

March 27, 1928.

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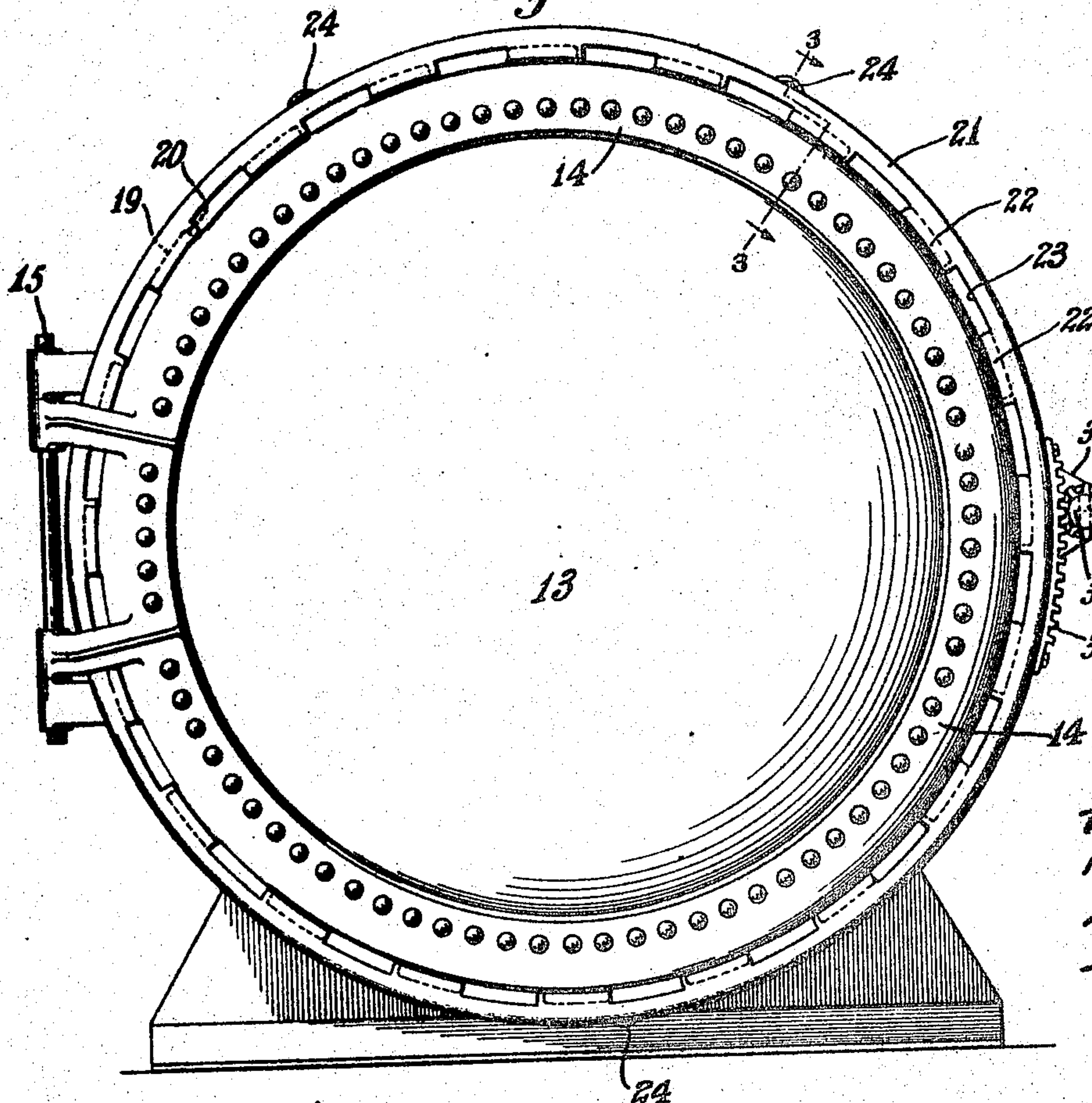
J. R. GAMMETER

DOOR STRUCTURE FOR PRESSURE TANKS

Filed June 28, 1926

2 Sheets-Sheet 1

Fig. 1.

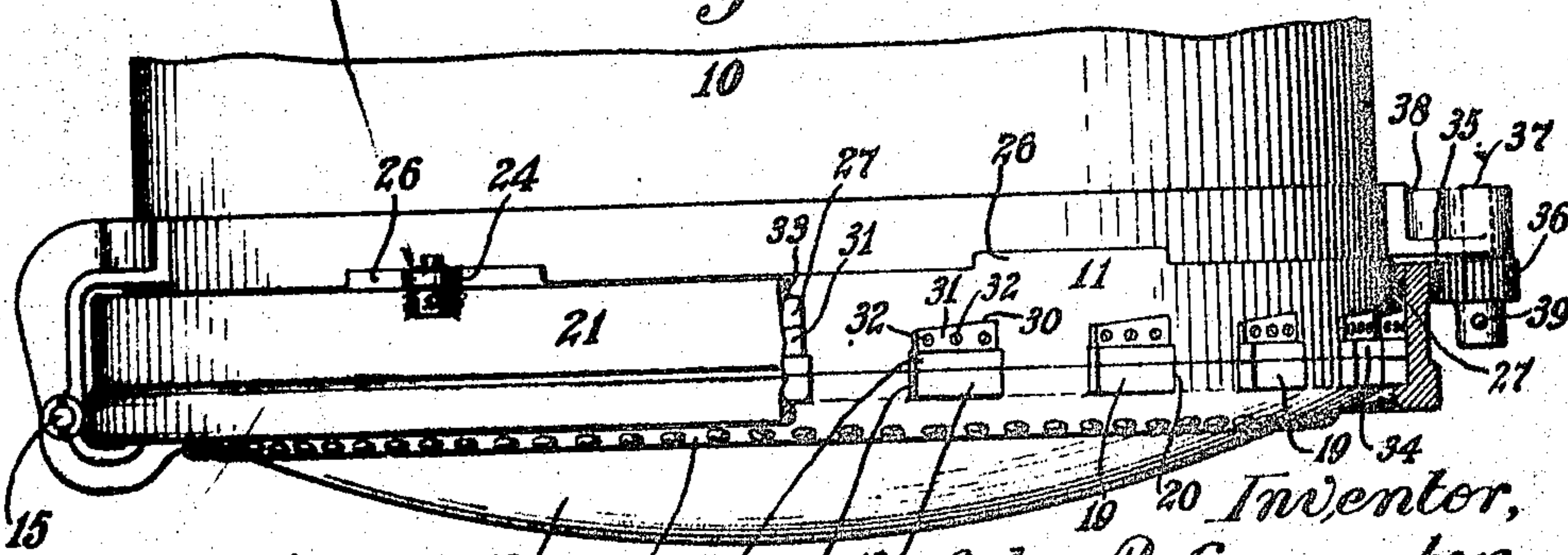


For operating locking ring.

The rack 35 rotates. Pinion rotates, but the is fixed.

Anti friction rollers

Fig. 2.



Locking ring

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March 27, 1928.

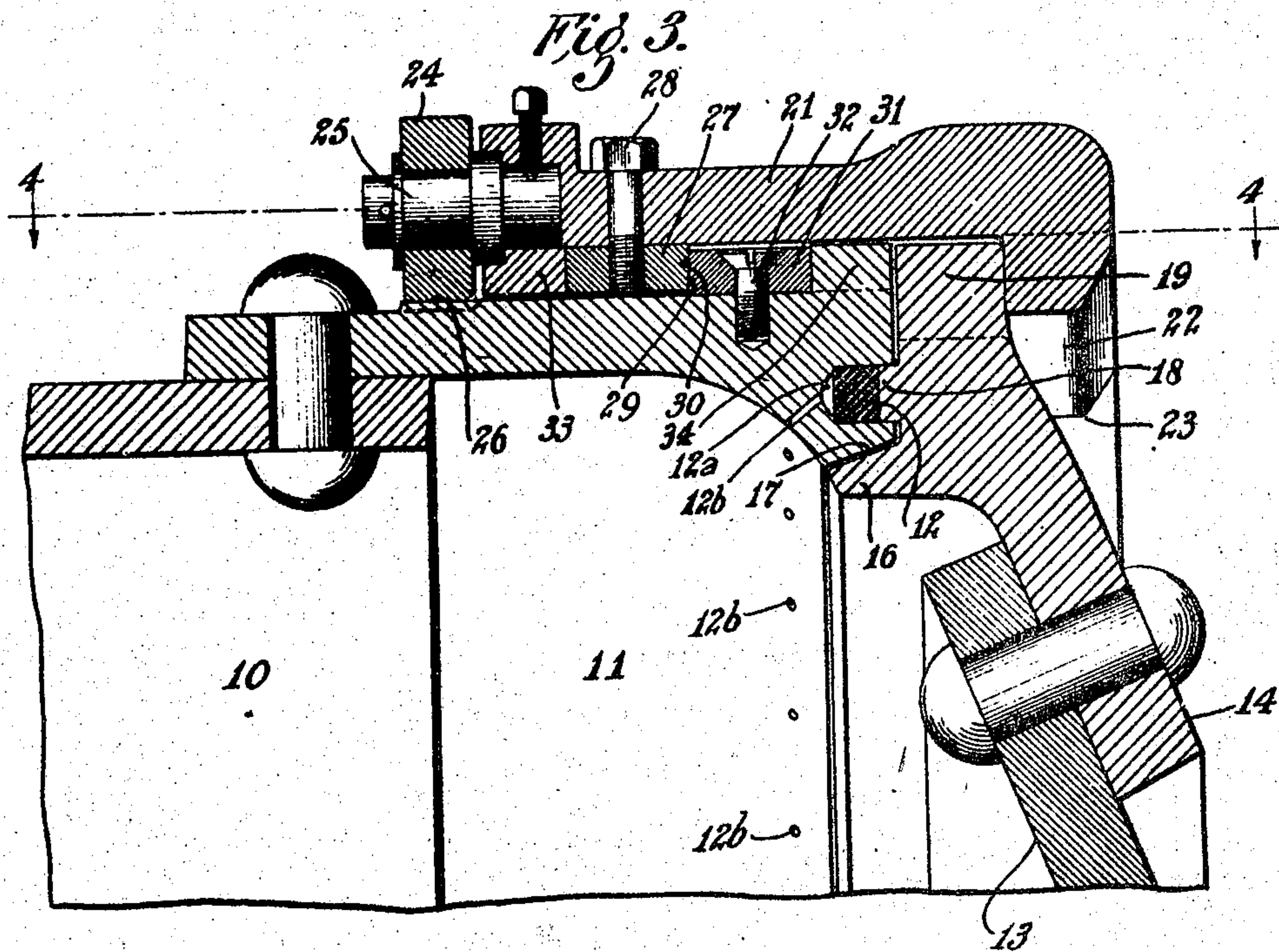
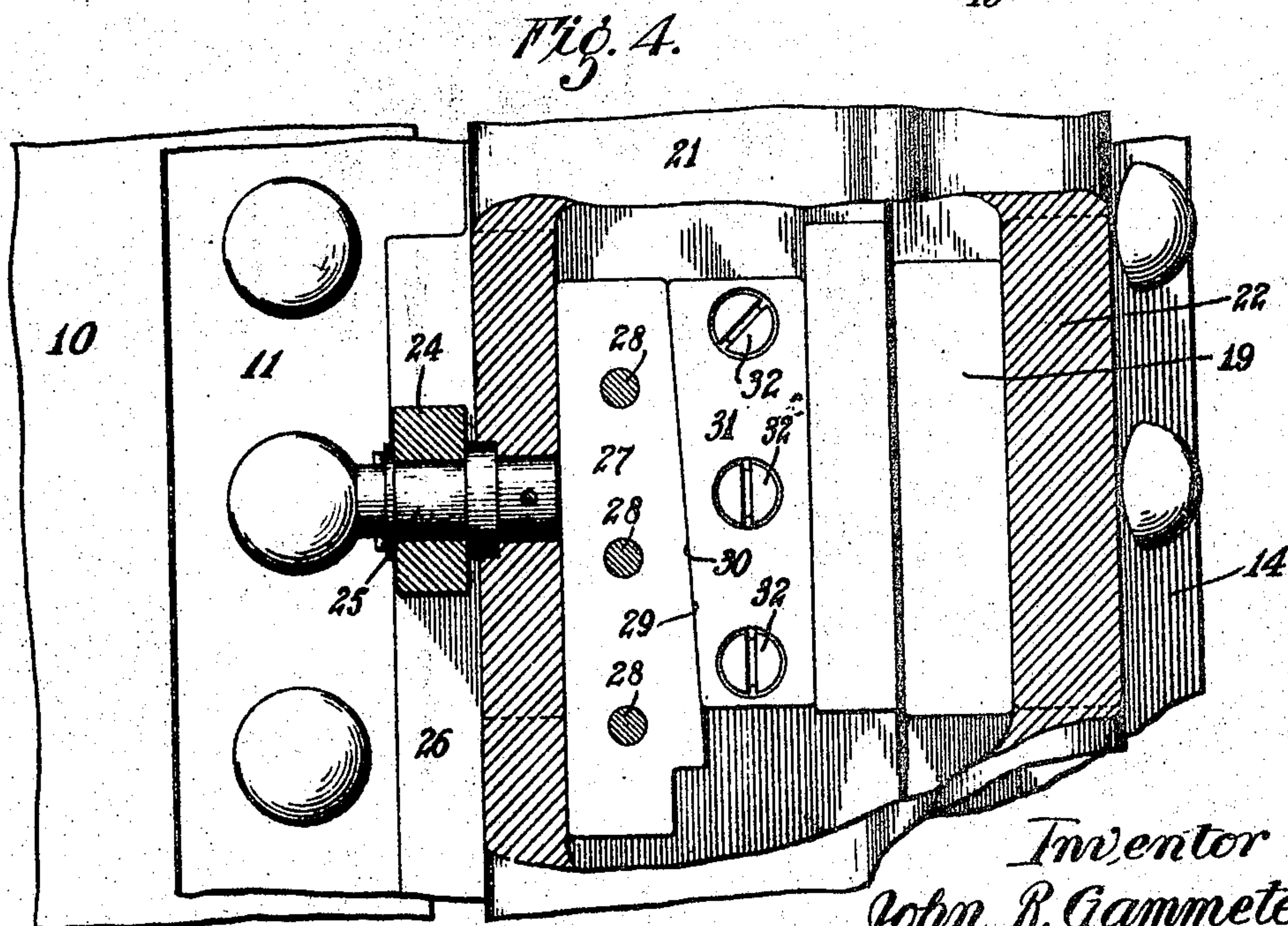
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DOOR STRUCTURE FOR PRESSURE TANKS

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2 Sheets-Sheet 2



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Patented Mar. 27, 1928.

1,663,755

UNITED STATES PATENT OFFICE.

JOHN R. GAMMETER, OF AKRON, OHIO, ASSIGNOR TO THE B. F. GOODRICH COMPANY,
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DOOR STRUCTURE FOR PRESSURE TANKS.

Application filed June 28, 1926. Serial No. 118,932.

This invention relates to door structures for pressure tanks such as vulcanizers, tanks for treating articles with fluid as in the case of creosoting wood, and the like.

Heretofore the doors of large pressure tanks of this character have been sealed by a lip gasket set in an annular recess formed in the door jamb or in the door, as in my United States Patent No. 1,226,766, the lip gasket permitting, without breaking the seal, the slight outward movement of the door under the force of the pressure within the tank which heretofore has been very difficult to avoid, because of the difficulty of obtaining and preserving a good fit of the parts throughout the circumference of a large and heavy door.

Such use of a lip gasket has proved serviceable in the case of vulcanizers, where the fluid contacted by the rubber gasket is steam or water, although in long usage the gasket may become over-vulcanized, but in tanks in which the contained material is of a gummy character, as in the case of creosote or tar, and in which the construction has been such that the material contacted the lip gasket, the latter has had the disadvantage of becoming so coated and fouled with the material as to prevent its proper functioning.

My chief objects are to provide an improved structure in which a compression gasket may be employed to obtain an effective seal; to provide against such play as may result from wear of the fittings; to provide for economy of construction and repair and ease of operation; and to provide such advantages in a door structure for the end of a horizontal tank, wherein the contained liquid must contact the sealing gasket.

Of the accompanying drawings:

Fig. 1 is an end elevation of a door-structure embodying my invention in its preferred form.

Fig. 2 is a plan view of the same.

Fig. 3 is a fragmentary section on line 3—3 of Fig. 1.

Fig. 4 is a section on line 4—4 of Fig. 3.

Referring to the drawings, the shell of a vulcanizer or the like is shown at 10, upon the end of which is mounted a ring casting 11 constituting the door frame or seat and formed in its end face with an annular,

relatively deep recess for seating a compression gasket 12. The bottom wall of the gasket recess is formed with a concentric groove 12^a, and the latter communicates with the interior of the vulcanizer through a plurality of apertures or passages 12^b, 12^b, so that fluid within the vulcanizer will urge the gasket outward against the door structure of the vulcanizer when said door is closed. The gasket may be of any suitable material but is preferably composed essentially of lead or other soft metal when the apparatus is to be used with gummy, viscous, or sticky material such as creosote, so that it will not be disintegrated by opening and closing of the door.

The door here shown comprises a dome-shaped circular plate 13 and a ring casting 14 secured to the plate and constituting the annular margin of the door. The door is hinged on a vertical axis, and with a loose fit, to the door frame 11 at 15, and its marginal casting 14 is formed with a conical guide flange 16 adapted to mate, with substantial tolerance, with a female conical face 17 formed in the door frame, and the said marginal casting is also formed with an annular flange 18 adapted to fit into the gasket recess of the door frame to compress and seal against the gasket 12.

The outer margin of the ring casting 14 of the door is formed with outwardly-projecting locking lugs 19, 19 equally spaced about its circumference, the said lugs thus alternating with and defining recesses 20, 20.

For engaging the lugs 19 to hold the door closed, a locking ring 21 is rotatably mounted upon the door-frame casting 11 and is formed at its annular forward margin with locking lugs 22, 22 projecting radially inward at a distance in front of the door-frame casting, the said lugs being equally spaced apart circumferentially of the casting and thus alternating with and defining recesses 23, 23. The lugs 19 of the door casting are somewhat narrower than the recesses 23 of the door-frame casting and the lugs 22 of the latter are narrower than the recesses 20 of the door casting, so that when the locking ring is in proper position the door may be closed, the lugs of each set passing between those of the other set, so that the locking ring then may be turned to bring each of the locking-ring lugs 22

over one of the door lugs 19, as shown clearly in Figs. 1 and 3, to lock the door shut.

The contacting faces of the lugs 19 and 22 may be given a smooth finish to avoid friction, and in the embodiment here shown, having other means for effecting the final movement of drawing the door against its seat, the said faces need not be oblique or of screw-thread form.

The locking ring is supported in a concentric position upon the door frame of the horizontal tank by a set of anti-friction rollers 24, 24 journaled on respective stub-shafts or axles, such as that shown at 25, suitably mounted in and projecting from the rear edge of the locking ring, each roller being adapted to run on a raceway 26 of suitable length and smooth surface formed in the outer face of the door-frame casting, 11.

For drawing the locking ring backward to tighten the door against its seat and compress the gasket 12 as the ring is rotated with its lugs interlocked with those of the door, a circumferential series of hardened wear-plates 27, 27 are secured to the inner face of the locking ring by screw bolts 28, 28, each of said plates being formed with an oblique, highly-finished edge-face 29 adapted to mate, in a wedging action, with a complementary-face 30 of one of a circumferential series of similar plates 31, 31 secured to the outer face of the door frame 11 by screw bolts 32, 32.

The wedging plates of the locking ring may be backed by radial lugs 33, 33 (Fig. 3) extending inwardly from the locking ring and the plates 31 of the door frame may be backed by radial lugs 34, 34 projecting outward from the latter, to avoid excessive strain upon the screw bolts 28 and 30.

The parts are preferably given such relative dimensions as to provide substantial clearance between all radially-overlying parts of the locking-ring assembly and the door-frame structure, as shown clearly in Fig. 3, excepting the rollers 24, so that the latter will constitute the only means for positively holding the locking ring in concentric position, and the locking ring will be rotatable with little friction.

For rotating the locking ring a segmental-gear or arcuate-rack 35 is secured upon its margin and meshed with a pinion 36 journaled on a stub-shaft 37 projecting from a bracket 38 mounted upon the rear margin of the door frame, the hub of the pinion being formed with a hole 39 to receive a turn-bar.

In the operation of the device, which in general will be obvious from the foregoing description, substantially all friction of tightening the door on its seat is taken by the smooth, plane faces of the locking lugs

19 and 22 and the highly-finished faces of the wedging-plates 27 and 31, so that a high compression of the gasket 12 may be obtained. The gasket-compressing flange 18 of the door is not required to be rotated upon the gasket, which avoids abrasion of the gasket, and as the said flange 18 may be given a snug fit between the walls of the gasket-holding recess, the sealing-face of the gasket is well-protected from fluid contained within the tank.

The wear-plates 27 and 31 may be economically made and are firmly backed by the respective lugs 33 and 34, and they not only may be economically made of wear-resisting material but may be readily and cheaply replaced by new plates when they become worn, and permit rotation of the locking ring with comparatively little friction.

The provision of the wear-resisting compression gasket with means for applying high compression to it while substantially closing it off from the interior of the tank, and without sliding movement of a sealing member against the gasket, results in a structure especially well-suited for treating articles with fluids of such character that they would destroy or would interfere with the functioning of a rubber gasket and particularly a gasket of the lip type.

My invention is susceptible of modification within its scope, and I do not wholly limit my claims to the specific construction shown.

I claim:

1. A door structure for pressure tanks, the said structure comprising a door frame, a door adapted to seat in the door frame, one of the said parts being formed with an annular gasket-receiving recess and the other being formed with an annular gasket-compressing flange adapted to fit snugly into the recess, a compression gasket in the recess, and means engaging the door at a multiplicity of positions about its periphery and constrained to act simultaneously at such positions for drawing the door bodily toward the door frame, without relative rotation or angular movement of the door and frame, to compress the gasket, the door and the frame being formed with complementary, conical, guiding surfaces.

2. A door structure for pressure tanks, the said structure comprising a door frame, a door adapted to seat in the door frame and formed with peripheral locking lugs, a locking ring rotatably mounted upon the door frame and formed with locking lugs adapted by rotation of the ring to be interlocked with the lugs of the door, the door and the door frame being formed with snugly interfitting, substantially cylindrical guiding surfaces, and a compression gasket mounted between the door frame and the door.

3. A door structure as defined in claim 2 in which the locking ring and the door frame are provided with coacting oblique surfaces adapted to move the ring axially to tighten the door on its seat in the rotation of the ring.

4. A door structure for pressure tanks, the said structure comprising a circular door frame mounted upon a horizontal axis, a door mounted for movement into and out of closed position with relation to the door

frame, a locking ring for drawing the two together, a roller bearing for the locking ring, the door and the door frame being formed with snugly interfitting, substantially cylindrical guiding surfaces, and a compression gasket mounted between the door frame and the door.

In witness whereof I have hereunto set my hand this 25th day of June, 1926.

JOHN R. GAMMETER.