No. 720,924. PATENTED FEB. 17, 1903.

O. INTZE.

ANNULAR TANK FOR LIQUIDS.

APPLICATION FILED SEPT. 14, 1901.

NO MODEL.

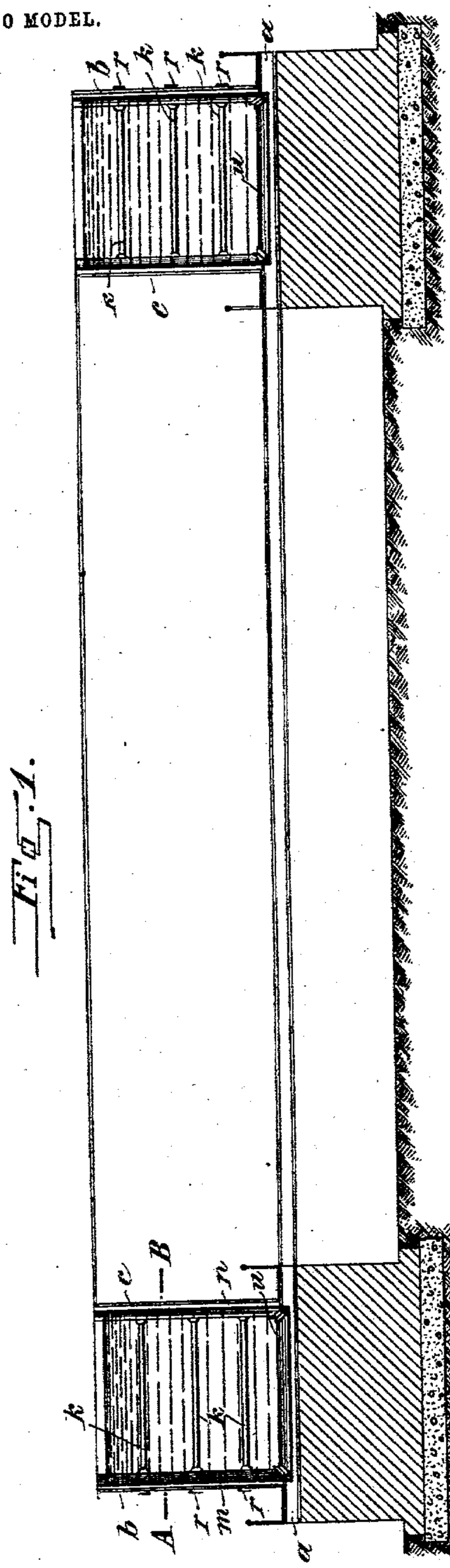

Fig. 1.

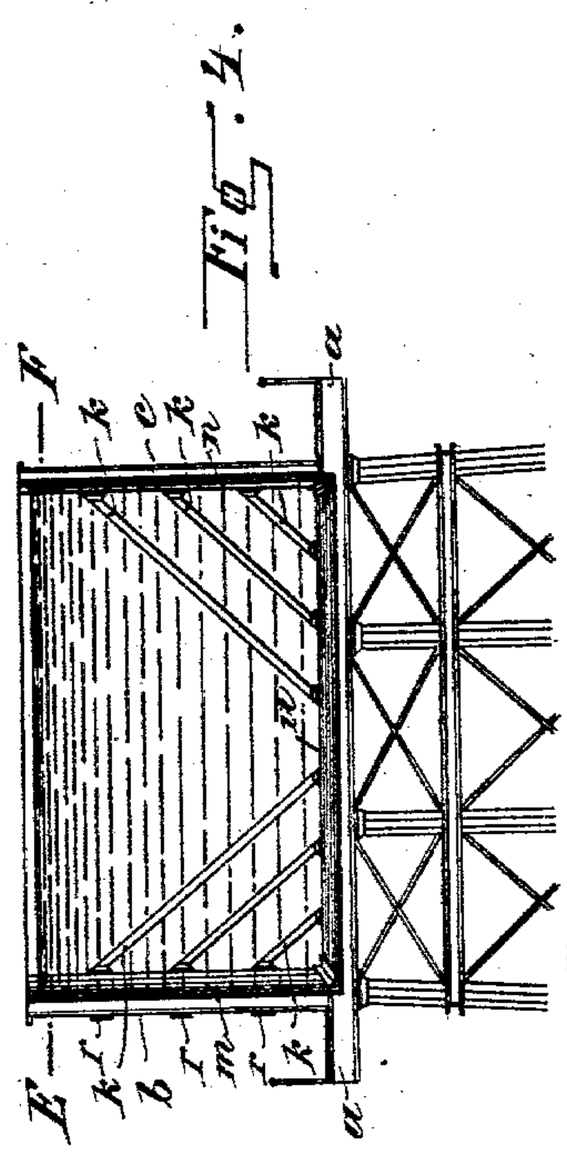

Fig. 4.

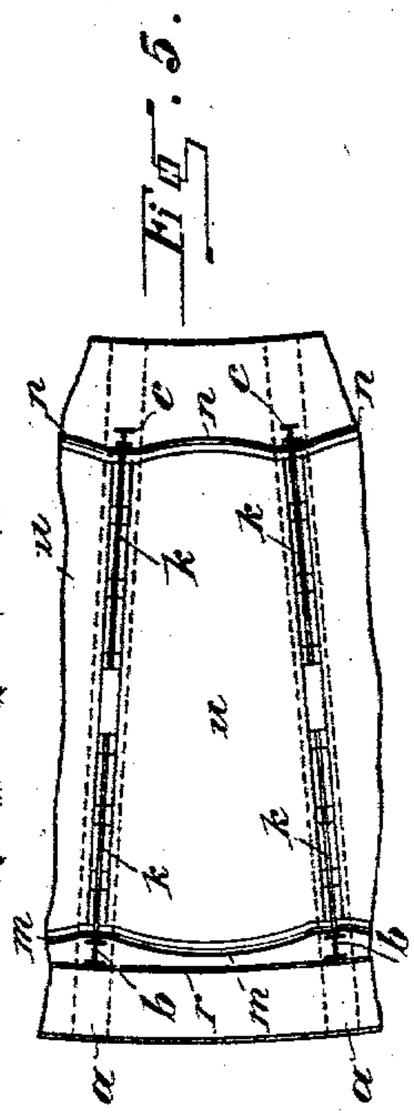

Fig. 5.

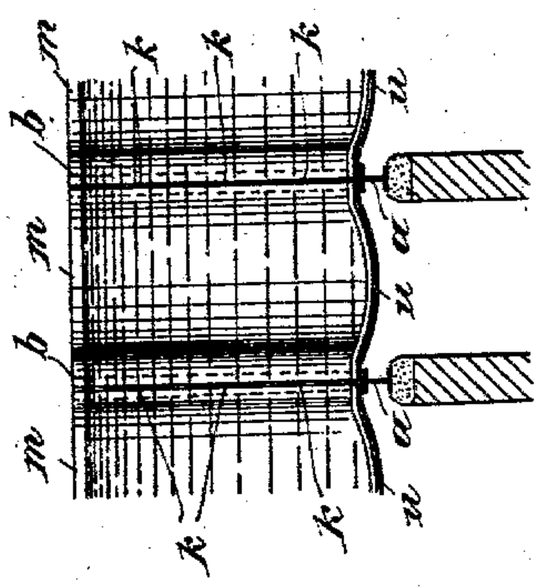

Fig. 3.

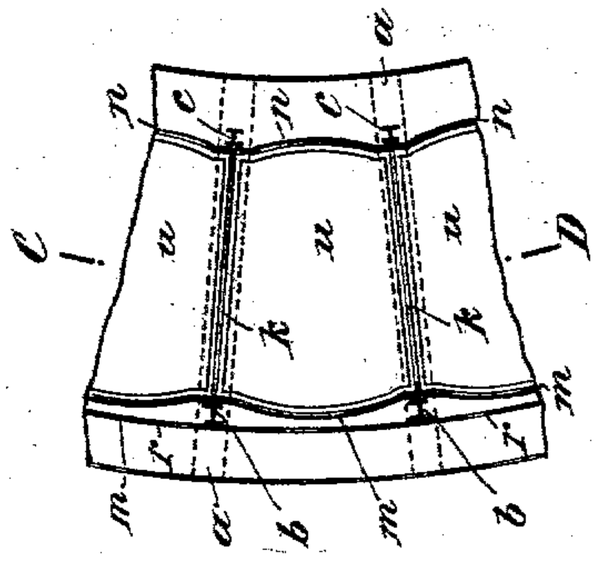

Fig. 2.

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ANNULAR TANK FOR LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 720,924, dated February 17, 1903.

Application filed September 14, 1901. Serial No. 75,378. (No model.)

To all whom it may concern:

Be it known that I, OTTO INTZE, a subject of the Emperor of Germany, and a resident of the city of Aix-la-Chapelle, in the Rhine Province, German Empire, have invented certain new and useful Improvements in the Construction of Tanks for Liquids, of which the following is a full, clear, and exact specification.

This invention relates to the construction of tanks for holding liquids.

The construction of large tanks of cylindrical or other form of iron for the reception of liquids is attended with many difficulties, consisting principally in the construction of the lower parts of the cylindrical walls, which are mostly of very strong iron plates, and in their connection with the bed or bottom of the tank and in the construction of a supporting structure capable of transmitting a heavy load in an advantageous manner onto the supports and also in the construction of the bottom of such tanks.

Both the diameter and the depth of tanks of ordinary construction for liquids are limited, owing to the aforesaid difficulties, and heretofore it has not been deemed advisable to construct single tanks of this description with a capacity beyond two thousand to two thousand five hundred cubic meters, while when it is desired to provide accommodation for larger quantities two smaller tanks are generally used. A division into two parts of cylindrical tanks for very large quantities or for large diameters meets with special difficulties with regard to the divisions, mostly of cylindrical form, which form the compartment of the tank.

This invention has for its object to obviate the previously-mentioned objections; and with this object, according to my invention, the tanks, whether erected on brickwork or iron structures, are composed of a number of constructional elements or frames and of bulged or bent plates arranged in such a manner as to cover in the spaces between the said frames.

In order that my invention may be readily understood and carried into effect, I have shown in the accompanying drawings four forms of construction embodying this invention.

Figure 1 is a longitudinal section of an annular tank with brickwork foundation. Fig. 2 is a horizontal section taken on the line A B of Fig. 1. Fig. 3 is a section on the line C D of Fig. 2. Fig. 4 shows a radial cross-section of an annular tank supported on an iron structure. Fig. 5 is a horizontal section taken on the line E F of Fig. 4.

The separate elements of the annular tanks shown in Figs. 1 to 5 consist each of a radially-disposed horizontal girder *a*, an outer pillar or column *b*, and an internal pillar or column *c*, both connected with the girder *a*. The spaces between each two pillars *b* and *c* are covered in by bulged or bent plates *m* and *n*, of small radius and comparatively thin material, which transfer the horizontal strains produced by the filling of the annular tank onto the supports. The vertical load or weight is transmitted by the bulged or bent baseplates *u* onto the girder *a* and by the latter onto the brickwork or iron structure supporting the tank. With a sufficient strength of the radial girders *a* the substructure of brickwork may—for example, as shown in Fig. 1—be of annular form.

By reason of the vertical bulged or bent plates *m* and *n* the radially-acting horizontal strains of the water-pressure are transmitted onto the pillars *b* and *c*. These horizontal strains are advantageously balanced as far as possible by stays or bars *k*, disposed in vertical radial planes. These stays *k* are in Figs. 1 and 2 placed horizontally between the corresponding or adjacent outer and inner pillars *b* and *c*. By providing a sufficient number of stays *k* the tendency of the pillars to bend between the fixing-points may be reduced at will, so that comparatively thin pillars may be used.

In the construction of the annular tank shown in Figs. 4 and 5 the horizontal and radial water-pressures acting against each outer and inner pillar *b* and *c*, respectively, are transmitted by diagonal stays *k* onto the horizontal girder *a*. It is thus possible to reduce the bending strain upon the horizontal girder *a*, Fig. 3, and to transmit the vertical load more onto separate points of the radial support of the said girder.

The excess of radial horizontal water-pressure, mostly very slight, against the outer

pillars as compared with that acting against the inner pillars is when using the horizontal stays *k* taken up by external tension-rings or polygonal braces *r*, which are applied around the outer pillars *b*, as clearly shown in Figs. 1 and 4. Obviously these rings or polygonal braces *r* may also be applied to the inner pillars, although less advantageously.

The tanks hereinbefore described need not be of circular form, but may, if desired, be rectangular, polygonal, elliptical, or of composite form of straight and curved portions and may generally have a closed annular cross-section.

The maintenance and cleansing of the tanks is greatly facilitated by making them in compartments by the interposition of two or more radial intermediate walls or partitions in the planes of various elements of the construction.

What I claim, and desire to secure by Letters Patent, is—

1. An annular liquid-tank, comprising pairs of spaced vertical pillars the members of which are radially alined, horizontal girders connecting said pillars and inner and outer coverings formed by curved plates.

2. An annular liquid-tank comprising pairs of spaced vertical pillars the members of which are radially alined, horizontal girders connecting said pillars, inner and outer coverings formed by curved plates and tie-rods arranged in radial planes between the outer and inner pillars.

3. An annular liquid-tank, comprising pairs of spaced vertical pillars the members of which are radially alined, horizontal girders connecting said pillars, inner and outer coverings formed by curved plates and partitions extending radially between the outer and inner pillars.

4. An annular tank for liquids, comprising the combination with a supporting-base, of an inner and outer circular line of vertically-disposed pillars, sheathings or coverings for said lines of pillars, said sheathings running circularly around the tank, and braces for supporting the pillars.

5. In an annular tank for liquids, the combination with a base or foundation, of horizontally-disposed girders laid thereon and arranged essentially in radial lines, inner and outer vertically-disposed pillars joined to said girders, the pillars forming two circular lines, and coverings or sheathings for said lines of pillars, said sheathings extending in two circular lines around the tank.

6. In an annular tank for liquids, the combination with a base or foundation, of horizontally-disposed girders laid thereon and arranged essentially in radial lines, inner and outer vertically-disposed pillars joined to said girders, the pillars forming two circular lines, coverings or sheathings for said lines of pillars, said sheathings extending in two circular lines around the tank, and tie-rods extending from the horizontal girders upward and outward to the respective vertically-disposed pillars.

Dated this 30th day of August, 1901.

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Witnesses:

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