

Patents Act 1952

APPLICATION FOR A STANDARD PATENT

593545

I/~~WE~~X CARLOS JOAQUIM COSTA MARTINS DE OLIVEIRA, of Estrada da Luz, no. 232-110, Dto., Lisboa, Portugal

hereby apply for the grant of a Standard Patent for an invention entitled:

PREFABRICATED DRAIN-PIPE WITH LONGITUDINAL JOINTS

which is described in the accompanying complete specification.

..... This application is made under the provision of Part XVI of the
..... Patents Act 1952 and is based on an application for a patent
..... or similar protection made

..... in Portugal

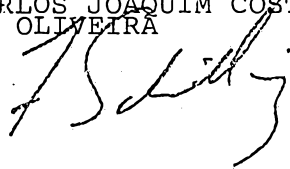
on 27 March 1985
(No. 80.171)

..... in

on
(No.

..... My/~~Our~~ address for service is: F.B. RICE & CO.,
..... 28A Montague Street,
..... Balmain, NSW 2041

..... Dated this 21st day of March 1986 .
..... CARLOS JOAQUIM COSTA MARTINS
..... DE OLIVEIRA

By: 
Patent Attorney

To : The Commissioner of Patents
COMMONWEALTH OF AUSTRALIA

F.B. RICE & CO.,
Patent Attorneys,
Sydney.

APPLICATION ACCEPTED AND AMENDMENTS

ALLOWED 11. 2. 89

120

DECLARATION IN SUPPORT OF AN APPLICATION A CONVENTION APPLICATION FOR A PATENT OR PATENT OF ADDITION

In support of the Application
Convention Application made by

Carlos Joaquim Costa Martins de Oliveira

for a patent
~~patent of addition~~ for an invention entitled
"Prefabricated Drain-Pipe with Longitudinal Joints"

I/~~We~~ Carlos Joaquim Costa Martins de Oliveira

do solemnly and sincerely declare as follows:

(1) I am/~~We~~ are the applicant for the patent
~~patent of addition~~

(~~I~~) am authorised by

~~the applicant~~ ~~xxxxxx~~ ~~for the~~ ~~xxxxxx~~ ~~patent~~ ~~of addition~~ ~~to make this declaration~~

~~on~~ ~~behalf~~

(2) The basic application as defined by Section 141
~~142~~ of the Act was
made in Portugal on 27 March 1985 ~~were~~
~~in~~ ~~on~~

by Carlos Joaquim Costa Martins de Oliveira

(3) Carlos Joaquim Costa Martins de Oliveira

is the actual inventor of the invention ~~and the facts upon~~
~~which~~
~~is/are entitled to make the application are as follows~~

The basic application referred to in paragraph 2 of this Declaration
is/~~are~~ the first application made in a Convention country in respect of
the invention the subject of the application.

Declared at Lisboa this 12th day of April 1989.

Carlos J.C. Martins de Oliveira
(Carlos Joaquim Costa Martins de Oliveira)

(12) PATENT ABRIDGMENT (11) Document No. AU-B-55089/86
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 593545

(54) Title
 PREFABRICATED DRAIN-PIPES WITH LONGITUDINAL JOINTS

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(71) Applicant(s)
 CARLOS JOAQUIM COSTA MARTINS DE OLIVEIRA

(72) Inventor(s)
 CARLOS JOAQUIM COSTA MARTINS DE OLIVEIRA

(74) Attorney or Agent
 F.B. RICE & CO.

(56) Prior Art Documents
 AU 521811 37071/78 F16L 9/22 E04H 12/08
 GB 2087456
 GB 1597534

(57) Claim

1. A pipe formed from longitudinally extending components of circularly curved cross-section, each said component extending around only a part of the circumference of the pipe of less than 120 degrees arcuate extent, the pipe having longitudinally extending joints or connection between two or more said components whose total arcuate extent is less than 360 degrees, whereby the pipe has a non-circular cross-section.

COMMONWEALTH OF AUSTRALIA

Patents Act 1952

C O M P L E T E S P E C I F I C A T I O N
(ORIGINAL)

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Lodged :

Complete Specification Lodged :

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Related Art :

N

Name of Applicant : CARLOS JOAQUIM COSTA MARTINS DE OLIVEIRA

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Address of Applicant : Estrada da Luz, no. 232-110, Dto.
Lisboa, Portugal

Actual Inventor : CARLOS JOAQUIM COSTA MARTINS DE OLIVEIRA

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Address for Service : F.B. RICE & CO.,
Patent Attorneys,
28A Montague Street,
BALMAIN. 2041.

Complete Specification for the invention entitled:

PREFABRICATED DRAIN-PIPE WITH LONGITUDINAL JOINTS

The following statement is a full description of this invention including the best method of performing it known to me :-

Field of Invention

The present invention relates to pipes and pipe components. Typically its applications will be as follows:

- Drain pipes for domestic or industrial waterflow,
5 or rainfall drainage;
- Surface or underwater drainage systems;
- Conduits for technical installations in a town substructure for water, electricity, telephones, TV cables, computer networks and admittance to sewerage
10 networks, or for pipeline installations;
- Culverts crossing under roads or railways;
- Channels for drainage on free surface;
- Admittance or linking ways for basements of
15 buildings, underground transport systems or underground buildings such as army lodgings.

Background to the Invention

Previously drain pipes have been pre-formed in cylindrical elements, of circular or ovoid cross-section. Other types of section are scarcely used except when built
20 'in situ'.

The pipe diameters currently available on the market are of standardised sizes. As the diameter of a pipe element grows larger the pipes become heavy and more difficult to manufacture, store, transport and assemble.

25 Generally, all common designs of drainage pipes have petticoat joints to ensure alignment between successive elements. The elements are joined together with mortar or rubber rings. This type of linking requires the petticoats to be very resistant towards high transverse
30 stresses, and requires excavations to be deeper and wider.

The non-accessibility of the great majority of drainpipes leads to the necessity of installing inspection chambers at short distances so that cleaning and unblocking operations can take place.

35 Roads and railways often have culverts with



cross-sections which become inadequate, particularly if there is a change in the soil of the hydrographic basin up the river, or if new town plannings take place. These culverts do not also allow, in most cases, the
5 installation of other substructures such as domestic sewers, water conduits, electricity cables, telephone cables or others.

Summary of the Invention

According to the present invention there is provided
10 a pipe formed from longitudinally extending components of circularly curved cross-section, each said component extending around only a part of the circumference of the pipe of less than 120 degrees arcuate extent, the pipe having longitudinally extending joints or connection
15 between two or more said components whose total arcuate extent is less than 360 degrees, whereby the pipe has a non-circular cross-section.

The longitudinal connections between adjacent components may be provided by connection pieces, which may
20 hold the components spaced apart. Thus the components can be prefabricated parts of standard size and shape, while the use of different connection pieces allows pipes of different cross-sectional areas to be made to meet the requirements of any individual application. The
25 connection pieces may be manufactured 'in situ' or may be prefabricated. The cross-sectional area of the pipe may also be varied by varying the number of components around its circumference.

Preferably the components have a perfected profile.
30 Also preferably the components can be stacked densely, which eases storage and transport.

The components can be manufactured using a variety of materials such as concrete, reinforced concrete, asbestos-cement, PVC, polyester, metals and others.

35 The pipe can be assembled quickly without subjecting



the parts to excessive strain from interlocking.

The finished pipe can be made to be sufficiently big to allow admittance for easy inspection and maintenance, without necessarily having as large a cross-section as a
5 circle of corresponding diameter.

Because the components are manufactured as curved pieces rather than complete pipe elements, the manufacturing machinery can be lighter and simpler and the manufacturing cost can be reduced.

10 The joints all along the pipe could be water-tight or permeable as desired, without exposing the materials to assembling strains or permanent compression after assembling.

Embodiments of the present invention given by way of
15 non-limiting example, will now be described with reference to the accompanying drawings, in which:

Figures 1 and 2 represent pipe sections with two different types of longitudinal joints;

Figures 3 and 5 represent pipe sections in which
20 components are connected by bottom and top slabs with various widths and shapes;

Figure 4 represents a pipe section usable as a conduit for utilities, cables etc;

Figure 6 shows in perspective a stack of pipe
25 components;

Figures 7, 8 and 9 show other shapes of pipe components;

Figure 10 shows a transverse joint in perspective;

Figure 11 shows in perspective a pipe with an
30 inspection chamber or man-hole; and

Figure 12 represents another drain construction with



a wider cross-section.

A pipe is formed from wall segments or components, 1, 2. They can be rigidly fixed together by the use of bolts 4 (as seen in Figure 1), mortar, glue or welding.

5 If autoblocked joints are used the structure will become more flexible by fitting an elastomer or plastometer between joints as a tightening material. The segments 1, 2 can also be fixed together by capturing their ends 6 in end slabs 3.

10 The materials used in the manufacturing of the segments 1, 2 can be of widely varying types such as concrete, reinforced concrete, asbestos cement, PVC, polyester, metals or others. Normally it is preferable that the materials used permit the cost of each segment to
15 be as low as possible.

The areas of the segments that are exposed to strains can conveniently be reinforced in order to optimise the structure and they can also be of variable thickness.

The ends 6 can also conveniently be reinforced and be
20 of variable shape according to the joint, fitting or use.

The mentioned segments can also be of a special shape in order to provide special features or fittings such as inspection holes and man-holes, benches, shelves, steps, flood-discharge means, admittance doors to adjacent
25 conduits, linkings to inflow drain pipes, forks of any type, T junctions, bends etc.

The transverse joints 5 (Figure 10), can be of petticoat type or tongue and groove joints. The joints can be fitted with silicone or epoxide rubber to tighten
30 them or seal them.

As can be seen in the drawings, the pipe may also include bottom slabs 7 and top slabs 8. The slabs connect the sections 1, 2 but hold them spaced apart to increase the size of the pipe bore. The width of these slabs will
35 be fixed in accordance with the hydraulic (or other)



necessities or uses of the pipe and can also be moulded or fabricated 'in situ'. The bottom slab 7 can be of special shape, as seen in Figures 4, 5 and 7, and may incorporate, for example, a small conduit 10. This may be formed by
5 post-mounting or may be built at once according to the scope of the project.

The segments may have shelves or supports for cables etc, as shown in Figure 4.

As can be seen from Figure 12, this type of pipe can
10 have a substantially extended transverse section. To achieve this the pipe consists basically of three segments 11, 12 and 13 which can be similar to the elements 1 and 2 previously described. In order to perform this type of assembling there may be used a bottom slab 14 and joints
15 15 and 16. Alternatively a further element may be fitted between the lower ends of side elements 11 and 12.

If larger sections are needed either more segments or segments with a larger dimension can be used.

Figures 7, 8 and 9 show variant segment shapes.

20 In Figures 7 and 9 the segment shape is not symmetrical about the longitudinal mid-line. In Figure 7 the segments have varying thickness.

The different segments around the circumference of the pipe may be offset longitudinally, so that the
25 transverse joints do not extend continuously around the circumference but instead the transverse joints are positioned alternately, along each side of the pipe. This improves the linearity of the pipe, spreads the strains over the structure and increases the resistance of the
30 whole, without taking away its flexibility for little adjustments to the bed ground. This is shown in Figure 10.

The drain pipe can be installed under earthworks, roads or railways providing that layings are not to take place on the earthworks. Thus, to overcome this, it will
35 be enough to install a metallic shield that allows both



the frontal earthmoving and the inside fitting of the segments that make the structure. It is then possible to install culverts of any type without cutting the pavements or causing inconvenience to traffic.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A pipe formed from longitudinally extending components of circularly curved cross-section, each said component extending around only a part of the circumference of the pipe of less than 120 degrees arcuate extent, the pipe having longitudinally extending joints or connection between two or more said components whose total arcuate extent is less than 360 degrees, whereby the pipe has a non-circular cross-section.
2. A pipe according to claim 1, in which adjacent said components around the circumference of the pipe meet at their longitudinal edges.
3. A pipe according to claim 2 in which the said adjacent components are bolted together.
4. A pipe according to any one of claims 1 to 3 in which the longitudinal edges of said adjacent components are held together by being captured in a longitudinally extending connection block.
5. A pipe according to any one of claims 1 to 4 in which there is a layer of elastomeric material or of a plastics material between the said adjacent components where they meet.
6. A pipe according to claim 1 or claim 2 in which connecting blocks hold adjacent said components spaced apart.
7. A pipe according to any one of the preceding claims in which there are two said components around the circumference of the pipe.
8. A pipe according to any one of the preceding claims in which the said components at a longitudinal position along the pipe are longitudinally offset with respect to each other, so that the joints between longitudinally successive components do not extend continuously round an entire circumference of the pipe.



9. A pipe according to any one of the preceding claims in which at least some of the components have shelves or other support means on their radially inner surfaces.
10. A pipe according to any one of the preceding claims in which at least some of the said components are reinforced at areas of anticipated stress.
11. A pipe substantially as herein described with reference to the accompanying drawings.

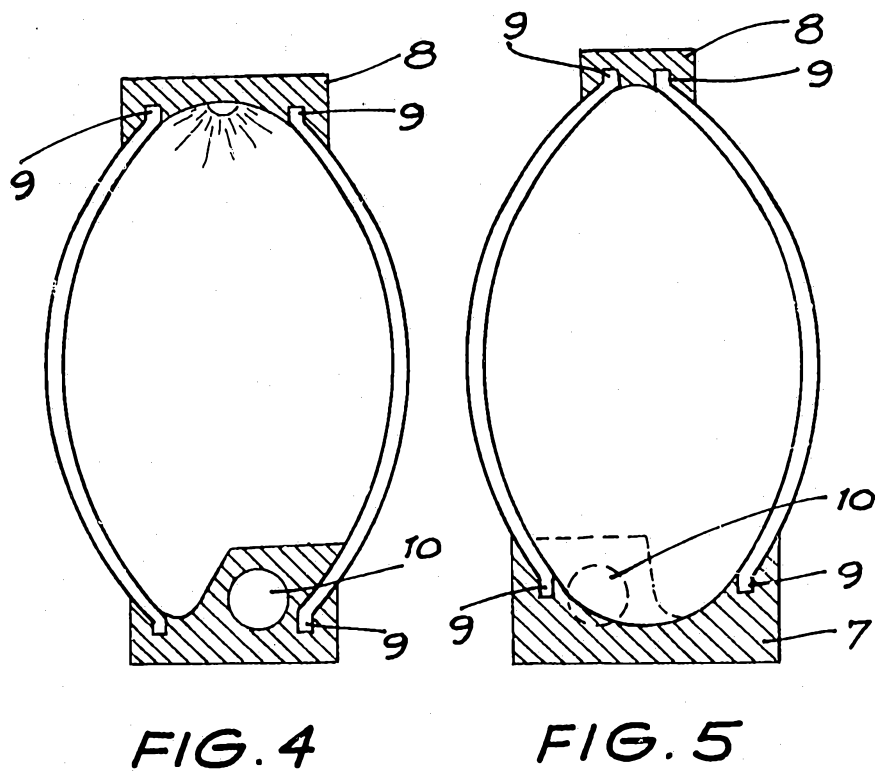
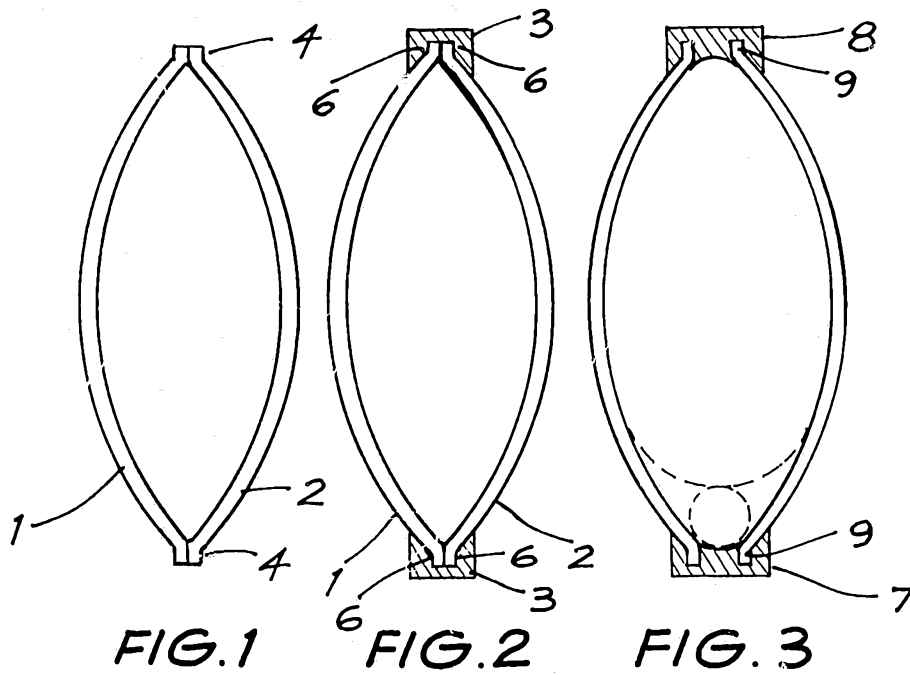
DATED this 29 day of November 1989

CARLOS JOAQUIM COSTA MARTINS
DE OLIVEIRA
Patent Attorneys for the
Applicant:

F.B. RICE & CO.



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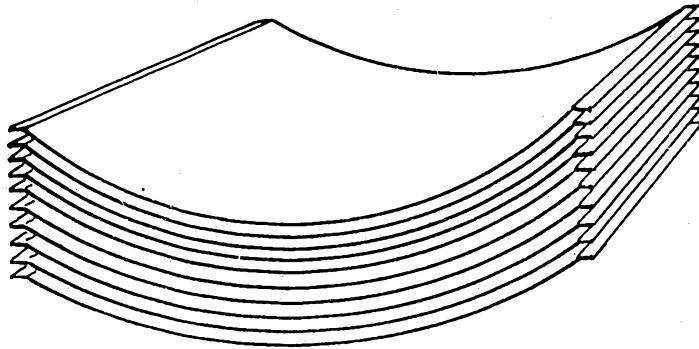


FIG. 6

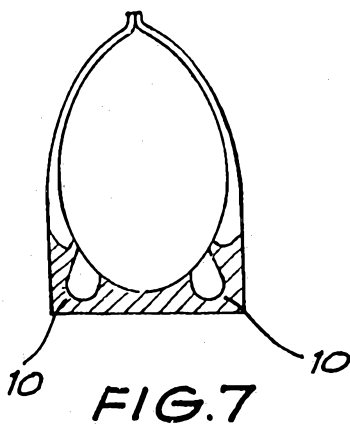


FIG. 7

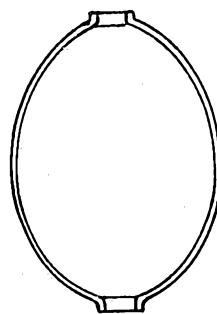


FIG. 8

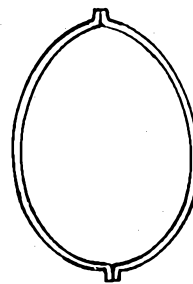


FIG. 9

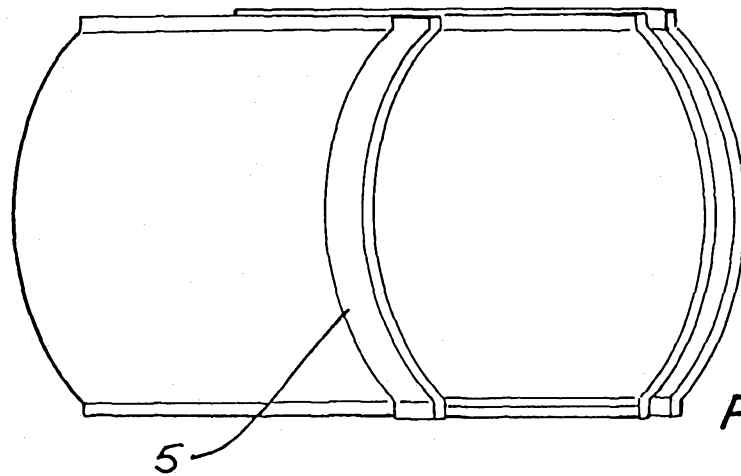


FIG. 10

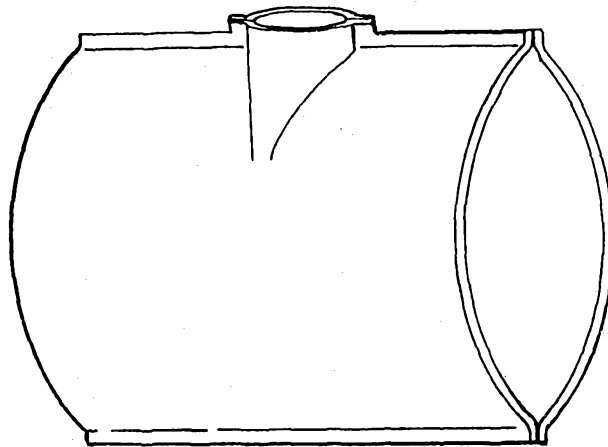


FIG. 11

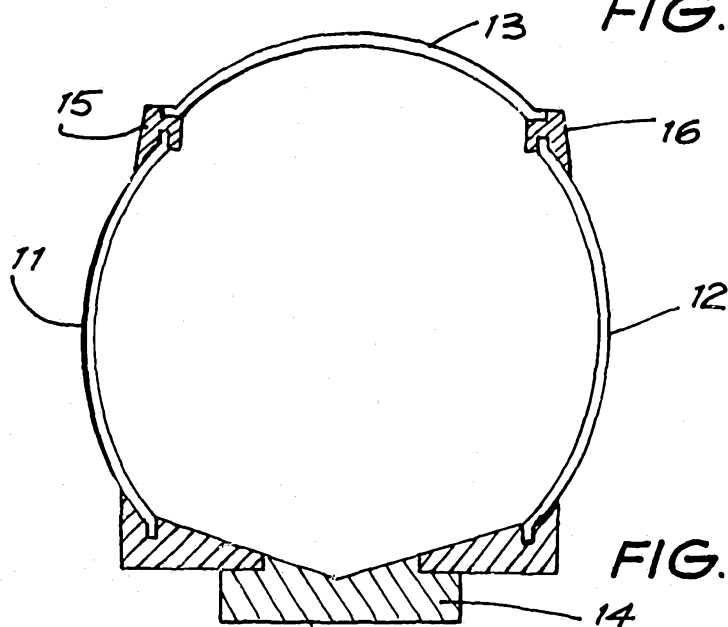


FIG. 12