

No. 797,696.

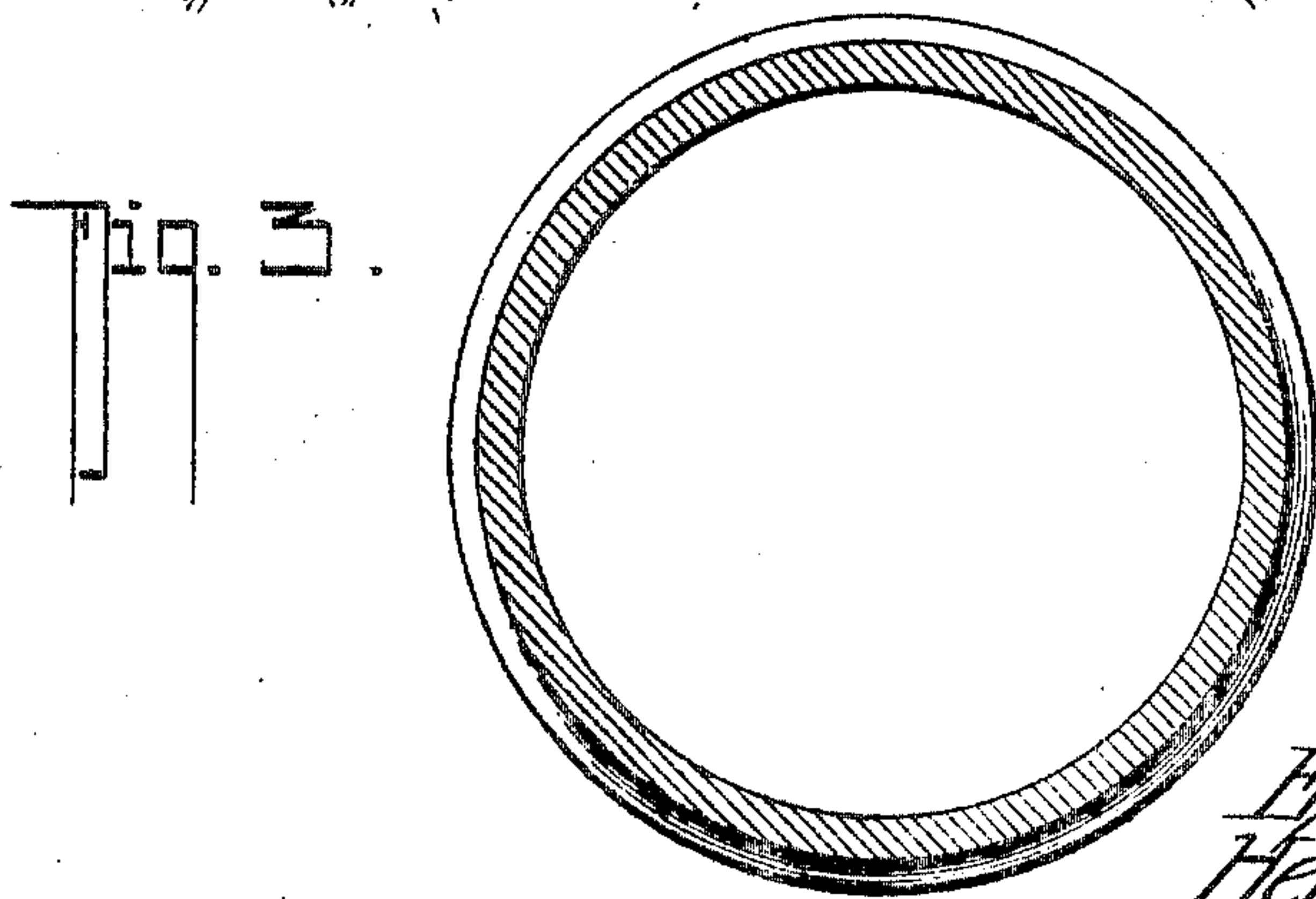
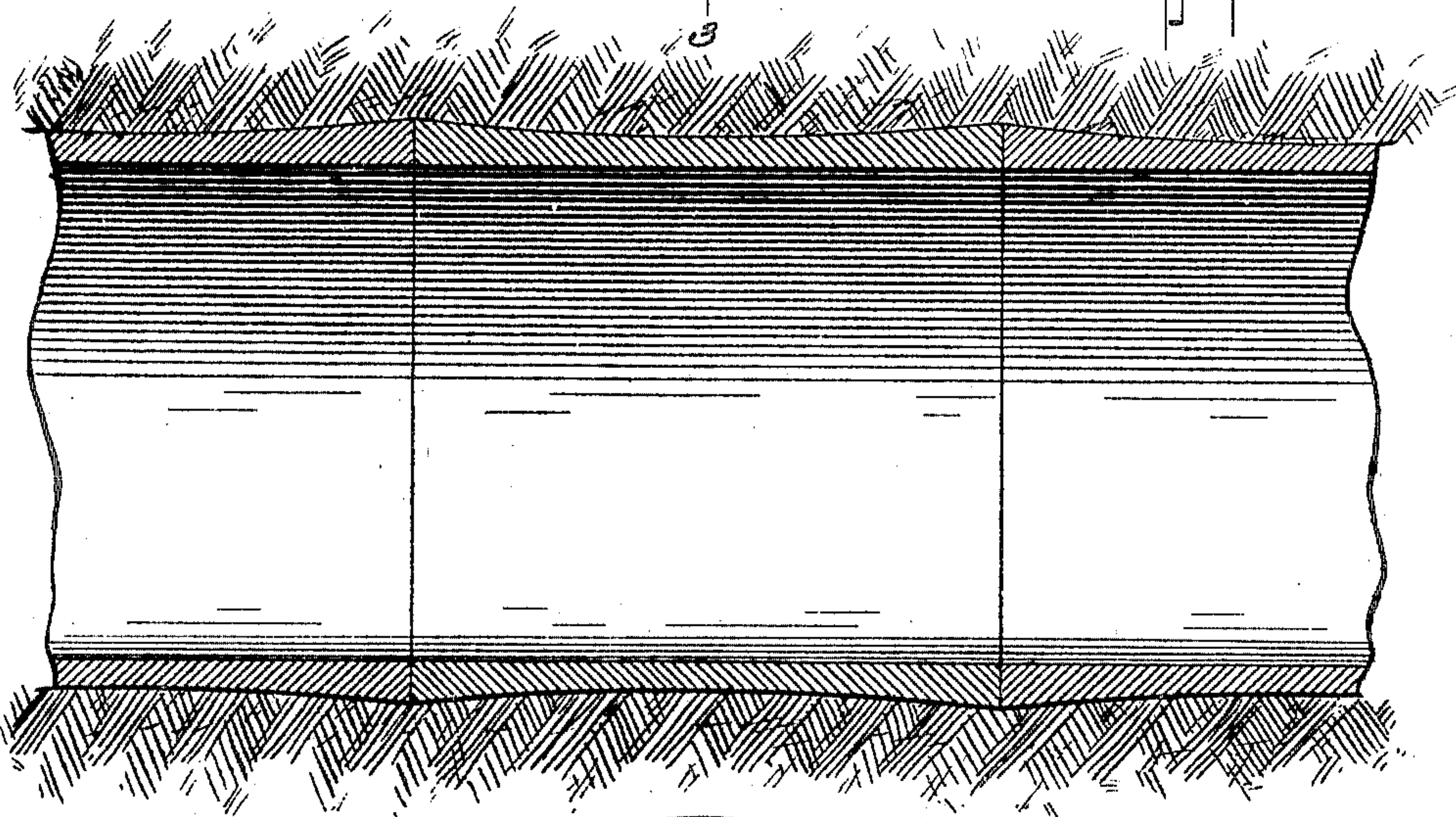
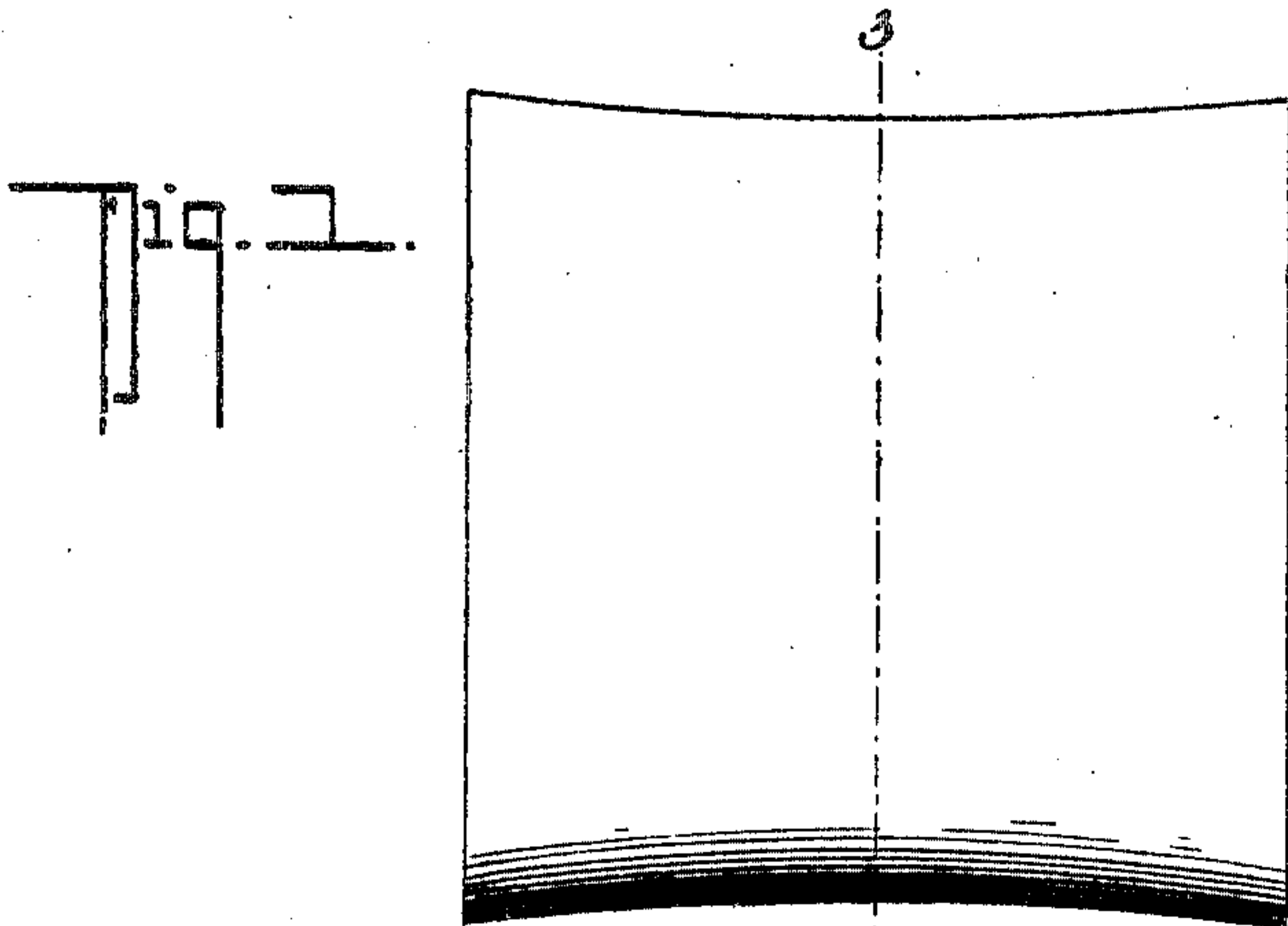
PATENTED AUG. 22, 1905.

E. C. & H. L. LITCHFIELD.

DRAIN TILE.

APPLICATION FILED APR. 27, 1905.

2 SHEETS—SHEET 1.



Witnesses

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*Henry L. Litchfield* and  
Inventors.

by *C. A. Snow & Co.*  
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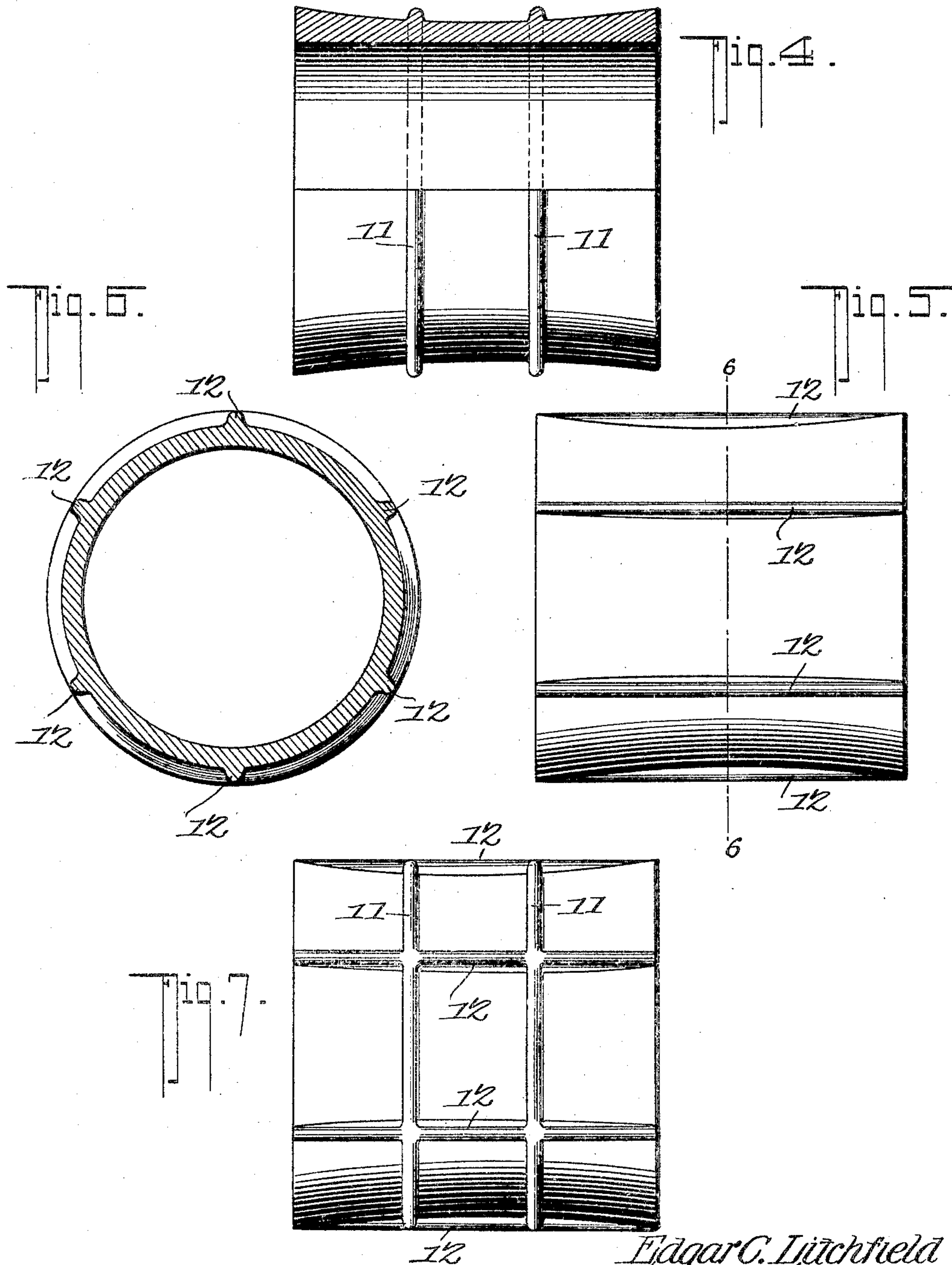
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# UNITED STATES PATENT OFFICE.

EDGAR C. LITCHFIELD AND HENRY L. LITCHFIELD, OF WATERLOO, IOWA.

## DRAIN-TILE.

No. 797,696.

Specification of Letters Patent.

Patented Aug. 22, 1905.

Application filed April 27, 1905. Serial No. 257,707.

*To all whom it may concern:*

Be it known that we, EDGAR C. LITCHFIELD and HENRY L. LITCHFIELD, citizens of the United States, residing at Waterloo, in the county of Blackhawk and State of Iowa, have invented a new and useful Tile, of which the following is a specification.

This invention relates to drain-tiles, and more especially to tiles of that class employed in seep draining, where the ends of the tiles are not provided with coupling or interlocking means, although the invention may be applied to any form of molded tile.

One of the principal objects of the invention is to reduce the cost of a tile without impairing the strength thereof by reducing the quantity of material usually employed in manufacturing a tile of the same length and diameter, a further object being to provide a tile of less weight and which may be more readily handled than ordinary tiles of the same size, and, further, to provide a tile of such construction that independent longitudinal movement of the tile-sections will be prevented.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is an elevation of a tile constructed in accordance with the invention. Fig. 2 is a vertical section illustrating a number of tiles placed end to end to form a drain. Fig. 3 is a transverse sectional view of the tile on the line 3 3 of Fig. 1. Fig. 4 is a view, partly in section and partly in elevation, illustrating a ribbed tile made in accordance with the invention, the rib extending circumferentially of the tile. Fig. 5 is an elevation showing the tile provided with longitudinal ribs. Fig. 6 is a transverse sectional view on the line 6 6 of Fig. 5. Fig. 7 is an elevation of a tile provided with both circumferential and longitudinal ribs.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In the manufacture of clay tiles, especially those used for seepage drains, it is usual to make the tiles in the form of plain cylinders of a uniform thickness from end to end and without coupling-bells or other means for interlocking adjacent tile-sections, and in more recent practice where these tiles have been made from concrete or cement compounds the same practice has been followed. The weakest point of tiles of this character, and, in fact, of any cylindrical tile, is adjacent to the end, the tiles being easily broken during transportation and when being placed in position to form a drain. It is usual, therefore, to make the tiles comparatively thick, in order to resist breakage, and this entails considerable expense, especially where the tiles are formed of cement-containing compounds. The central portion of a tubular tile will resist considerable strain, even where comparatively thin; but if the thin cylindrical wall is continued to the ends of the tile it will not be of sufficient strength to meet requirements.

In carrying out the present invention the tile is provided with a wall straight on its inner face in order not to impede the flow of liquid, while the outer face is approximately concaved from end to end of the tile, the thinner portion being at or adjacent to the center of the tile, while the thicker and heavier portions are at the opposite ends thereof, said thicker portions being of sufficient strength to resist the rough handling to which these tiles are subjected during the course of manufacture, shipment, and when being placed in position. In some cases it is found desirable to provide the tile with ribs for the purpose of strengthening the same or preventing independent movement of the tile-sections when embedded in the earth.

In Fig. 4 is illustrated a tile provided with ribs 11, extending in parallel relation circumferentially of the tile, and Fig. 5 shows a similar tile provided with ribs extending from end to end thereof, and while it is preferred that these ribs should not extend beyond the major diameter of the tile—that is to say, the diameter of the ends thereof—it is obvious that such ribs may be made thicker and heavier, if necessary.

Fig. 7 illustrates a still further modification in which the tile is provided with both circumferential and longitudinal ribs, the circumferential ribs 11 intersecting the longitudinal ribs 12.



It is found in practice that a tile constructed in the manner described is considerably cheaper than an ordinary tile, owing to the smaller quantity of material used, and this is a very important factor where cement is employed; that it is of the same strength, but much lighter than an ordinary tile of the same capacity, and that owing to its peculiar conformation any independent longitudinal movement will be prevented when the tile is embedded in the earth, this being of especial value where the tiles are employed for culvert-draining under road-beds and the like.

Having thus described the invention, what is claimed is—

1. A tubular tile, the wall of which is thicker at the ends than at the intermediate portion of the tile.

2. A tubular tile, the outer face of which is concaved from end to end, presenting a thicker wall at the ends than at the center of the tile.

3. A tubular tile having a wall of continu-

ously-increasing thickness from its center toward the opposite ends.

4. A tubular tile having peripherally-disposed strengthening-ribs.

5. A tubular tile, the outer face of which is concaved from end to end, said concaved face being provided with projecting ribs.

6. A tubular tile having a concaved outer face and provided with a circumferentially-disposed strengthening-rib.

7. A tubular tile having a concaved outer face and provided with intersecting ribs extending circumferentially and longitudinally thereof.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in the presence of two witnesses.

EDGAR C. LITCHFIELD.

HENRY L. LITCHFIELD.

Witnesses:

E. E. MULHAIN,

C. L. BLACK.