

No. 746,206.

PATENTED DEC. 8, 1903.

W. VIGGERS.
STEAM ENGINE FOR PUMPS, &c.

APPLICATION FILED JAN. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 3

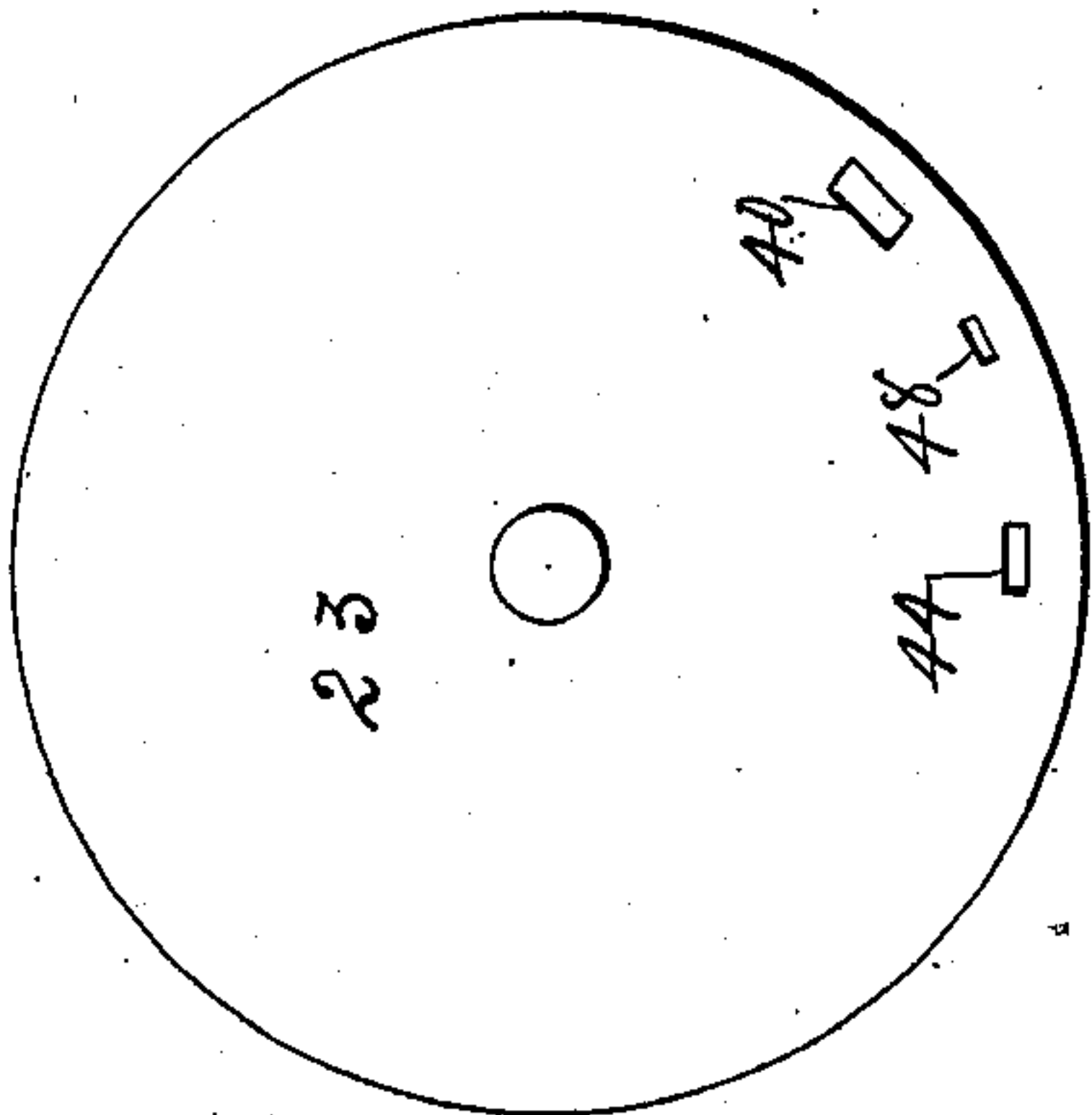


Fig. 1

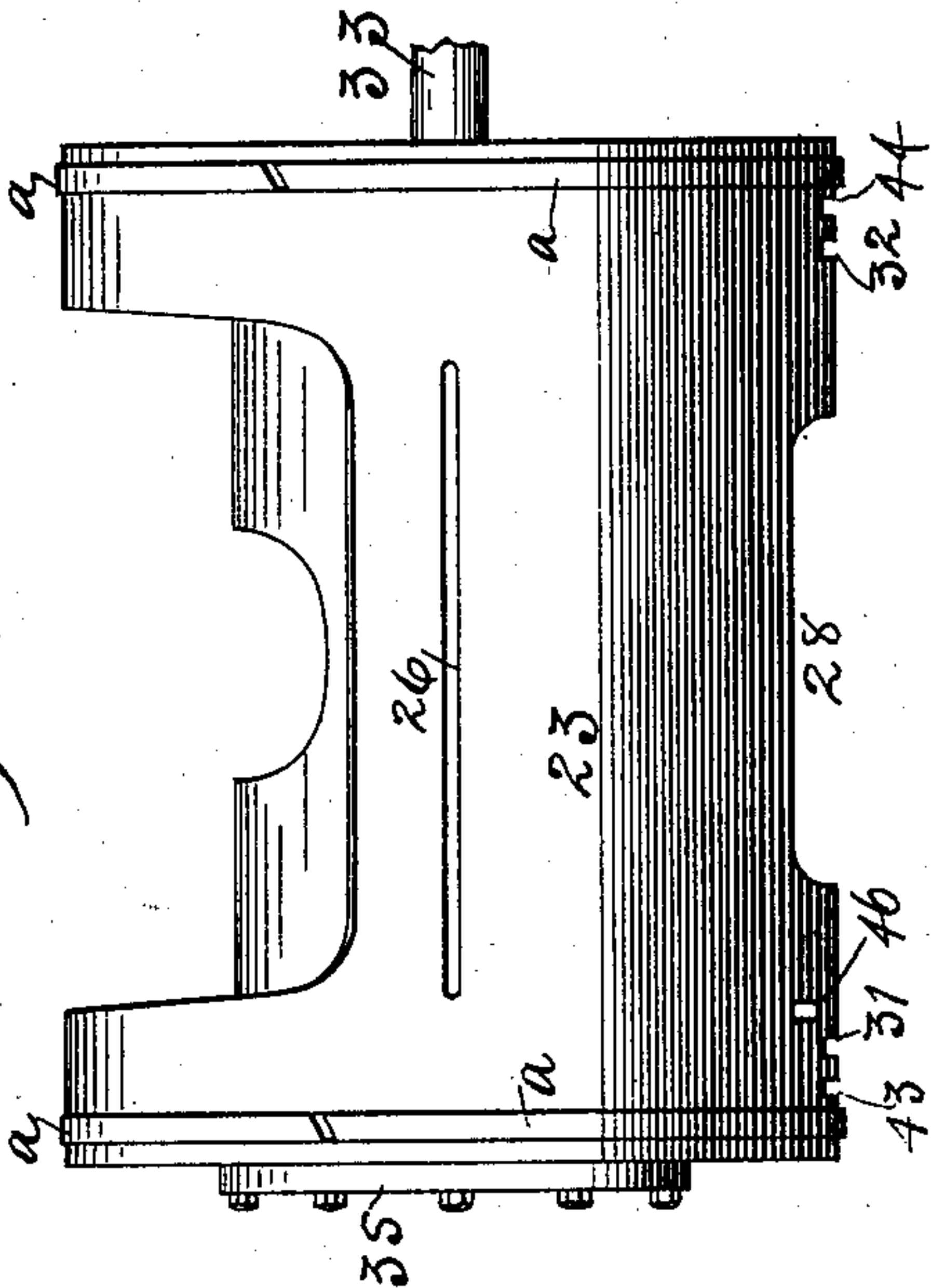


Fig. 2

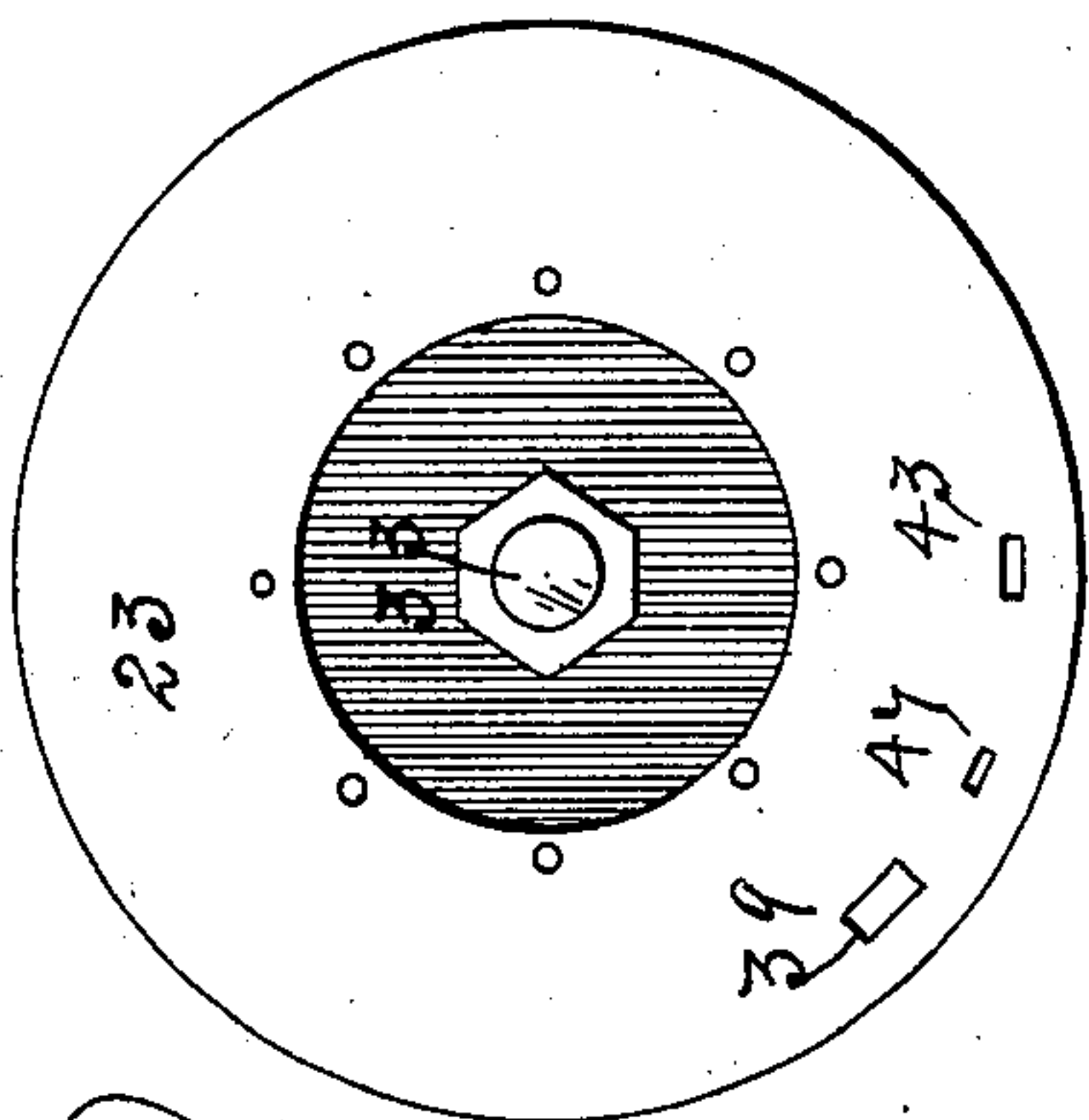
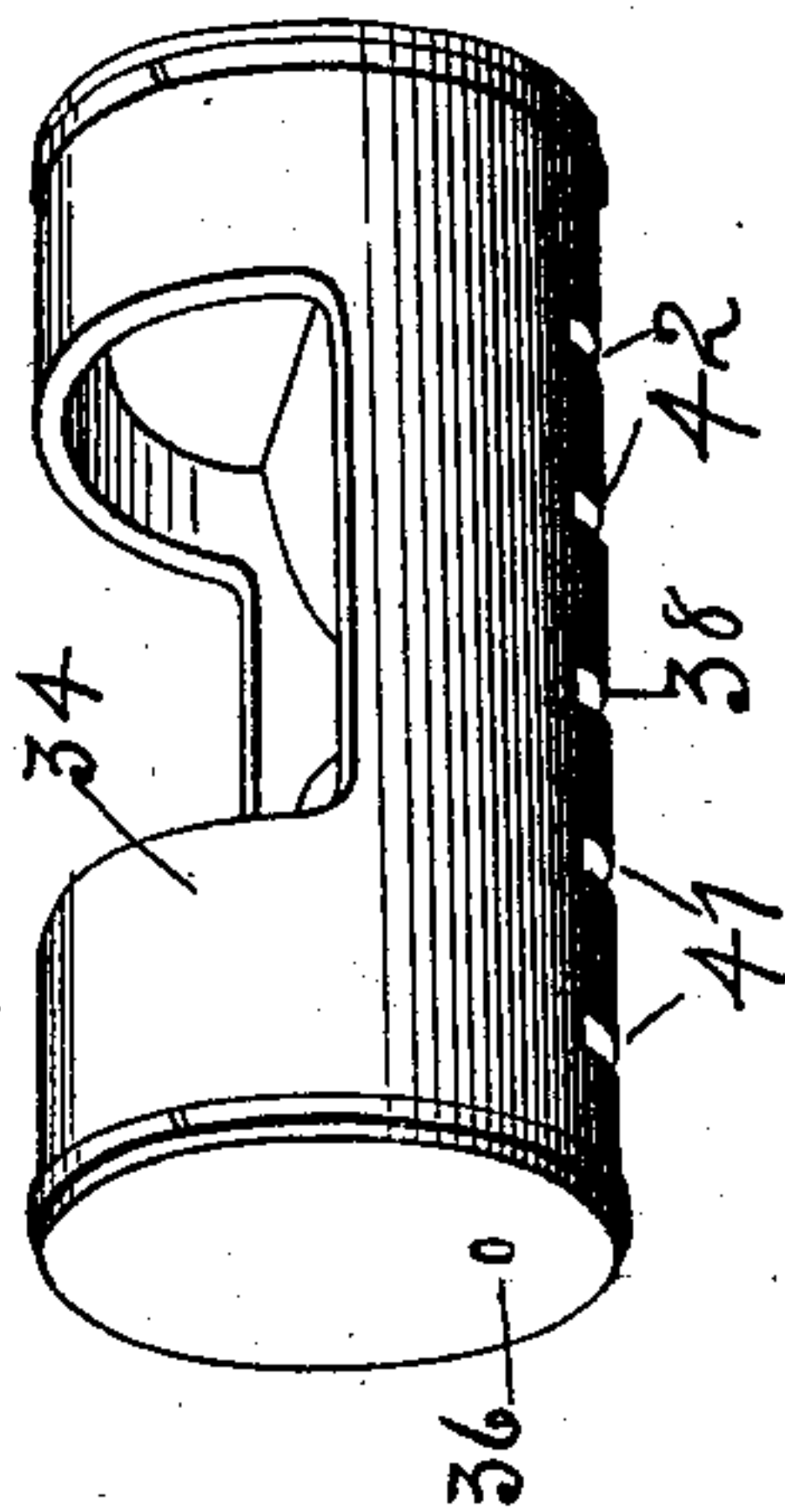


Fig. 4



Witnesses:
Geo. F. White,
Henry Manger.

Inventor: William Viggers,
By Thomas G. Orrig, Attorney.

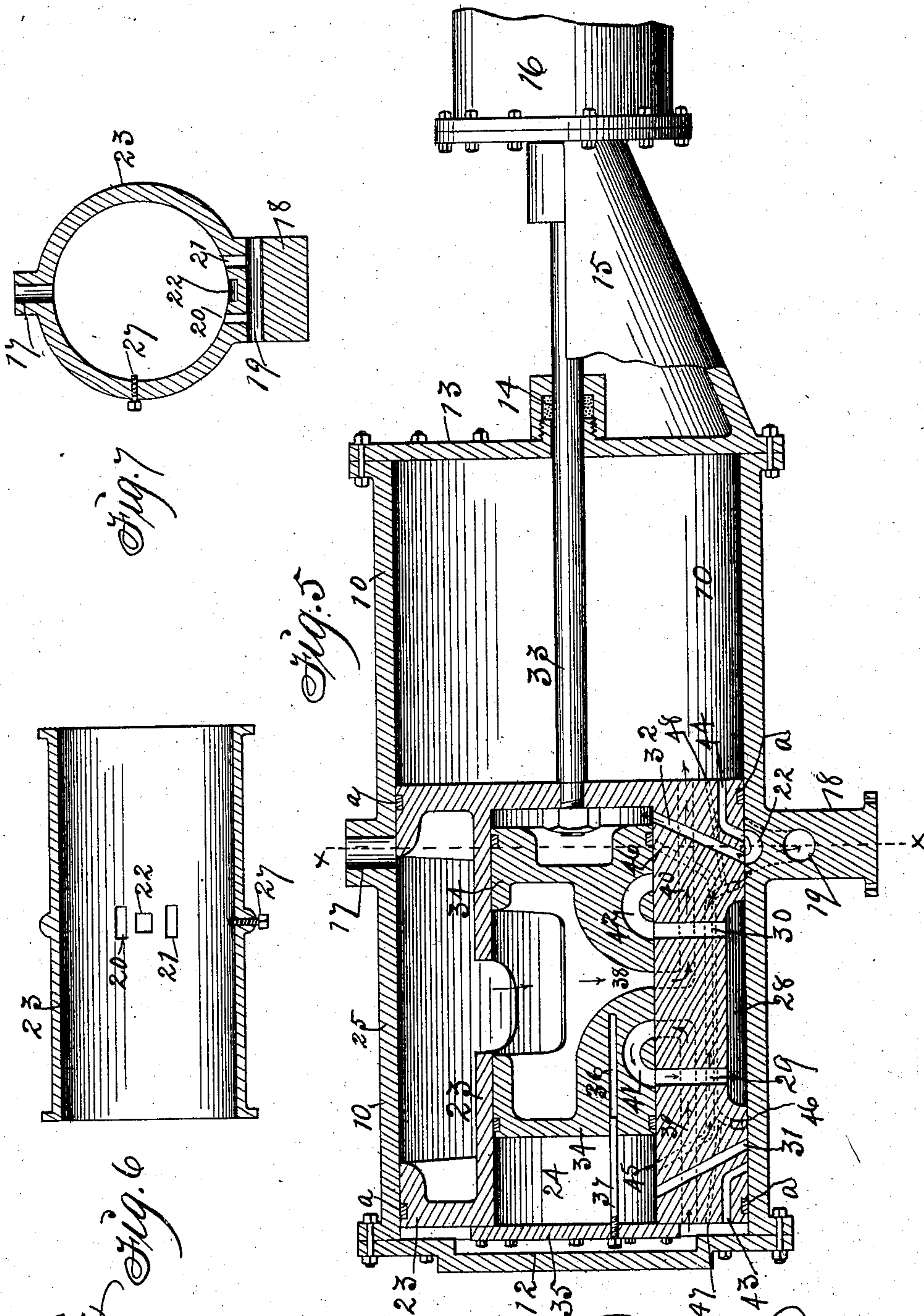
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UNITED STATES PATENT OFFICE.

WILLIAM VIGGERS, OF DES MOINES, IOWA.

STEAM-ENGINE FOR PUMPS, &c.

SPECIFICATION forming part of Letters Patent No. 746,206, dated December 8, 1903.

Application filed January 19, 1903. Serial No. 139,568. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM VIGGERS, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have invented a new and useful Steam-Engine for Pumps, &c., of which the following is a specification.

My object is to provide a strong and durable steam-pump by inclosing the valve in the piston and the piston in the cylinder in concentric position relative to each other, so that the valve and piston will reciprocate in reverse ways, lubricated by steam and oil and cushioned by steam, as required to prevent wear and damage by friction and jarring.

My invention consists in the construction, arrangement, and combination of parts, as hereinafter set forth, pointed out by my claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a side view, Fig. 2 a view of the open end, and Fig. 3 a face view, of the closed end of the piston. Fig. 4 is a perspective view of the valve, adapted to be reciprocated within the piston. Fig. 5 is a longitudinal sectional view that shows the valve and the piston combined within the cylinder, as required for practical use. Fig. 6 is a reduced horizontal sectional view of the lower portion of the cylinder. Fig. 7 is a reduced transverse sectional view of the cylinder on the line *xx* of Fig. 5.

The numeral 10 designates the steam-cylinder. It has a head 12 at one end that is provided with a space in its inside face adapted to retain steam for cushioning the piston and a head 13 at its other end provided with a stuffing-box 14 for the piston-rod and an integral extension 15, to which is fixed the head of a water chamber or cylinder 16 in concentric position with the steam-cylinder 10. At the center and top of the steam-cylinder is the steam-inlet 17 and at its bottom an extension 18, through which steam exhausts through a horizontal passage-way 19 and ports 20 and 21, that intersect the passage-way, as shown in Fig. 7. A steam passage-way 22 is located midway between the ports 20 and 21, as shown in Figs. 5 and 7, that when in alignment with passage-ways in the piston allows steam to pass from the valve into the end por-

tions of the cylinder alternately, as required to reciprocate the piston.

The piston 23 is fitted in the cylinder 10 and provided with packing-rings *a* at its end portions and a longitudinal central bore 24, that serves as a cylinder for a reciprocating valve. An open elongated steam-chamber 25 in the top portion of the piston communicates with the steam-inlet 17 and is constantly filled with live steam when the engine is in operation. A groove 26 in the outside surface of the piston, as shown in Fig. 1, admits the end of a screw 27, seated in the cylinder 10, as shown in Fig. 6, as required to allow longitudinal motion to the piston and to prevent rotary motion, as required to retain the steam passage-ways in the end portions of the piston in alinement with the exhaust-ports and steam passage-way in the cylinder, as shown in Fig. 5. The lower portion of the piston has an elongated steam-chamber 28 and ports 29 and 30, that intersect it at its end portions. Ports 31 and 32 extend through the end portions of the piston from its central bore to its outer surface to alternately coincide with the passage-way 22 to alternately admit steam to pass from the valve into the opposite ends of the cylinder, as required to reciprocate the piston in the cylinder. The piston-rod 33 is fixed to the piston and extended through the stuffing-box 14 and into the water-cylinder 16, as required to actuate a plunger therein.

The valve 34 is open at its top and central portion and is fitted in the bore of the piston 23 and confined in said bore by means of a subhead 35, fixed over the open end of the piston, as shown in Fig. 5. A small bore 35 in the end of the valve admits a guide-rod 37 to enter. The rod is fixed in the subhead 35 and prevents rotary motion of the valve, but allows rectilinear reciprocating motion. The open-topped steam-chamber of the valve has a passage-way 38 extending down from its center to communicate alternately with elbow-shaped passage-ways 39 and 40, that are indicated by dotted lines in Fig. 5 and shown in Figs 2 and 3. Passage-ways 41 and 42 in the valve, semicircular in form, as shown in Fig. 5, and on opposite sides of the passage-way 38, also communicate alternately with

the passage-ways 39 and 40 in the piston and, as required to alternately convey live steam from the valve to the opposite ends of the piston, to reciprocate the piston in the cylinder. The passage-way 38 in the valve 34 also communicates alternately with the passage-ways 29 and 30 in the piston, as required to maintain steam in the chamber 28 for balancing the piston in the cylinder. Passage-ways 43 and 44 in the lower portions of the ends of the piston alternately communicate with the ports 20 and 21 and the exhaust-passage 19 and also with the passage-ways 31 and 32, as required to actuate the valve in the piston by the expansive force of steam thus conveyed from the cylinder. Passage-ways 45 and 46 (indicated by dotted lines in Fig. 5) alternately communicate with the ports 21 and 22 to alternately allow steam to enter and also to exhaust from the opposite ends of the chamber in which the valve is reciprocated. Passage-ways 47 and 48 in the ends of the piston intersect the passage-ways 45 and 46, as indicated by dotted lines in Fig. 5, to aid in alternately conveying exhaust-steam from the opposite ends of the cylinder.

Having thus described the purpose of my invention and the construction and function of each element and subcombination and the arrangement and combination of all the parts, the practical operation and utility of the invention will be obvious to persons familiar with steam-engines, and

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

1. In a steam-engine, a cylinder having a central stuffing-box in its head at one end, a steam-chamber in the inside face of its other end, a steam-inlet at its top and center, an extension at its bottom and center, two exhaust-ports in the said extension, a steam passage-way between said ports, a reciprocating piston in the cylinder and provided with a steam passage-way leading from its circumference to its end and a steam passage-way leading from its circumference to its steam-chamber, a longitudinal groove in the outside face of the piston and a screw seated in the cylinder to enter and traverse

the said groove, arranged and combined to operate in the manner set forth for the purposes stated.

2. In a steam-engine, a cylinder having a central stuffing-box in its head at one end, a steam-chamber in the inside face of its other end, a steam-inlet at its top and center, an extension at its bottom and center, exhaust-passages in the said extension and a reciprocating piston fitted in the cylinder, a longitudinal groove in the outside face of the piston and a screw seated in the cylinder to enter and traverse the said groove, a longitudinal central bore in the piston, a reciprocating valve fitted in the said bore, a longitudinal small bore in the end of the valve and a rod fixed in the end of the piston to extend into the said small bore, arranged and combined to operate in the manner set forth for the purposes stated.

3. A steam-engine for pumps comprising a cylinder having an extension at its bottom and center provided with an inlet-port at its top and center, exhaust-ports at its bottom and center between the exhaust-ports, a piston having an open end, a fixed subhead to close said opening, an opening in its top and central portion, an elongated steam-chamber in its bottom and central portion, steam passage-ways intersecting the end portions of said elongated chamber, a steam passage-way in such end portion leading from the circumference to the interior, elbow-shaped passage-ways leading from the circumference through the ends, elbow-shaped passage-ways leading from the central portion of the interior through its ends, a valve having closed ends fitted in the piston and provided with an opening in its top, a steam passage-way extending through the center of its bottom, semi-circular passage-ways in its bottom on opposite sides of said central passage-way and means for preventing the valve from rotating, arranged and combined to operate in the manner set forth for the purposes stated.

WILLIAM VIGGERS.

Witnesses:

REUBEN VIGGERS,
THOMAS G. ORWIG.