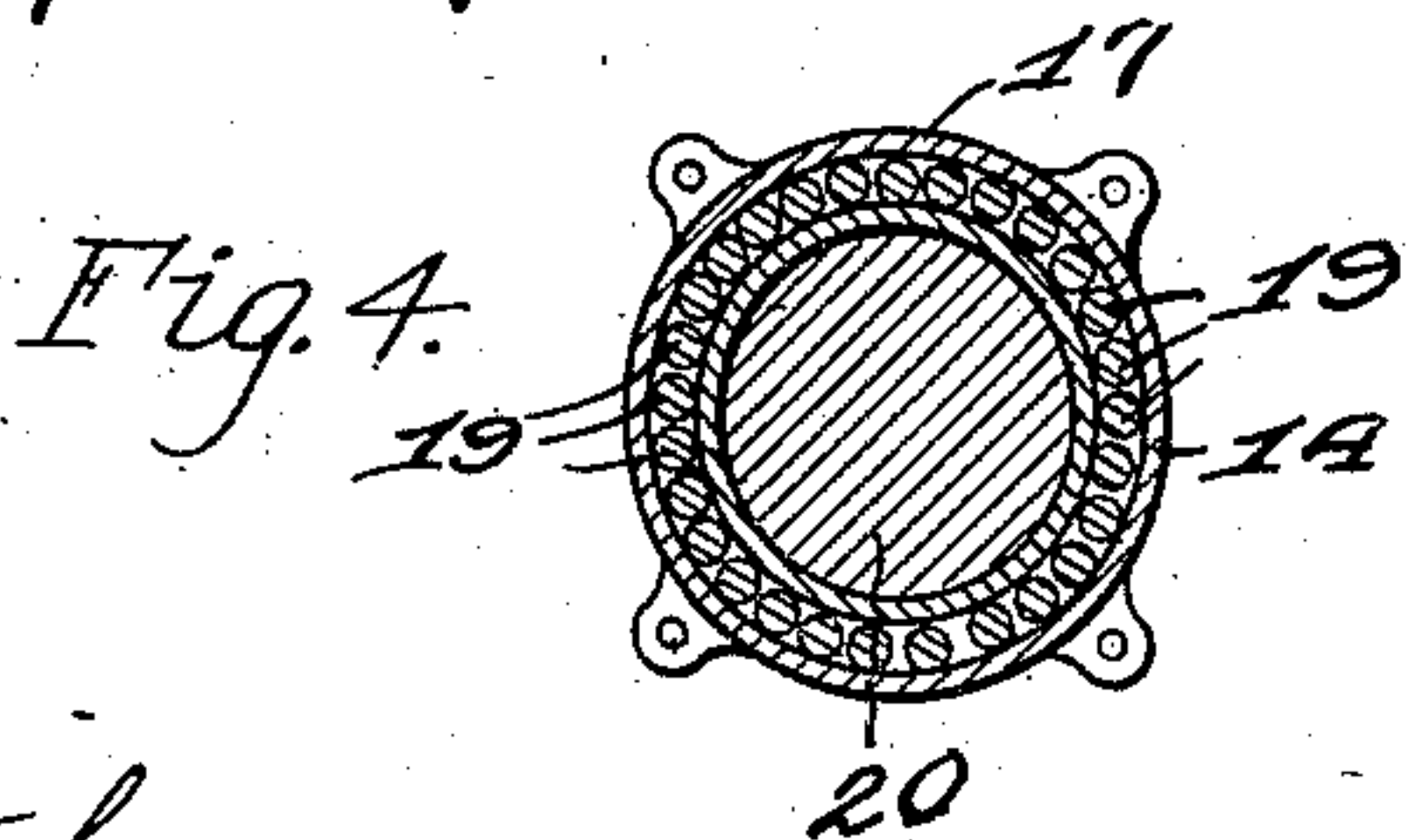
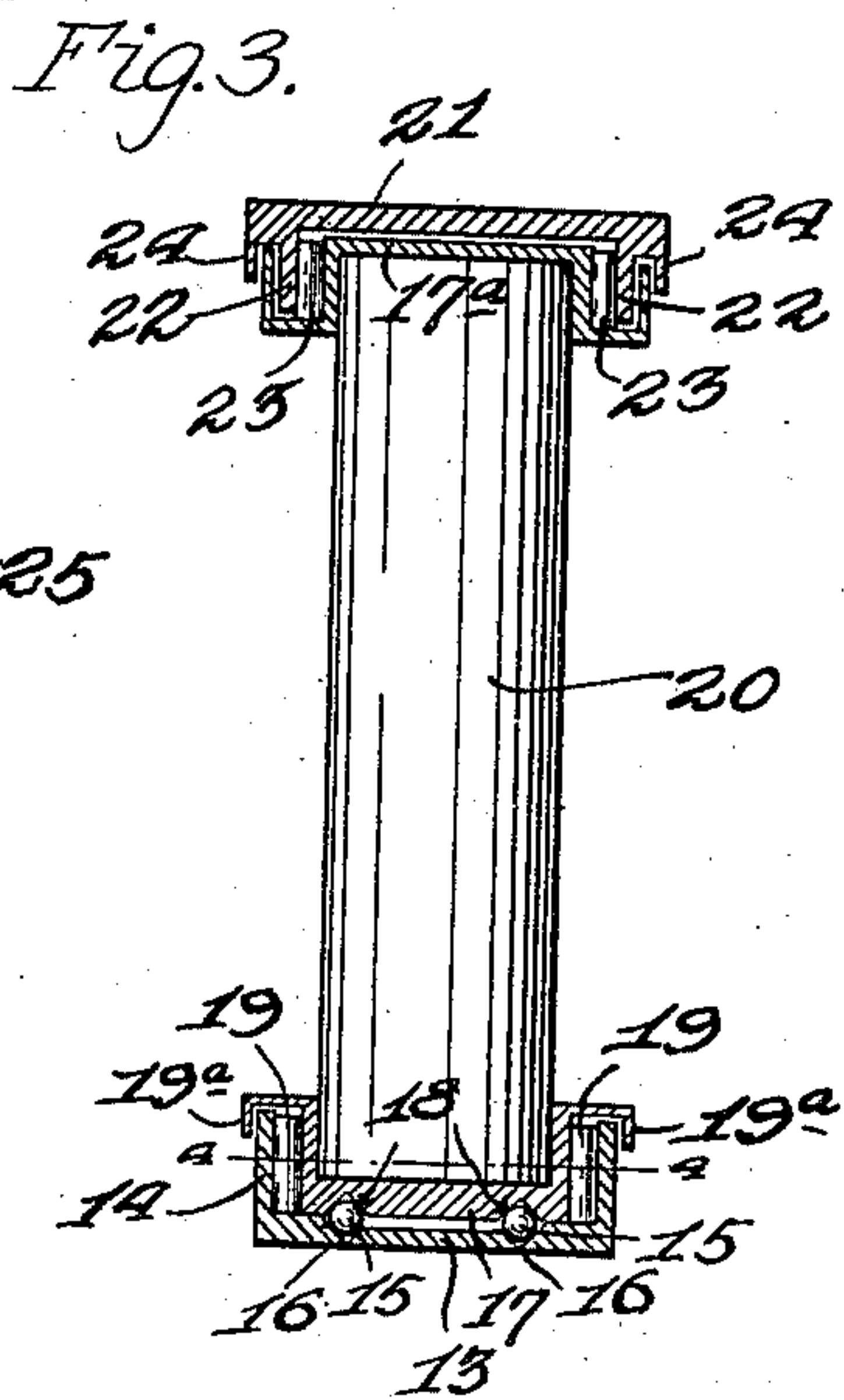
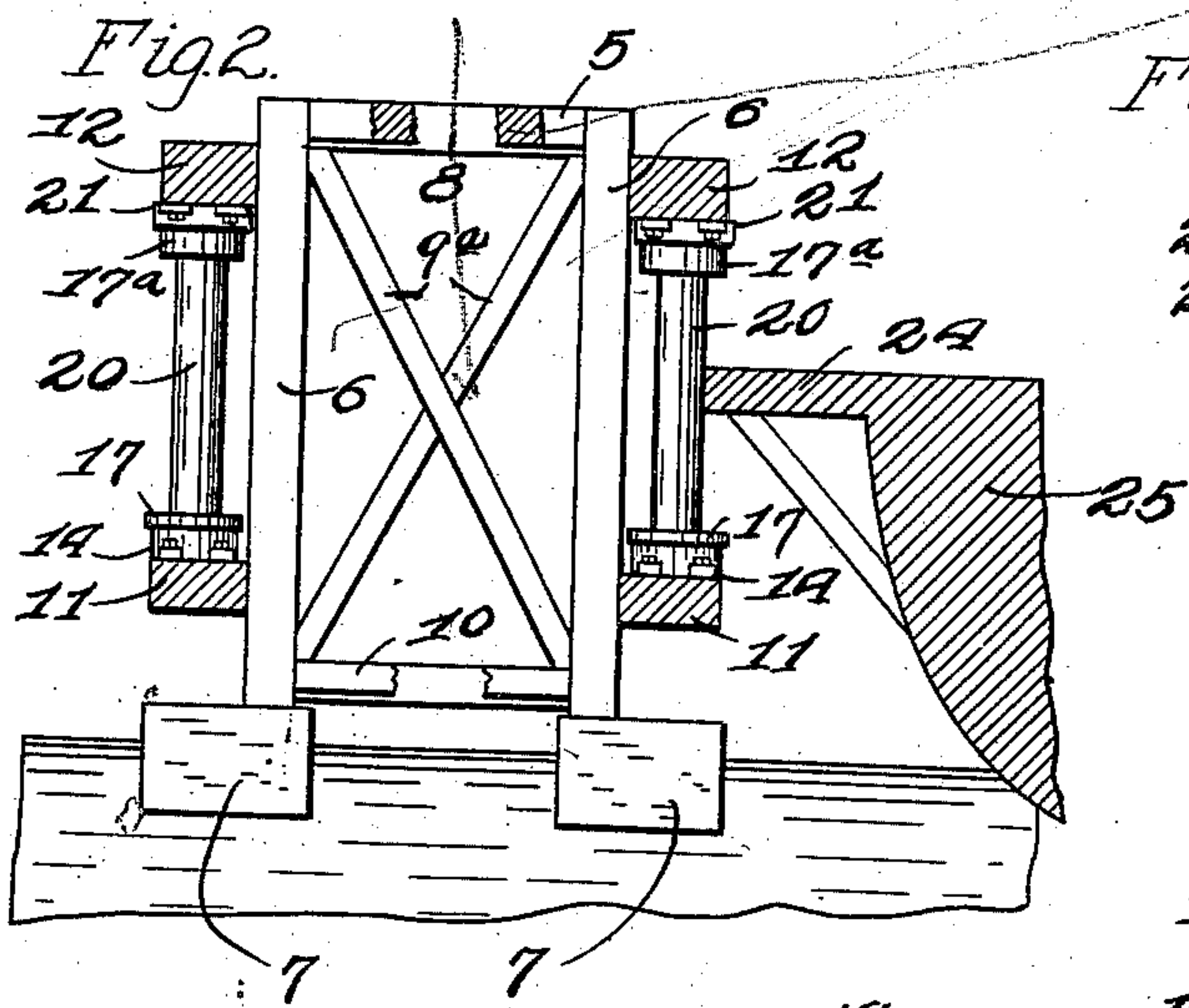
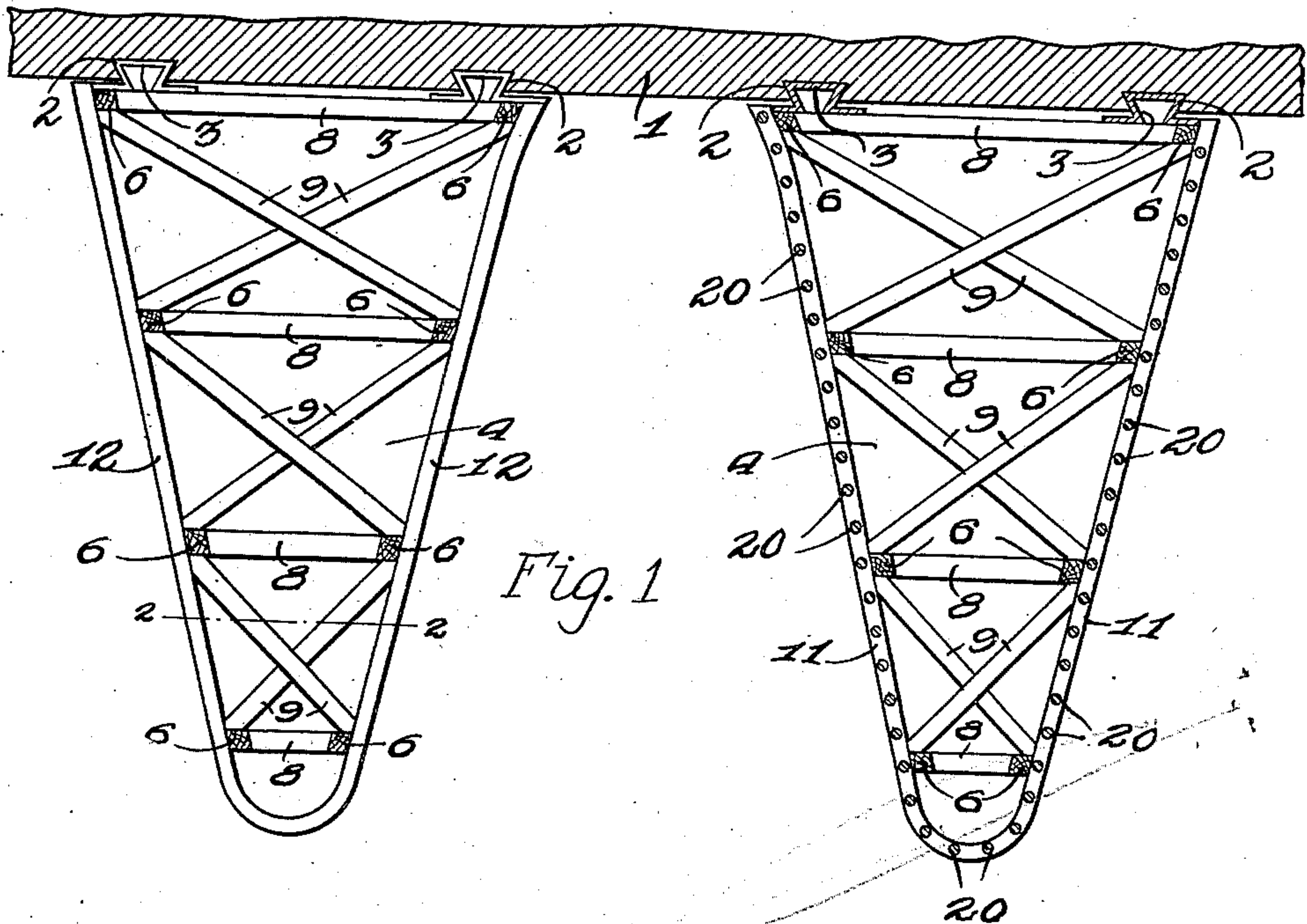


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PIER CONSTRUCTION.
APPLICATION FILED MAY 31, 1910.

985,371.

Patented Feb. 28, 1911.



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UNITED STATES PATENT OFFICE.

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PIER CONSTRUCTION.

985,371.

Specification of Letters Patent. Patented Feb. 28, 1911.

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To all whom it may concern:

Be it known that we, GEORGE ROETH and BYRON W. HASKELL, citizens of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Pier Construction, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to boat landings such as ferry slips and the like, and the principal object of the same is to provide a landing that will rise and fall with the tides and which is provided with means whereby the wear and tear on the landing and on boats making a landing are reduced to the minimum.

Another object of the invention is to provide a landing in which the parts thereof are readily removable.

In carrying out the objects of the invention generally stated above it will be understood, of course, that the essential features thereof are necessarily susceptible of changes in details and structural arrangements, one preferred and practical embodiment of which is shown in the accompanying drawings, wherein:—

Figure 1 is a top plan view of the improved landing, shown as a ferry slip parts being shown in section. Fig. 2 is a sectional view taken on the line 2—2, Fig. 1, showing, fragmentarily, a boat entering the slip. Fig. 3 is a detail view of one of the rubbing piles forming a part of this invention. Fig. 4 is a sectional view taken on the line 4—4, Fig. 3.

Referring to the accompanying drawings by numerals, it will be seen that the improved landing is used in connection with a stationary structure 1, such as a ferry shed, embankment or the like which is provided with vertical grooves 2 that are engaged by the tongue 3 of the piers 4, said grooves and tongues being of the type known as "dovetails" and the tongues being vertically slidable in said grooves so that the piers can rise and fall with the tides. The piers are formed of the string pieces 5 which are supported by the standards 6 carried by the caissons 7. Upper, lower and in-

termediate beams 8, 9, 9^a, and 10 are employed for strengthening the piers.

The outer portions of each pier are provided with the upper and lower spaced parallel beams 11 and 12, and at regular intervals the lower beams 11 have base plates 13 bolted or otherwise detachably fastened to their upper surfaces. Said plates are provided with an annular flange 14 and are also provided with an annular groove 15 in which anti-friction balls 16 are mounted. An inverted cap 17 is seated in each plate 13 and is provided with an annular groove 18 for the balls 16. Anti-friction rollers 19 are interposed between the flanges 14 of said plates and said caps, and said caps are provided with a guard flange 19^a that overhangs and incloses the flanges of plates 13 to prevent dirt, water, or the like getting in said plates. The caps 17 are carried by the cylindrical piles 20, and each pile is equipped with a similar upper cap 17^a that is rotatably fitted within a plate 21 bolted or otherwise detachably fastened to the bottom surface of upper beams 12. Said plates 21 are provided with an inner flange 22 between which and the body of said caps, anti-friction rollers 23 are arranged, and also with an outer flange 24 which overhangs and surrounds the outer portion of said caps to prevent foreign matter gaining access to said caps.

As is shown in Fig. 2, the rotary rubbing piles 21 are arranged so that the guards 24 of a boat 25 will contact therewith and rotate said piles so that damage to the piles or the guards is reduced to the minimum. It will also be understood that in the event of any of the piles becoming broken, a new one can be readily substituted for the reason that the piles are carried by the beam plates, and said plates are detachably secured to the beams.

What we claim as our invention is:—

1. A device of the character described comprising a pier formed of floating caissons, standards, stringers, and braces, upper and lower horizontally parallel arranged beams carried by the sides of said pier, and vertically arranged rotatable rubbing piles detachably carried by said beams.

2. A device of the character described comprising a pier, horizontally arranged upper and lower beams carried by the sides thereof, plates detachably connected to said
5 beams, a cap rotatably fitted in each plate, anti-friction means interposed between said caps and plates, and rubbing piles having their ends inclosed by said caps.

In testimony whereof we hereunto affix our signatures in presence of two witnesses. 10

GEORGE ROETH.
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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
