Dec. 9, 1941. W. W. TRICKEY 2,265,328

PIPE

Original Filed May 11, 1936

Fig. 1.

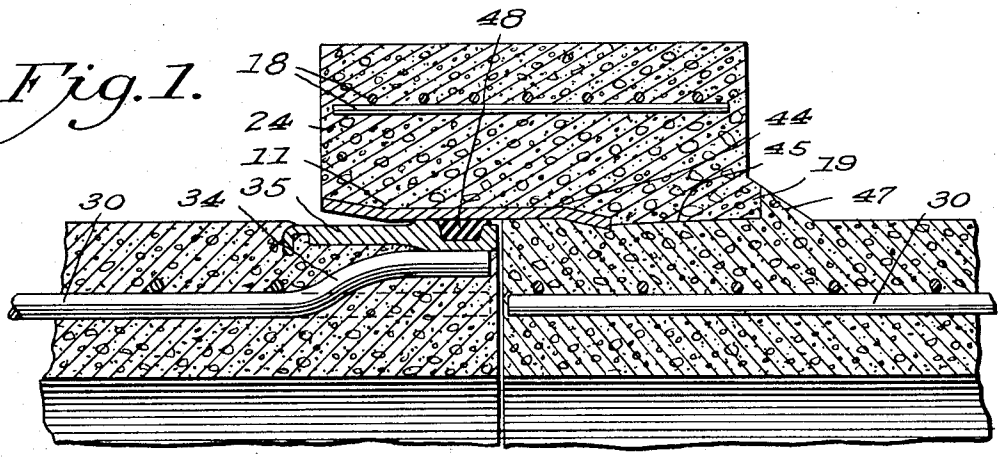


Fig. 2.

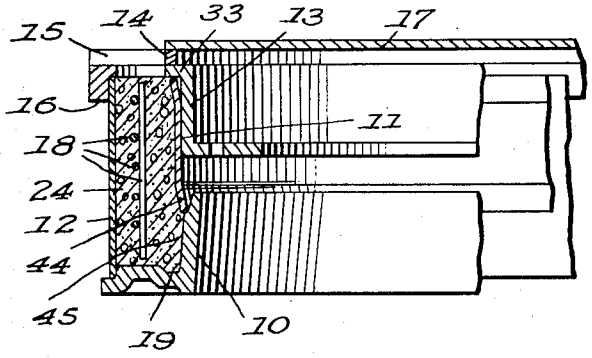
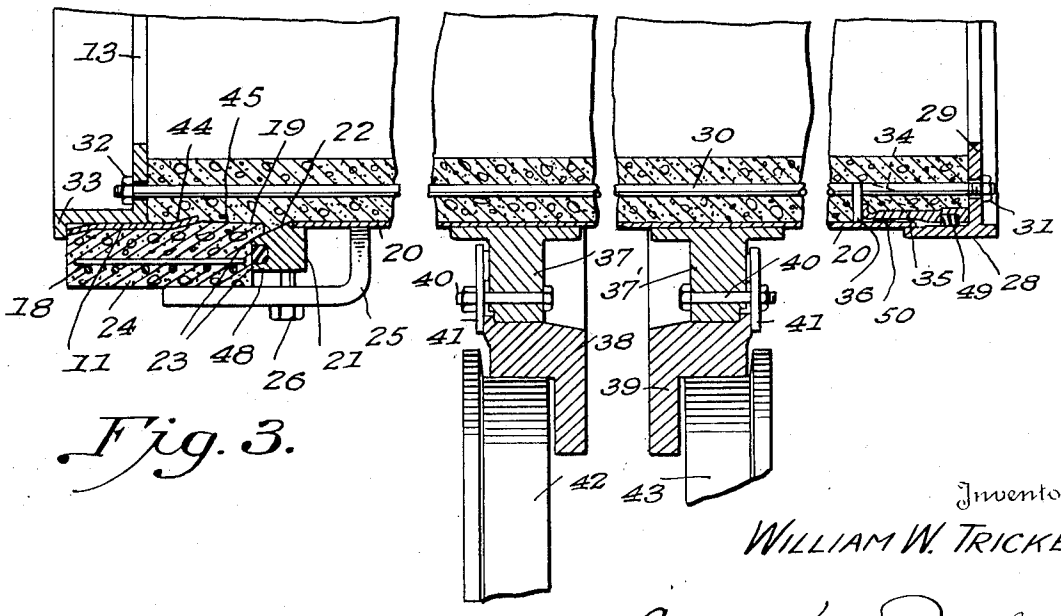


Fig. 3.



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2,265,328

PIPE

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Original application May 11, 1936, Serial No. 79,054, now Patent No. 2,216,896, dated October 8, 1940. Divided and this application December 9, 1939, Serial No. 308,337

2 Claims. (Cl. 285—112)

This invention relates to concrete pipe of the bell and spigot type.

Among the objects of the invention is to provide a durable and reliable concrete pipe of the kind having permanently joined conduit and collar portions connected together.

Another object is to provide a concrete pipe of the bell and spigot variety wherein a metallic bearing ring for the interior of the bell is anchored to both the collar which forms the bell and the conduit portion of the pipe.

Other objects of the invention are to provide concrete pipe wherein the collar of the pipe and a metallic bearing member are intimately bonded to each other and to the exterior surface of the conduit portion of the pipe, and to provide means for engaging the collar to the conduit whereby these members are locked against axial displacement.

Further and other objects of the invention will be hereinafter set forth in the accompanying specification and claims and demonstrated by the drawing which shows by way of illustration a preferred embodiment and the principle of my invention, and what I now consider the best mode in which I contemplate applying that principle. Other embodiments of the invention employing the same principle may be used and structural changes made as desired by those skilled in the art, within the spirit of the appended claims and without departing from the present invention.

Having reference to the drawing:

Fig. 1 is a longitudinal section of a portion of joined ends of concrete pipes made according to the present invention.

Fig. 2 illustrates a type of mold which may be used for casting the collar.

Fig. 3 shows a section of the mold in which the conduit portion of the pipe is cast.

This application is a division of my copending application Serial No. 79,054, which was filed in the United States Patent Office on May 11, 1936, which matured into Patent No. 2,216,896, dated October 8, 1940. Inasmuch as the invention claimed in the present application is confined to an article of manufacture and my aforesaid prior application contains a complete description of a process for producing the article, I shall describe herein only so much of the process as may be necessary to understand the structure and characteristics of the article.

The collar of the present pipe is fabricated as a finished unit before it becomes a part of the pipe. Included as a part of the collar is a metallic ring which is to serve as a bearing surface within the bell of the pipe. By completing the collar first, it is possible to unite intimately the concrete of the collar and the metallic bearing ring. While the mold for casting the collar may take other forms, I prefer to use a type of mold wherein the metallic bearing ring forms part of the inner wall of the mold. Such a mold is illustrated in Fig. 2 of the drawing. The mold has an annular base 10 which is designed to support the steel bearing ring 11 in the position it is to remain as a part of the finished collar. The mold cavity is completed by an outer wall 12 which is supported upon the base 10. The bearing ring 11 is concentric with the cylindrical portion of the mold and defines a true circular section.

The bottom of the mold forms the end of the collar that is remote from the bell opening and this can be entirely plain if desired but I prefer that it have a projection 19 which is provided with a sloping surface at its outer periphery. The mold is so designed that the sloping surface will be that of a truncated cone having the same axis as the inner and outer cylindrical walls of the collar. The advantage of providing a sloping surface having this relationship to the collar will appear hereinafter in reference to its function in the forming of the complete pipe.

An inner core member 13 is supported upon the upper edge of the bearing ring. In addition to its function as a guide and core this member has the function of later serving as an element in the molding of the complete pipe.

When molding the collar, a cover ring 14 is seated upon the core 13. This cover ring is provided with a number of outwardly extending fingers 15 leaving openings therebetween for permitting the introduction of concrete to the mold cavity. The fingers 15 have attached thereto a depending rim 16 which sets upon and overlaps the upper edge of the outer mold wall 12. The mold cover ring 14 has secured thereto a circular plate 17 which covers the central area of the mold above the inner core member 13. Rings 14 and 16 and plate 17 are rigidly associated and they provide means for truing up the concentricity and spacing of the inner and outer mold walls.

Whatever steel reinforcing that may be desired is introduced into the mold cavity. This reinforcing usually takes the form of steel longitudinal bars and encircling bands 18.

Fresh concrete is introduced into the mold up to the top edge of the bearing ring and precautions are taken to assure that it is properly placed so that no voids will remain within the

finished collar. The type of mold illustrated may be vibrated for this purpose or the concrete may be tamped by hand. Compactness of the concrete assures a close bond against the outer periphery of the bearing ring and securely attaches the ring to the concrete of the collar. After the concrete has set, the demountable mold parts are removed and the collar is lifted from the base 10.

The collar, together with the core member 13 is then used as a part of the mold in which the conduit portion of the pipe is formed. While this mold may be so made as to be complete in itself and contain the collar, a convenient manner of forming the same is to use a rotatable shell or drum 20 as the main part of the mold and mount the collar upon one end thereof. The mold so formed is complete when end walls are in place, Fig. 3. The shell of the mold is cylindrical and is capable of separation longitudinally into several sections for extricating the completed pipe.

One end of the shell 20 is provided with a ring 21 against which the collar of the pipe is held. This ring is welded to the shell or is otherwise permanently attached thereto. The ring is provided with two surfaces 22 and 23 against which corresponding surfaces of the collar of the pipe rest. Surface 22 is in the form of a truncated cone having the same axis as the axis of the cylindrical shell 20, and it bears the same relation to radial surface 23 as the corresponding sloping surface at the bottom of the collar mold bears to the adjacent plain surface at the bottom of the collar mold, Fig. 2. Accordingly, the sloping surface and the adjacent radial surface upon projection 19 of the collar conforms exactly with sloping surface 22 and radial surface 23 of ring 21 against which they are brought, with the result that when the collar is properly held in place against ring 21, the bearing surface of the bell will be concentric with the cylindrical wall of the mold 20. The centering of the collar is thereby automatically accomplished by the holding of the collar in place against ring 21 of the cylindrical mold. This has the result of eliminating errors which might otherwise occur if it were necessary to rely upon manual adjustment to center the collar in reference to the cylindrical mold. If the collar is not provided with a projection and sloping surface, other means may be resorted to for holding the collar in place, such as, for example, the dogs 25 which are provided for supporting the collar until the same is firmly assembled as a part of the mold.

A number of these dogs are spaced circumferentially about the mold. The dogs are engaged by cap screws 26 which are carried by the ring 21. One end of each dog rests against the outer surface of mold wall 20 and the other end serves as a support for the collar. Before the position of the collar in reference to the mold is determined by the sloping surface 22, the collar may be preliminarily adjusted in reference to the tubular wall by the use of screws 26.

The other end of the tubular mold 20 carries a ring 28 having a radial flange 29 which serves as an end wall for forming the spigot end of the pipe.

Concrete pipe which is designed to withstand pressure is provided with longitudinal and circumferential reinforcing bands which may be assembled in the manner illustrated. If desired some of the longitudinal rods 30 may be provided with nuts 31, 32 at their ends and used to support and hold in place the end rings 13 and 29, but these rings may be held in their proper relation in respect to the mold in any other manner as by devices attached to the outside of the mold. The end ring 13 has a flanged lip 33 engaging the end of the collar 24 whereby the collar is maintained in proper position against ring 21. Some of the longitudinal bars 30 may be bent in the manner illustrated at 34 and welded to the steel ring 35, which is to form the spigot bearing-ring of the finished pipe. Short braces 36 may be used to assist in maintaining the spigot ring in its proper position within the mold.

When the mold for the conduit portion of the pipe has been completely formed with the collar 24 and the end rings 13 and 29 forming a part thereof, fresh concrete is introduced within the mold as the same is rotated, care being taken to introduce the concrete in sufficient quantity to obtain the thickness of pipe wall desired. Since the wall being formed is of substantially uniform thickness no area of unequal strains will develop as the concrete is setting.

For rotating the mold, the exterior of its wall 20 is provided with rings 37, 37', which carry trunnion rings 38, 39. These trunnion rings are held in place by bolts 40 and dogs 41. One trunnion ring rests upon a pair of rollers 42 and the other trunnion ring rests upon a pair of rollers 43, which are motor-driven. The entire mold assembly is rotated until the fresh concrete of the conduit portion of the pipe has become compacted sufficiently to withstand handling of the mold. When sufficient time has elapsed for this to have occurred, the mold is removed from its rollers. When the pipe is removed from the mold the ends of the longitudinal rods 30 which extend beyond the concrete are cut and the pipe is ready for use.

By rotating the mold as the concrete of the conduit portion of the pipe is setting, the centrifugal action developed causes the formation of a close bond between the fresh concrete and the interior of the collar and the avoidance of any condition likely to cause weakness or looseness between the collar and conduit portion of the pipe.

My method also provides a means of designing the interior contour of the collar to lock or key the collar to the remaining portion of the pipe. As illustrated in Fig. 2, the collar is provided with two non-cylindrical surfaces 44, 45, in the form of truncated cones and a radial surface upon projection 19 which are to be engaged by complementary surfaces upon the conduit portion of the pipe. The surface which is complementary to the radial surface upon projection 19 is part of abutment ring 47, an integral part of the conduit portion of the pipe.

The tubular mold is provided with such gaskets as may be needed to prevent the escape of fluid concrete and water while the mold is being rotated. In the mold illustrated in Fig. 3 a gasket 48 is provided at the bell end of the pipe between the ring 21 and collar 24 and two gaskets 49 and 50 are provided at the spigot end of the pipe for preventing the escape of concrete ingredients about the spigot bearing ring 35 during the centrifuging operation. In referring to concrete I mean such cementitious materials as are commonly used in manufacturing water and other fluid conducting pipes.

What is claimed is:

1. A composite reinforced concrete pipe having a bell on the exterior of and extending beyond the

conduit of the pipe and comprising, in combination, a reinforced concrete conduit having a wall thickness at its ends substantially the same as the wall thickness of the greater portion of its length, a collar including concrete and metallic reinforcement and bell lining together constituting a prefabricated unit, said unit being inseparately secured to and mounted upon the exterior of said conduit at one end of the conduit and extending beyond said end to form the extended bell of the pipe, and means common to said collar and conduit respectively for locking said collar and conduit together against relative displacement along the axis of the pipe, said locking means comprising adjacent portions of the collar and conduit including pairs of complementary and intimately engaging concrete surfaces of the collar and conduit which slope with respect to the axis of the pipe in such manner as to maintain the collar and conduit permanently inseparable.

2. A composite reinforced concrete pipe having a bell on the exterior of and extending beyond the conduit of the pipe and comprising, in combination, a conduit having a reinforced concrete wall whose wall thickness at its ends is substantially the same as that of the wall for the greater portion of the conduit, a unitary collar of reinforced concrete overlapping the exterior of the conduit at one end and extending beyond its said end to form the bell of the pipe, said collar having a metallic ring which lines the interior of the bell and extends along the exterior of the conduit for a portion only of the overlapping length of the collar, the lengths of the collar and metallic lining ring which overlap the conduit having intimately engaging surfaces which are oblique to the pipe axis and thereby anchor the metallic lining ring to the pipe and lock the collar and conduit inseparable with respect to each other to form a composite pipe with an extended bell.

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