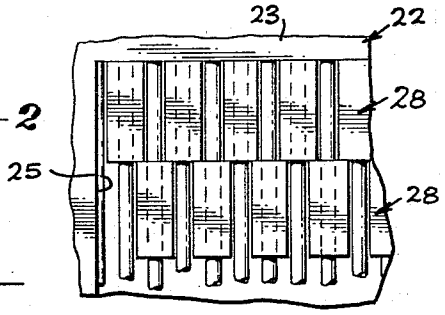
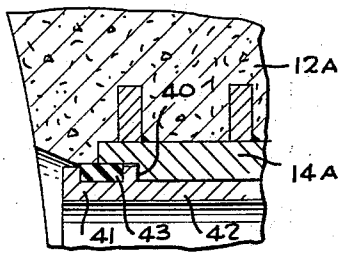


Fig. 7



DELBERT A. HAUSMANN
ALFRED B. SZULC
INVENTORS

BY Mason & Graham

ATTORNEYS

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OUTLET CONSTRUCTION FOR CONCRETE PIPE AND METHOD OF MAKING SAME

Delbert A. Hausmann, Glendale, and Alfred B. Szulc, Alhambra, Calif., assignors to American Pipe and Construction Co., Monterey Park, Calif., a corporation of California

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11 Claims. (Cl. 138—176)

This invention has to do generally with the fabrication of prestressed concrete pipe of the type embodying prestressing wire which is wound helically and secured under tension around the concrete body of the pipe and particularly with the provision of an outlet in a pipe section.

A common method of providing an outlet in a pipeline is to use a special steel section having the outlet which is inserted between the ends of two of the pipe sections. However, this method is objectionable because of the expense of fabrication and installation.

Outlets have been provided in prestressed concrete pipe of the type having an embedded steel cylinder by reinforcing the cylinder with a wrapper sheet. A steel sleeve of the required diameter is then welded to the wrapper sheet and this extends to the outside diameter of the pipe, The core is then cast, prestressed and coated. After the coating has cured it is broken away in the vicinity of the outlet to expose the prestressing wires which are then cut around the opening and an outlet riser pipe section is welded to the previously placed sleeve. The whole assembly is then protected by a cement mortar encasement.

There are serious objections to this type of construction. There is a tendency for the pipe to develop circumferential cracks around the edges of the wrapper sheet due to change in the effective wall section and some loss of prestress due to severance of the prestressing wires.

This weakening effect is especially objectionable in a prestressed pipe made without a steel cylinder embedded in the concrete wall since cracking and leakage will result. For these reasons no satisfactory means has been devised to provide an outlet in such pipe either during fabrication or afterwards without weakening the pipe.

Therefore, an object of the present invention is to provide a new and improved outlet construction for a prestressed concrete pipe which eliminates the above-noted objections and difficulties.

Another object is to provide a new and improved method of providing an outlet in a prestressed concrete pipe of the type wherein the body of the pipe does not include a reinforcing cylinder.

A further object is to provide a novel saddle plate for use in providing an outlet in a prestressed concrete pipe.

Another object is to provide novel means for anchoring the prestressing wire so that the same may be cut to provide for an opening and yet remain in tension.

These and other objects will be apparent from the drawings and the following description. Referring to the drawings:

FIG. 1 is a side elevational view of a concrete pipe embodying the invention shown with the covering mortar coat partially broken away to expose the prestressing wire and a saddle member which forms a part of the outlet construction;

FIG. 2 is a sectional elevational view on line 2—2 of FIG. 3, the view being similar to FIG. 1 but on a larger scale and showing only the outlet and immediate surrounding portion of the pipe;

FIG. 3 is a fragmentary sectional view on line 3—3 of FIG. 2;

FIG. 4 is a side view of an anchor member;

FIG. 5 is an edge view in the direction of line 5—5 of FIG. 4 of the anchor member of FIG. 4;

FIG. 6 is a fragmentary plan view of a modified arrangement of anchor members; and

FIG. 7 is a fragmentary sectional view of a modification.

More particularly describing the invention, numeral 11 generally designates a concrete pipe which has a cast core body 12 (FIG. 3) of concrete having a helical external wrapping of high tensile wire 13 which has been wound under tension about the body and secured at each end thereof, thereby prestressing the body. When the concrete body is cast, an outlet sleeve 14 is placed in the mold and this may have one or more annular external flanges 15 which serve to anchor the sleeve in the body of the pipe. The pipe body may also be provided with a suitable bar reinforcement structure 17 around the outlet sleeve.

After the concrete body has been prestressed by the wrapping of the high tensile wire 13 therearound, a cement mortar encasement or coating 20 is applied over the wrapping except in a limited region around the outlet sleeve 14. This mortar coating is of substantial thickness so that the wire turns are buried beneath the surface thereof as best seen in FIG. 3.

Subsequent to the placement of the coating 20 a cement mortar 21 of plastic consistency is applied between the turns of the reinforcing wire 13 in a limited area to be covered by a special saddle plate 22. The latter is then placed in position around the opening in the pipe defined by the outlet sleeve 14 and seated against the turns of wire 13, squeezing out any excess cement mortar until the saddle rests firmly on the wire turns as shown in FIG. 3.

Saddle plate 22 comprises a plate-like body which is curved to the general radius of curvature of the outer surface of the wire wrapping 13 so that it lies flat against the wire. The saddle plate includes two, plate-like end portions 23 connected by elongated side sections 24 with the plate as a whole defining an opening or open area 25 which is shown as generally rectangular and which is larger than the area of the outlet sleeve so that there is clearance between the sleeve and the saddle itself.

After the saddle has been seated and placed we install two anchors 28 on each turn of the wire 13 which is exposed within the open area 25 of the saddle. These anchors are each comprised of a body 29 of steel having a longitudinally extending wire-receiving channel 30 with toothed edges 31 at each side. The width of the slot 30 relative to the diameter of the wire is such that the anchor must be driven onto the wire. To install an anchor it is driven onto the wire and into place as shown in FIGS. 2 and 3 with its outer end abutting the inner edge 34 of the end section of the saddle. When these anchors are all installed the wires are severed inwardly of the anchors to remove a section from each (not shown) which would otherwise obstruct the outlet opening, leaving the free ends as shown in FIG. 2. The wires may readily be cut by relieving the tension therein by heating them with a cutting torch along the center line of the outlet and then flame-cutting them around the outlet opening.

The next step in the process comprises the welding to the outlet sleeve of an outlet riser or pipe section 35 which may have a flange 36 at its outer end. Finally a cement mortar coating 38 is applied over the exposed parts.

In the event that the wire convolutions of the prestressing wire are extremely close together the anchors may be arranged in two rows (or more) with the anchors of the inner row seated against the ends of the anchors of the outer row as shown in FIG. 6.

It will be apparent that the saddle plate acts as a yoke to which the stress of the cut wires is transferred by means

of the anchors thus preventing relaxation and consequent loss of the required prestress. Also, by transmitting the forces from the cut wires around the outlet by means of the yoke, there is a minimum of disturbance to the continuity of the core which is particularly important in pipe not embodying a steel cylinder reinforcement member in the pipe body.

While we have shown and described a concrete pipe of the type not having a steel cylinder embedded in the wall, we contemplate that the method and construction are also suitable for pipe having a steel cylinder in the pipe wall. Such cylinder would be provided with an opening to accommodate a sleeve **14** and the two parts preferably would be welded together.

In FIG. 7 we show an alternate construction wherein the outlet sleeve, here designated **14A**, is provided with a recess **40** to receive a spigot-type end **41** of the outlet riser **42** around which is placed a resilient gasket **43** of rubber or other suitable material. This construction eliminates water-tight welding of the outlet riser **42** to the outlet sleeve. The compressed rubber gasket **43** provides an effective seal to the passage of water between the outlet sleeve **14A** and the outlet riser **42** and between the core body **12A** of concrete and the outlet sleeve **14A**. The recess **40** in the outlet sleeve **14A** also serves to resist any outward thrust which develops along the axis of the outlet riser **42** due to hydrostatic pressure.

Although we have shown and described preferred forms of our invention, we contemplate that various changes and modifications can be made therein without departing from the invention, the scope of which is indicated by the following claims.

We claim:

1. In an outlet construction for a concrete pipe having a concrete core body and wrappings therearound of high tensile wires under tension, an outlet sleeve in the core body providing an outlet opening therethrough, a saddle plate overlying the wires in a region about said opening and having an open area encompassing the opening in the pipe core body, and means cooperatively associated with the saddle plate securing the individual turns of wires in tension in the open area of the saddle plate at opposite sides of the opening in the pipe, said secured turns each being interrupted between its regions of being secured whereby the opening in the pipe is not obstructed.

2. The construction set forth in claim **1** in which a riser pipe is joined to said outlet sleeve and forms a continuation thereof.

3. The construction set forth in claim **2** in which a protective coating of cement mortar covers said wires, said saddle and said securing means.

4. In an outlet construction for a concrete pipe having a concrete core body and having helical wire wrappings therearound of high tensile wires under tension, an outlet sleeve in a core body providing an outlet opening therethrough, a saddle plate seated on said wires in the region of said outlet opening and having an open area encompassing the outlet opening, and anchor members secured to the individual turns of the wires within the open area of the saddle plate at each end thereof and abutting the edges of the saddle plate, said secured individual turns each being interrupted between anchor members whereby the outlet opening in the pipe is not obstructed.

5. The construction set forth in claim **4** in which said saddle plate is accurately concave on its underside with a radius of curvature substantially the same as that of the outer side of the wire wrappings.

6. The container set forth in claim **4** in which a riser pipe is joined to said outlet sleeve and forms a continuation thereof.

7. The construction set forth in claim **4** in which a protective coating of cement mortar covers said wires said saddle member and said clamp members.

8. The method of making a prestressed concrete pipe, which comprises casting the pipe core body with an outlet sleeve in place defining an outlet opening, prestressing the core body after the same has cured substantially by helically wrapping the same from end to end with a high tensile wire under tension and anchoring the wire under tension, placing a saddle plate having a relatively large central open area on said wrapping in position such that said open area encompasses the outlet opening, securing the individual turns of the wire wrapping which are exposed in the open area of the plate and overlie the outlet opening at each side of the open area of the saddle plate against movement in a direction away from the outlet opening, and severing sections from the secured turns of wire at each side of the outlet opening and removing said severed sections whereby to leave said outlet opening unobstructed.

9. The method set forth in claim **8** in which said wire wrapping is covered with a layer of cement mortar except in a limited area around said outlet opening prior to placing said saddle plate, and in which said saddle plate and contiguous area of the pipe are covered with cement mortar after said wire sections have been removed.

10. The method set forth in claim **9** in which a rise piper is welded to said outlet sleeve.

11. In an outlet construction for a concrete pipe having a concrete core body and wrappings therearound of high tensile wires under tension, an outlet sleeve embedded and anchored in the core body providing an outlet opening therethrough, a saddle plate overlying the wires and having an opening area encompassing the opening in the pipe core body, means cooperatively associated with the saddle plate securing the individual turns of the wires in tension in the open area of the saddle plate at opposite sides of the opening in the pipe, said secured turns each being interrupted between its regions of being secured whereby the opening in the pipe is not obstructed, a riser pipe received in said outlet sleeve and projecting therebeyond, interlocking means on the inner end portions of said sleeve and riser pipe preventing outward movement of said riser pipe, and a seal ring between said sleeve and riser pipe.

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LAVERNE D. GEIGER, *Primary Examiner.*

LEWIS J. LENNY, *Examiner.*

T. MOORHEAD, *Assistant Examiner.*