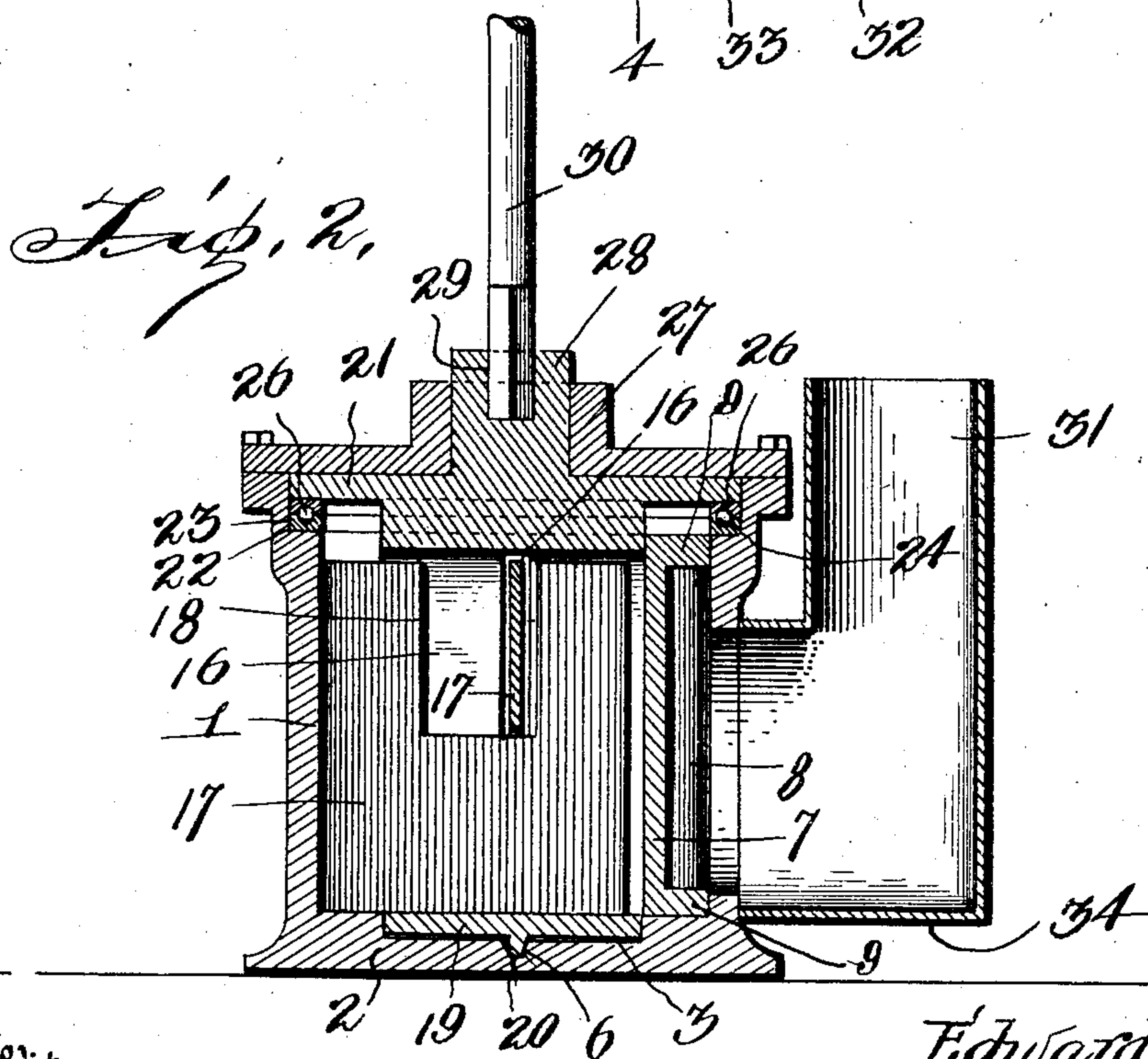
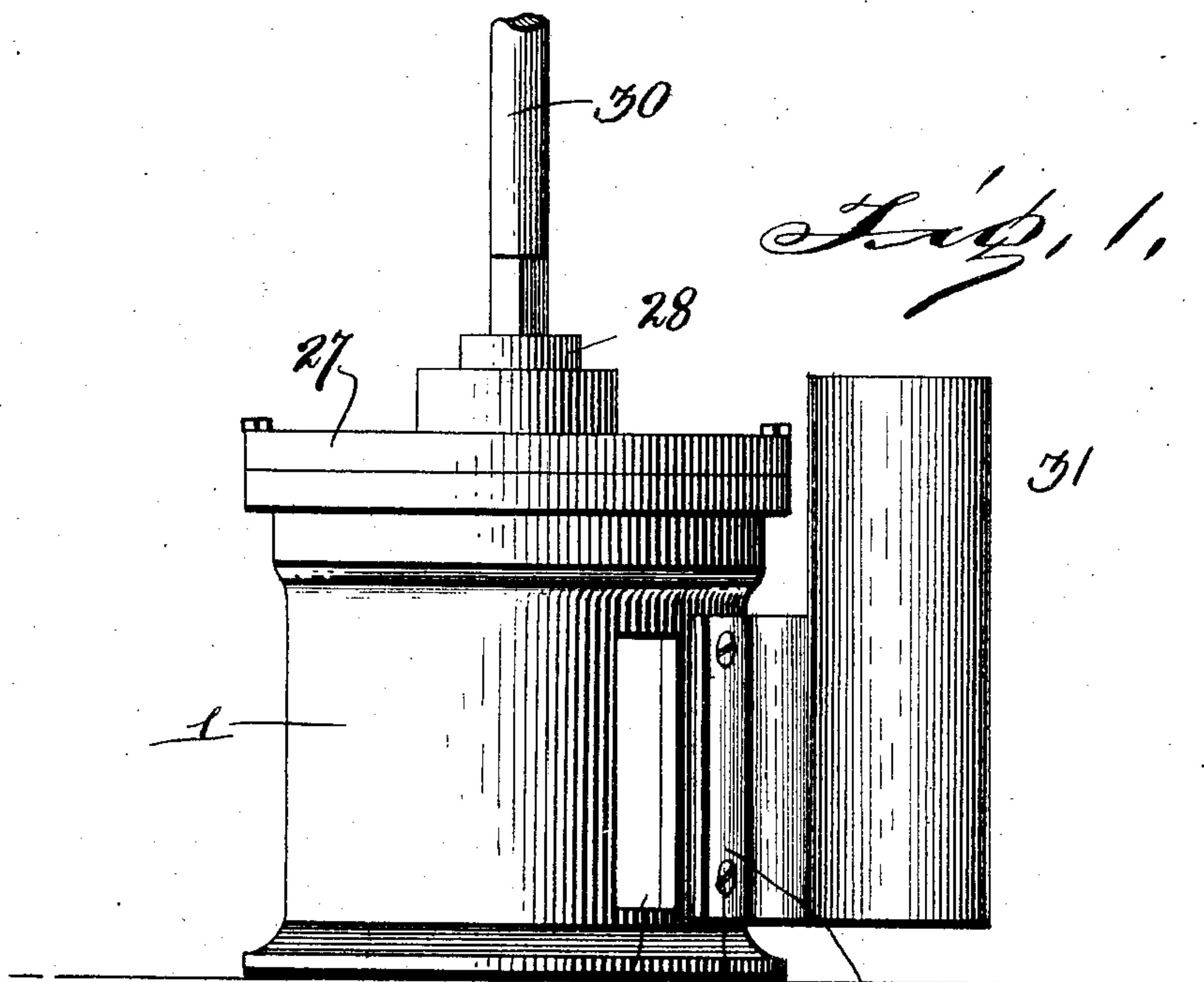


No. 786,466.

PATENTED APR. 4, 1905.

E. A. SMITH.  
ROTARY TURBINE PUMP.  
APPLICATION FILED AUG. 4, 1904.

3 SHEETS—SHEET 1.



Witnesses  
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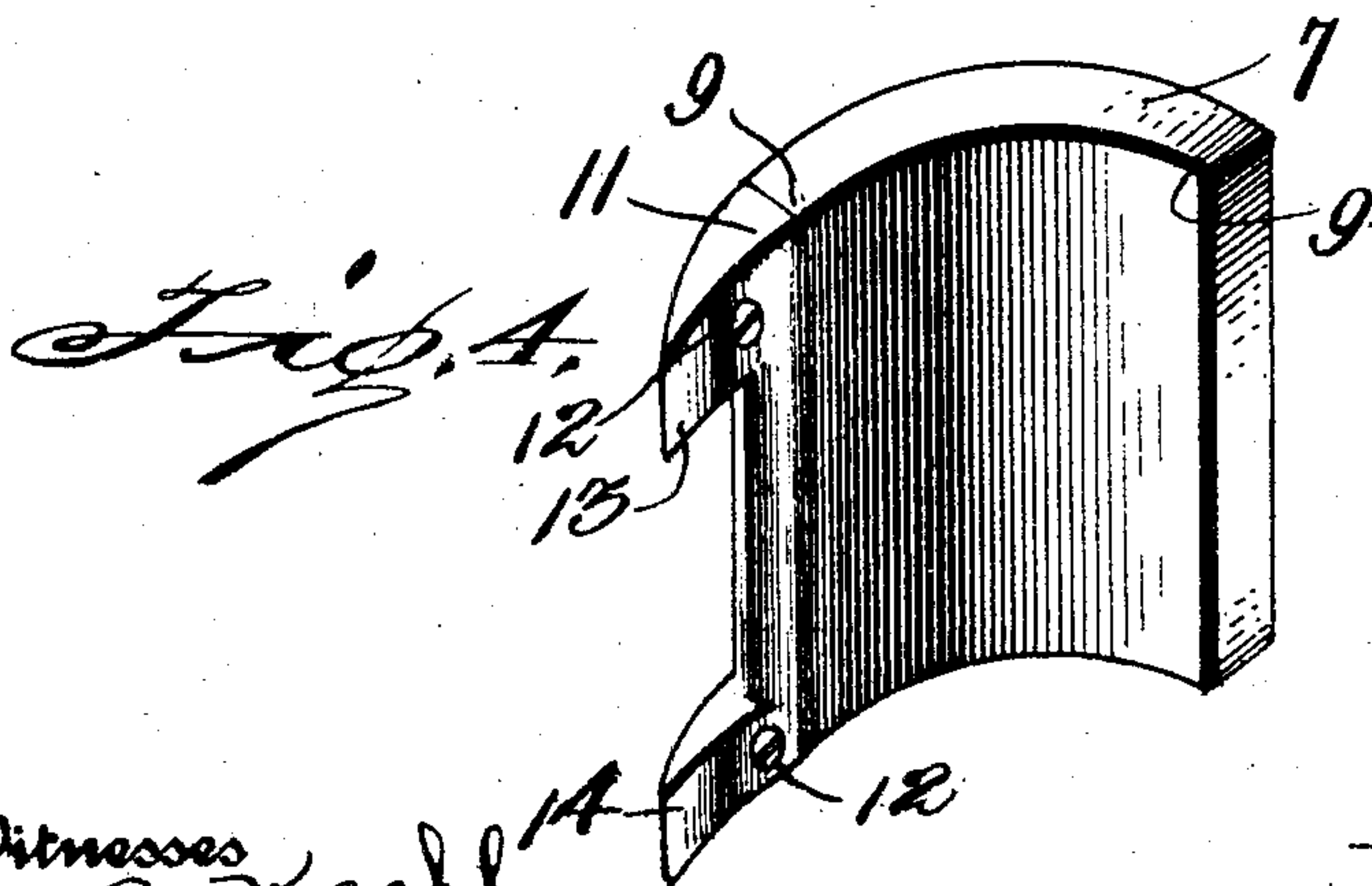
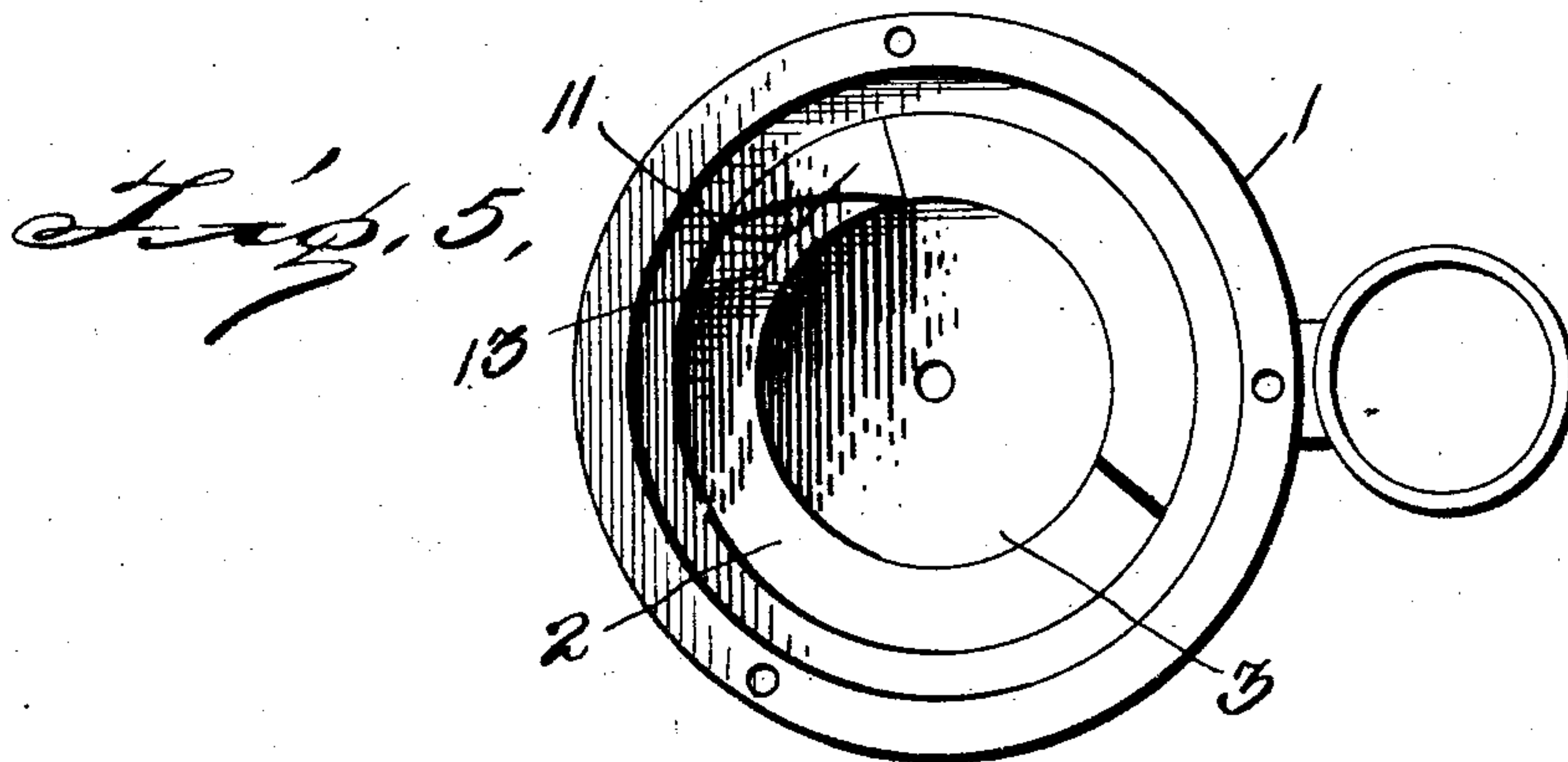
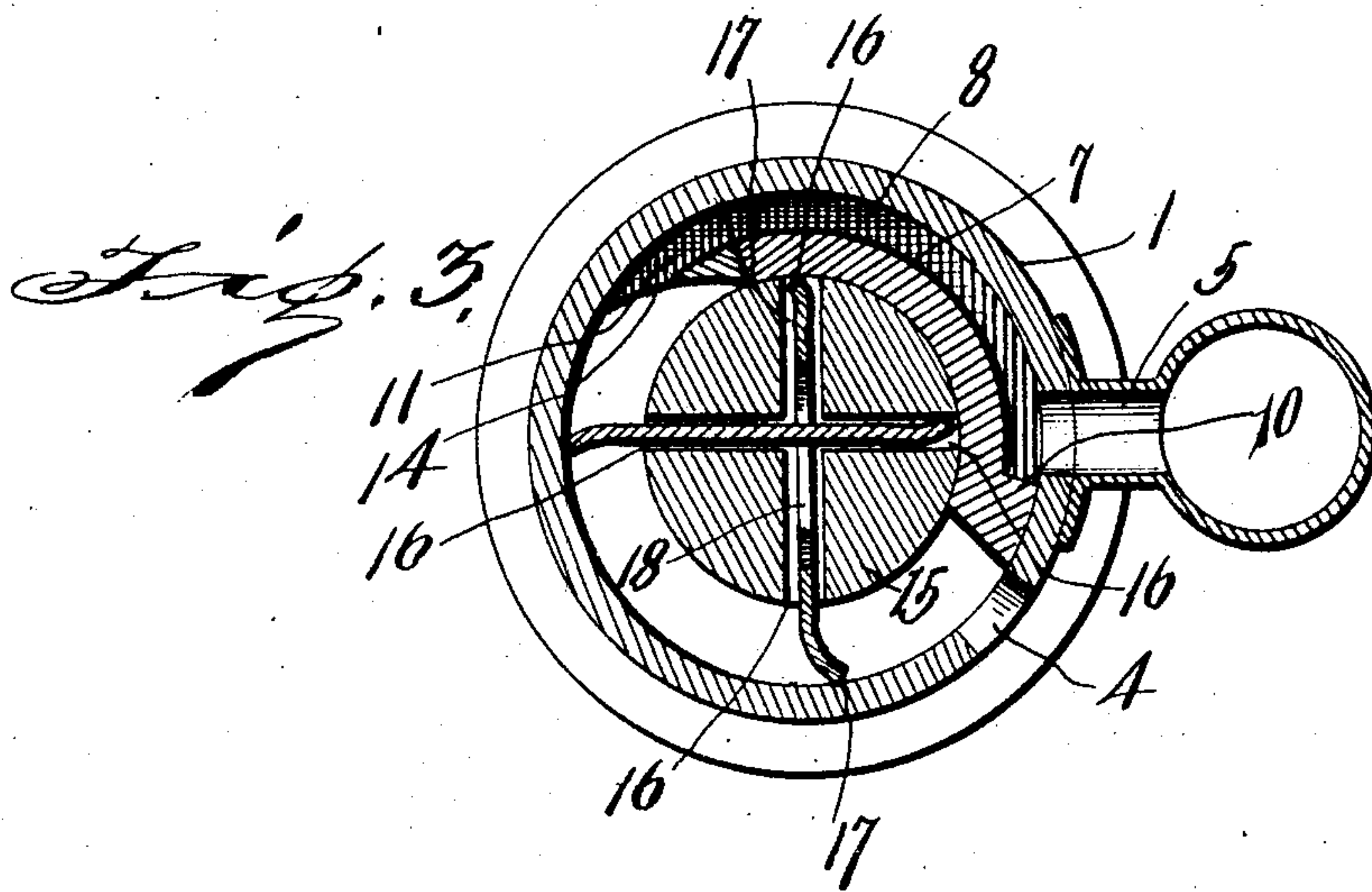
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3 SHEETS—SHEET 2.



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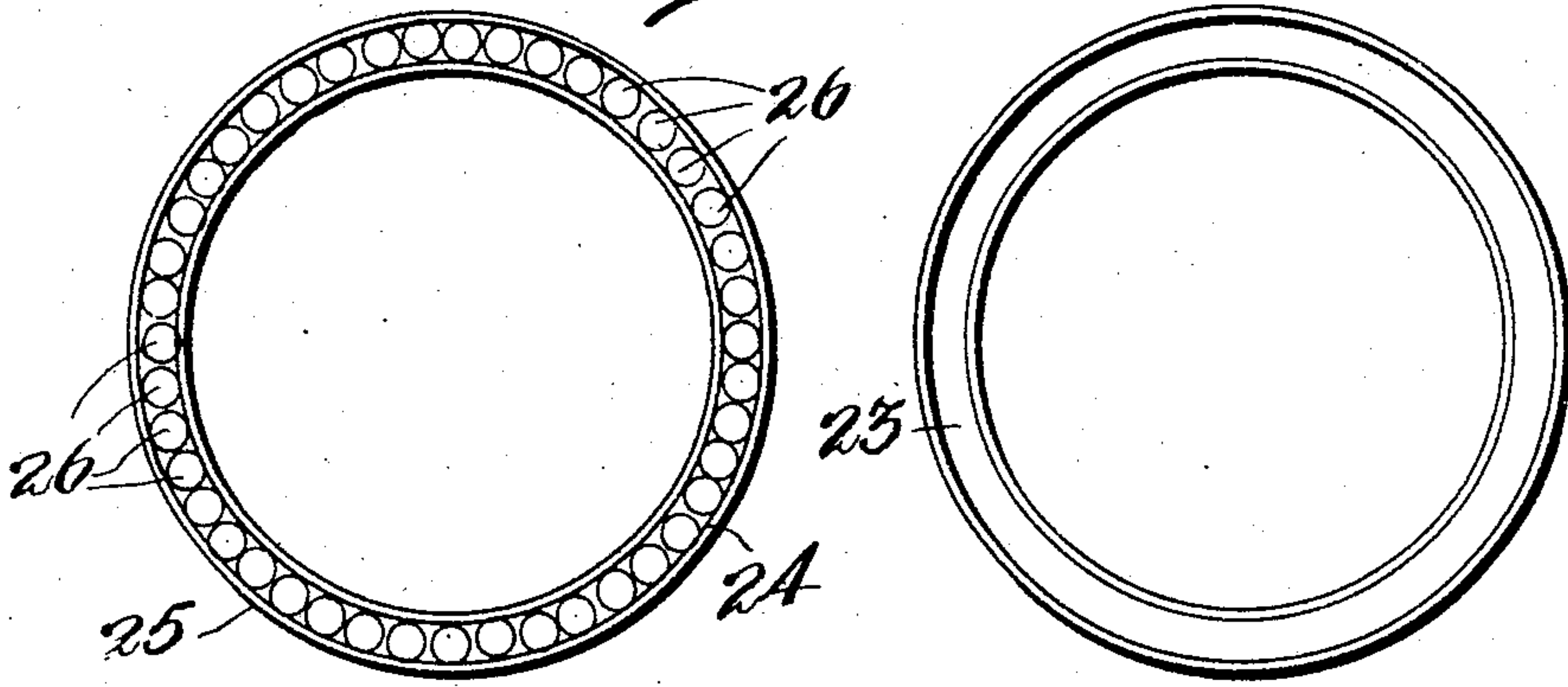
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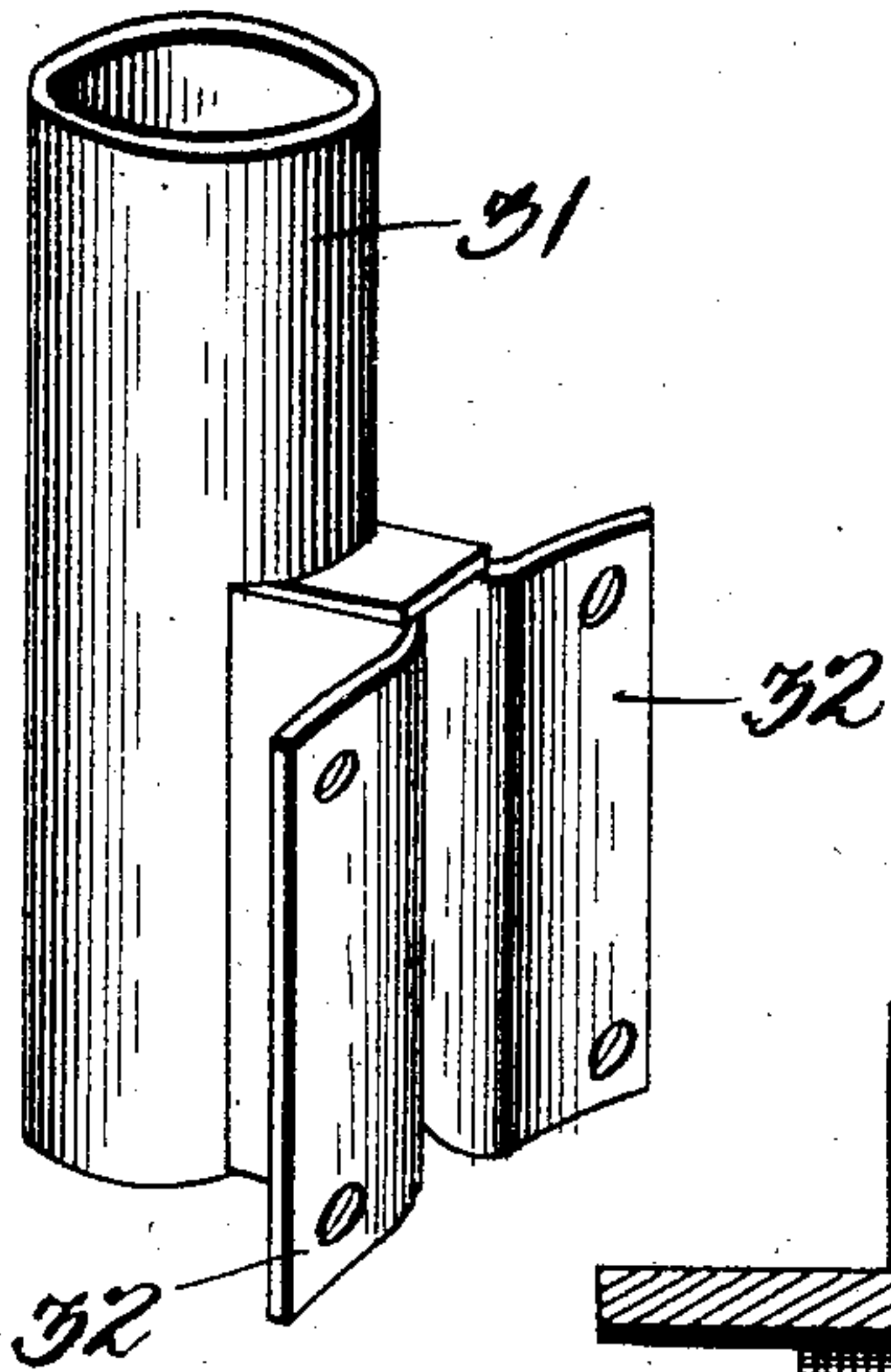
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3 SHEETS—SHEET 3.

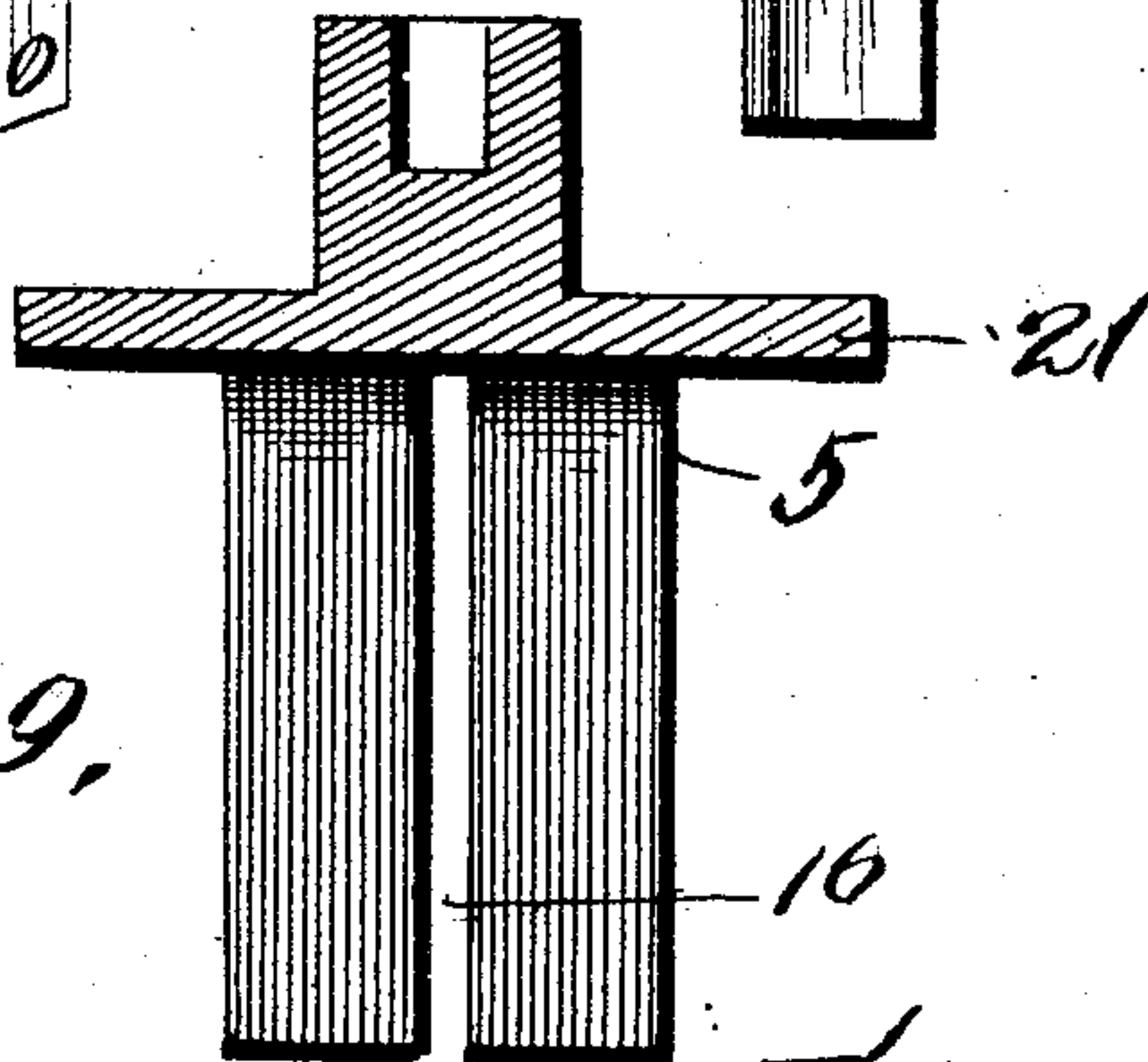
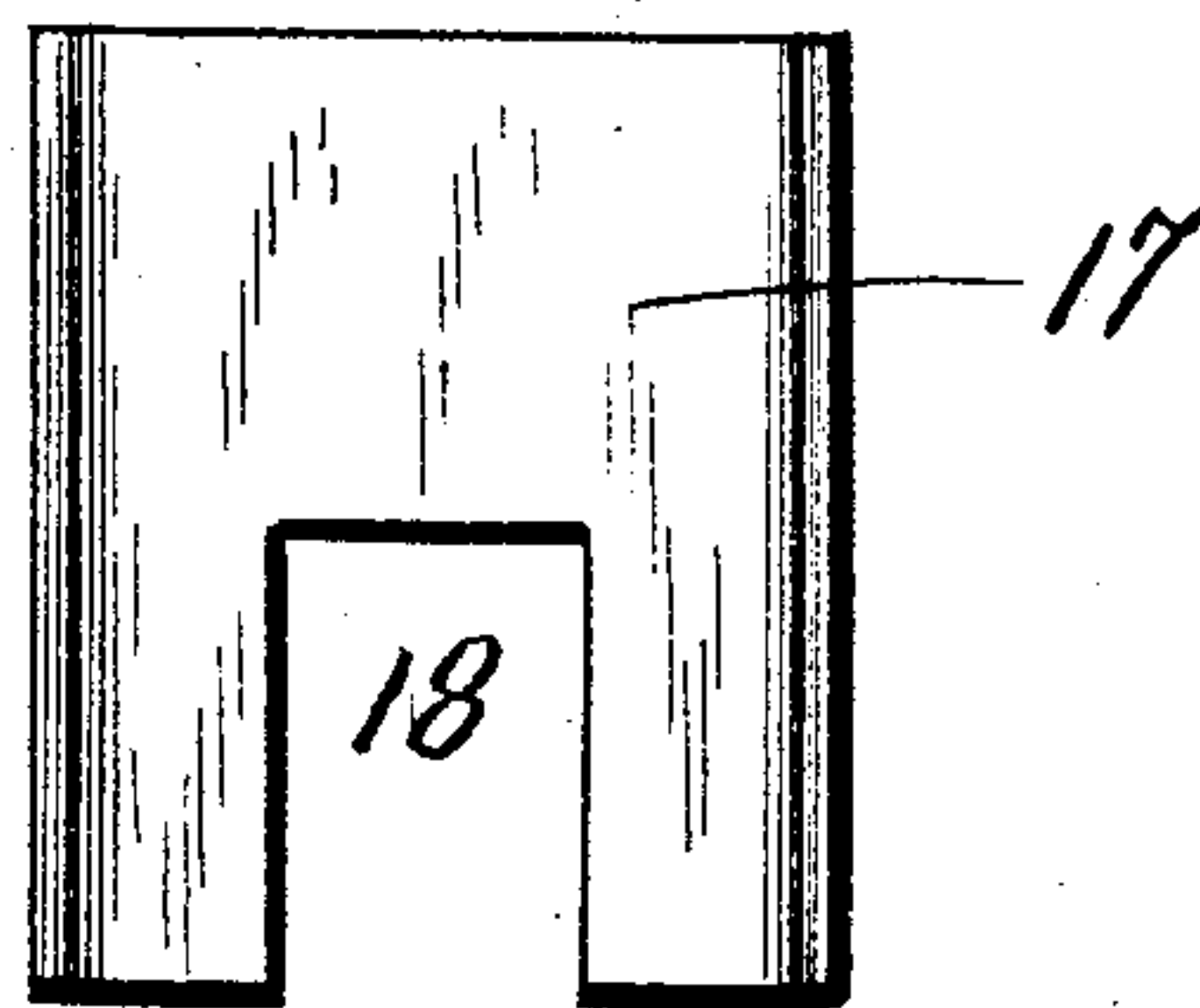
*Fig. 6.*



*Fig. 7.*



*Fig. 8.*



*Fig. 9.*

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# UNITED STATES PATENT OFFICE.

EDWARD A. SMITH, OF DENVER, COLORADO.

## ROTARY TURBINE-PUMP.

SPECIFICATION forming part of Letters Patent No. 786,466, dated April 4, 1905.

Application filed August 4, 1904. Serial No. 219,501.

*To all whom it may concern:*

Be it known that I, EDWARD A. SMITH, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Rotary Turbine-Pumps; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to rotary pumps of that type designed to be submerged in a body of water and rotated to elevate the water to the surface; and one of the objects of the same is to provide a device of this character which shall be comparatively simple in construction and which will operate smoothly and efficiently.

Another object is to provide a rotary or turbine pump of comparatively few parts, which may be constructed at slight cost and which will not be liable to get out of order.

These and other objects are attained by means of the construction illustrated in the accompanying drawings, in which—

Figure 1 is a side view of my invention set up in position for operation. Fig. 2 is a vertical section of the pump-casing and interior parts. Fig. 3 is a transverse section of the same. Fig. 4 is a perspective view of the outlet-port and cam for operating the gates or pistons. Fig. 5 is a plan view looking into the casing or shell. Fig. 6 is a detail section of the ball-bearing rings. Fig. 7 is a perspective view of the outlet-tube. Fig. 8 is a side view of one of the gates or pistons detached from the hub. Fig. 9 is a vertical central section through the hub or piston-head.

Referring to the drawings for a more particular description of my invention, the numeral denotes a casing of cylindrical form, said casing being hollow and having an integral bottom 2, interiorly recessed at 3 and provided with an inlet-port for the water at 4 and an outlet-port 5. In the center of the recess 3 a conical bearing 6 is provided. Within the cylinder is a combined port and cam 7, provided with a recess or waterway 8, having opposite shoulders 9 and an end shoulder 10, forming a continuation of the outlet-port

5 and being in alinement therewith. A steel cam 11 is secured to the opposite end of the port by the screws or bolts 12, said cam comprising tapered flanges 13 14, as shown in Fig. 4. The piston-head or hub 15 is provided with cross-slots 16, and fitted to slide in these slots are the gates or pistons 17, said pistons consisting of steel plates, their opposite edges being curved in reverse directions, as shown in Fig. 8. These pistons are slotted at 18 in order that one piston may slide within the other when operated by the cam 11. The pistons are held in place upon the piston-head by means of a disk 19, bolted to the lower end of the piston-head and provided with a bearing-point 20, designed to fit the conical bearing 6. At the outer end of the piston head a disk 21 is secured or formed integrally with the head, said disk being adapted to fit a recess at the upper end of the casing or cylinder, said recess being provided with a shoulder 22, upon which is supported a ball-bearing ring 23, said ring having a groove or ball-raceway 24 in its upper face. A similar ring 25 is placed in reverse position within the recess, and steel balls 26 are arranged within the rings. The upper ring may be secured to the under face of the disk 21, and the lower ring may be secured to the shoulder 22. A cap or piston-head 27 is secured to the casing and provided with a central opening to permit the hub 28 of the piston-head to pass through it, said hub being provided with a square opening 29 for the vertical operating-shaft 30, said shaft being provided at its upper end with a suitable crank mechanism or other means for operation. The outlet-tube 31 comprises the flange 32, bolted at 33 to the casing or cylinder and provided with an opening in line with the outlet-opening in the cylinder or casing, said tube having its lower end 34 closed, as shown, and said tube extending vertically to the point of discharge.

The operation of my pump will be readily understood from the foregoing. Upon revolving the vertical shaft the pistons or gates sweep the water around within the casing out through the waterway and into the outlet-tube, the steel cams upon the opposite sides



of the waterway serving to hold the blades in proper relative position.

From the foregoing it will be obvious that my invention is of comparatively simple construction, and will operate smoothly and with comparatively little power to force the water to the surface. Being composed of comparatively few parts, the device is not liable to get out of order by any ordinary usage.

10 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A rotary pump comprising a casing or cylinder, a piston-head mounted upon ball-  
15 bearings within the casing and provided with cross-slots, slotted sheet-metal pistons mounted within the slots and constructed to move independently, said pistons having oppositely-curved edges, and a combined waterway and  
20 cam comprising a recessed plate having tapering cams secured at its opposite edges, said waterway being secured within the casing and provided with a shoulder which alines with

the outlet-opening in the cylinder, an outlet-tube closed at its lower end and means for  
25 operating the piston-head, substantially as described.

2. In a rotary pump, the herein-described combined waterway and cams comprising opposite shoulders, providing an intermediate  
30 recess, and an end shoulder, and tapering cams secured to the ends of said waterway and forming continuations of the opposite shoulders, in combination with a piston-head provided with cross-slots and slotted sheet-  
35 metal independently-operated pistons mounted in the slots and actuated by the cams, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing wit-  
40 nesses.

EDWARD A. SMITH.

Witnesses:

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