

(Model.)

2 Sheets—Sheet 1.

N. A. WAHTOLA.
DIAPHRAGM PUMP.

No. 598,830.

Patented Feb. 8, 1898.

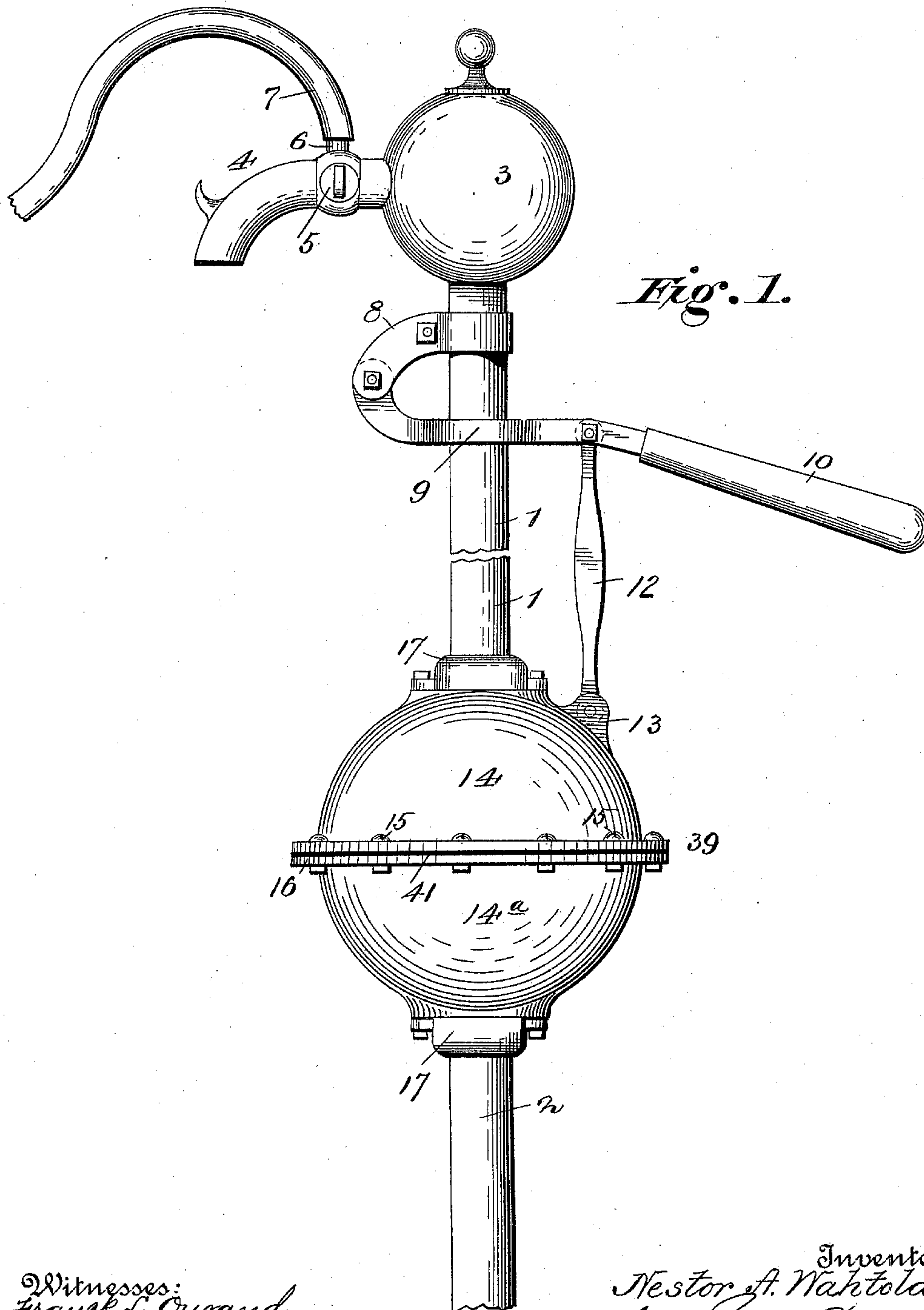


Fig. 1.

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Fig. 2.

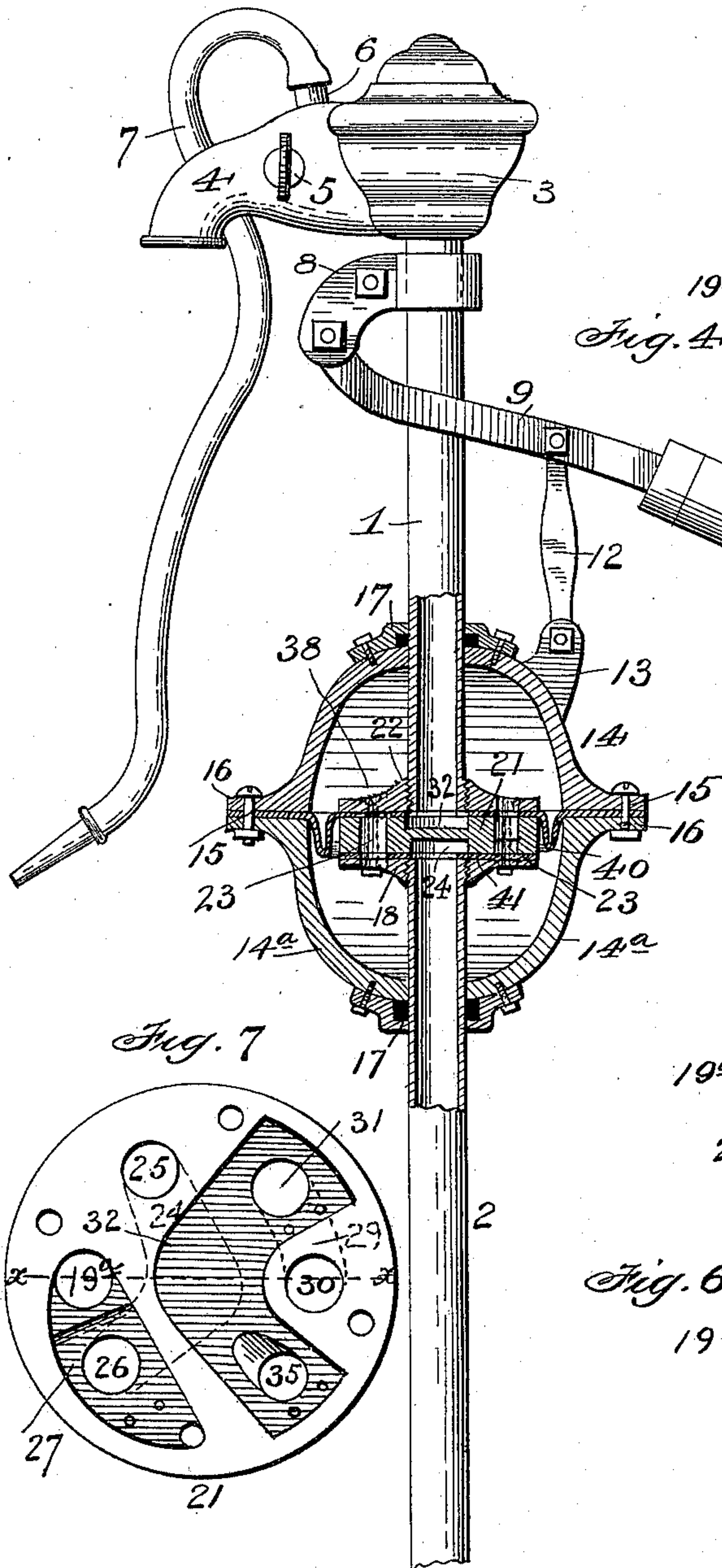


Fig. 3.

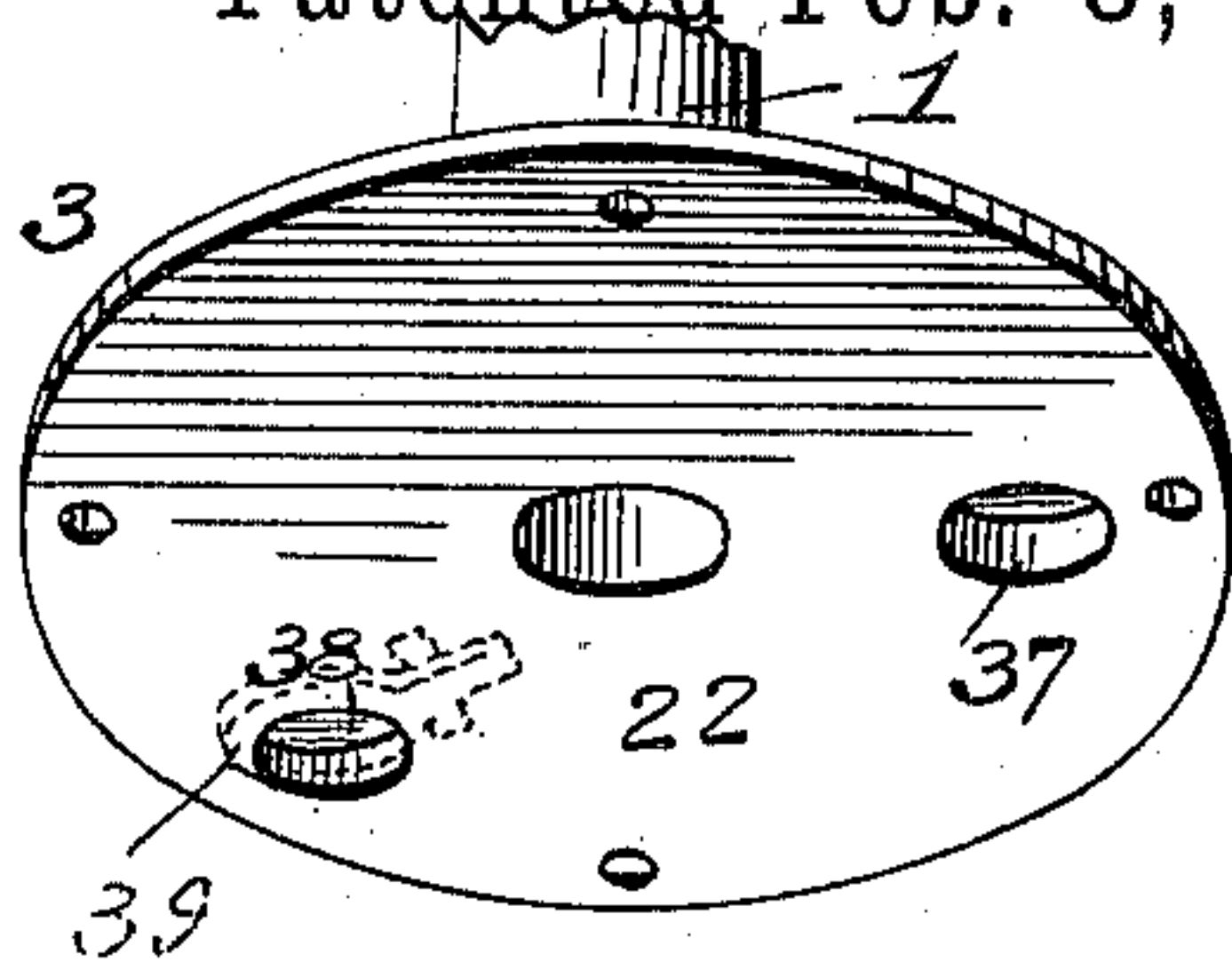


Fig. 4.

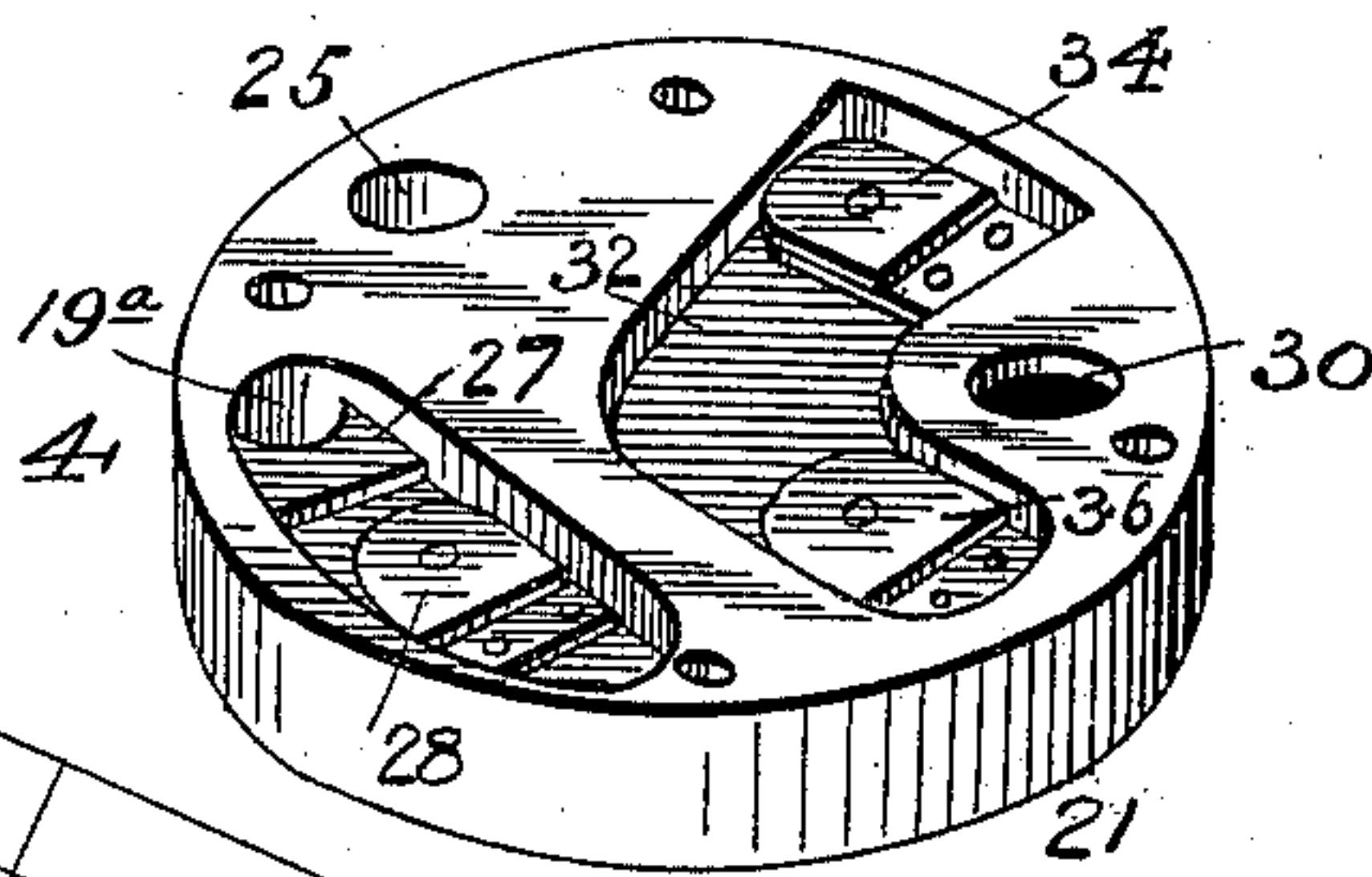


Fig. 5.

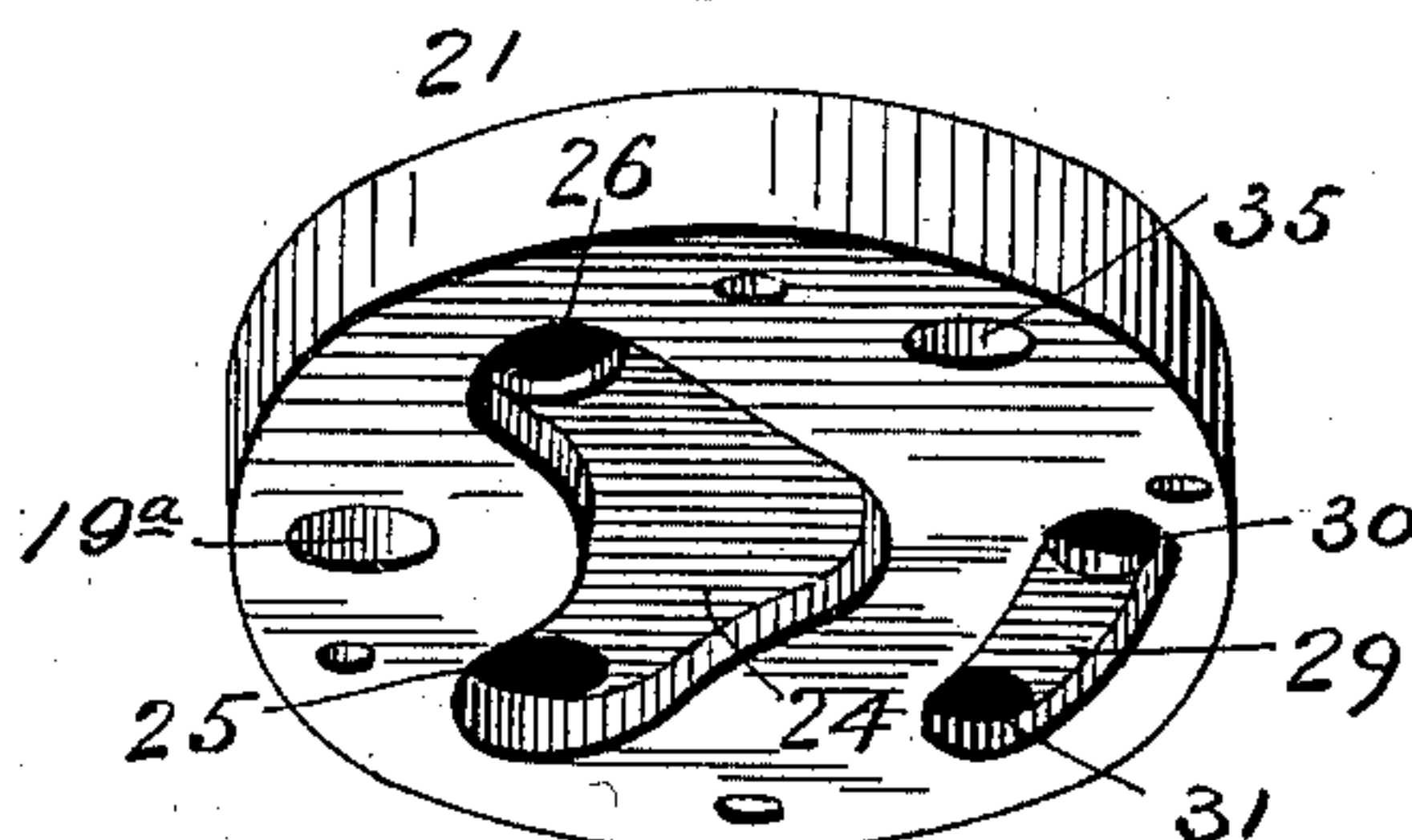


Fig. 6.

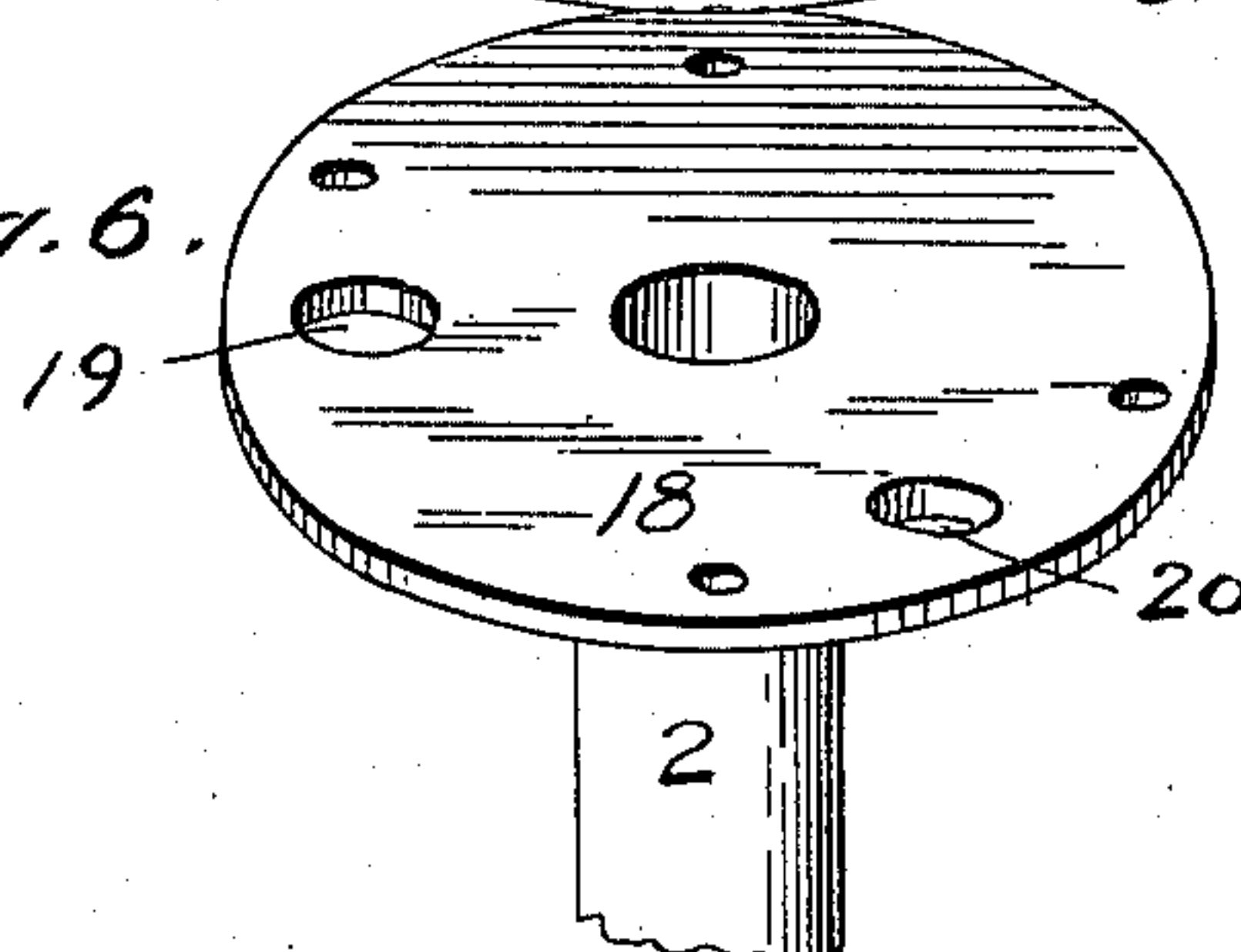
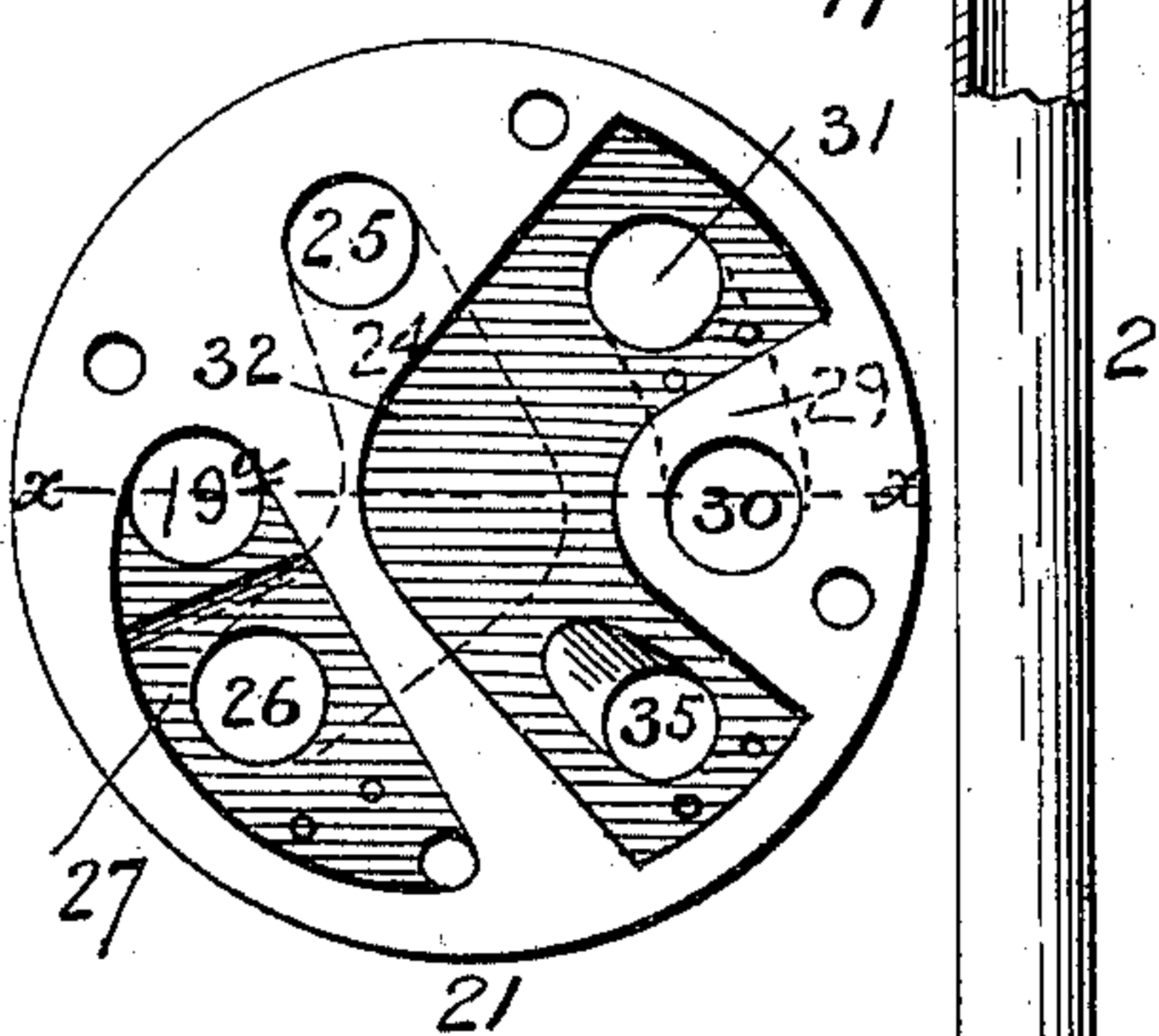


Fig. 7.



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UNITED STATES PATENT OFFICE.

NESTOR A. WAHTOLA, OF IRONWOOD, MICHIGAN.

DIAPHRAGM-PUMP.

SPECIFICATION forming part of Letters Patent No. 598,830, dated February 8, 1898.

Application filed August 26, 1896. Serial No. 604,022. (Model.)

To all whom it may concern:

Be it known that I, NESTOR A. WAHTOLA, a citizen of the United States, and a resident of Ironwood, in the county of Gogebic and State of Michigan, have invented certain new and useful Improvements in Diaphragm-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to diaphragm-pumps; and its object is to provide an improved construction of the same which shall possess superior advantages with respect to efficiency in use.

The invention consists in the novel construction and combination of parts, hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of a pump constructed in accordance with my invention. Fig. 2 is a vertical longitudinal section of the pump tubes or barrels, the movable cups or sections, the partition, and the diaphragm on the line *x x*, Fig. 7. Fig. 3 is a perspective view looking from the under side of the upper section of the partition. Fig. 4 is a similar view looking from the upper side of the intermediate section. Fig. 5 is a similar view looking from the under side of the same. Fig. 6 is a perspective view looking from the upper side of the lower section. Fig. 7 is a plan view of the intermediate section, the valves being removed.

In the said drawings the reference-numerals 1 and 2 designate, respectively, the upper and lower pump tubes or barrels, connected together by a stationary circular partition, hereinafter described.

At the upper end of the upper tube or barrel is an air-chamber 3, provided with a discharge-pipe 4, having a stop-cock 5. This pipe intermediate the stop-cock and air-chamber is provided with a nipple 6, with which is connected a hose 7. By turning this cock the water may be discharged through the pipe 4 or forced through the hose, as desired.

Pivotally connected with lugs 8, secured to the upper pump tube or barrel, is a yoke 9,

provided with a handle 10, and pivotally connected with the latter is a rod 12, the lower end of which is secured to lugs 13 of a vertically-movable cup or section 14. This section, which is semispherical in form, is provided with a central aperture through which the upper tube 1 passes. This cup or section is connected with a similar, but inverted, section 14^a by means of screw-bolts 15, which pass through lugs or flanges 16 on said sections. This lower cup or section is also formed with a central aperture through which the lower pump-tube passes. These sections, where the tubes pass therethrough, are provided with packing-boxes 17 to make tight joints.

The numeral 18 designates the lower section of a partition containing the water passages and valves. This section consists of a circular plate securely fixed to the upper end of the lower pump-tube 2 and is provided with two apertures or openings 19 and 20.

The numeral 21 designates the central or intermediate portion or section of the partition, and the numeral 22 designates the upper section, which is secured to the lower end of the upper pump-tube 1. These three sections are securely bolted together by bolts 23. The said central section on its under side is provided with an angular recess or channel 24, forming a water-passage. At one end this passage is formed with an opening or port 25, extending clear through the section. At the other end the said passage is formed with a port 26, which communicates at one end with a passage 27 on the upper side of the said section. This port is closed by an upwardly-opening valve 28, and said passage 27 is provided with a port 19^a, which communicates with the opening or port 19 in the lower section 18. The lower side of said central section is also formed with a recess or passage 29, having a port 30 at one end passing through said section. At the other end of this passage is a port or opening 31, communicating with an angular recess or passage 32. This port 31 is closed by an upwardly-extending valve 34, and at the other end of said passage 32 is a port or opening 35, closed by a similar valve 36. This latter port 35 communicates with the opening 20 in the lower section 18. The upper section 22 is provided

with a port or opening 37, which communicates with the port 30 of the passage 29, and is also provided with a port 38, which communicates with port 25 of the angular passage 24. This port 38 is provided with an upwardly-opening valve 39.

The upper and lower pump-tubes communicate, respectively, with the angular passages in the upper and lower sides of the central section of the partition.

The numeral 40 designates a cup-shaped diaphragm of leather or other flexible material, the edge of which is confined between edges of the movable cups or sections and confined at the center between the upper and central sections of the partition and has openings therein corresponding with the openings and passages in the said sections. A leather washer 41 is interposed between the central and lower sections, also having openings corresponding with the ports and openings in said sections.

The operation is as follows: The handle and yoke are moved up and down, causing the connected cups or sections to be reciprocated. On the downstroke of said cups the water will be drawn through the lower tube into the angular passage 24, and from thence through port 26 (valve 28 opening) to the passage 27, and thence through port 19^a to port 19 into the lower cup 14^a. During this operation the water in the upper cup 14 is forced through ports 37 and 30 to passage 29, to port 31 and angular passage 32, (valve 34 opening,) and from thence through the upper pipe 1 to discharge. Upon the return or upward movement of the said cups the water in the lower cup will be forced through port or opening 20 through port 35 (valve 36 opening) to passage 32 to the upper pump-tube 1. At the same time water will be drawn up into the upper cup 14 through angular passage 24, port 25, and port 38, the valve 39 opening.

From the above it will be seen that the pump is double-acting, the water being sucked

up from the lower pump-tube and forced up through the upper tube at each up-and-down stroke of the reciprocating cups or sections.

Having thus fully described my invention, what I claim is—

1. In a diaphragm-pump, the combination with the upper and lower stationary pump-tubes, the partition comprising the upper and lower sections secured, respectively to said pump-tubes and the intermediate section connected therewith, and said sections provided with ports, passages and valves, substantially as described, of the vertically-movable semi-cylindrical cups, through which said pump-tubes pass, provided with annular flanges at their adjoining ends, the flexible diaphragm of greater diameter than said cups clamped between said flanges and said upper and intermediate sections, and means for reciprocating said cups on the tubes, substantially as set forth.

2. In a diaphragm-pump of the character described, the combination with the upper and lower pump-tubes, the vertically-reciprocating cups or sections, and the diaphragm, of the sectional partition comprising the lower section secured to the lower pump-barrel having two ports, or openings 19 and 20 therein, the intermediate section having an angular passage 24, with which the lower pump-tube communicates, a port 25, a port 26, a passage 27 on its upper side, a port 19^a communicating with port 19, a passage 29, port 30, port 31 communicating with an angular passage 32 in the upper side, and the upper section having ports 37 and 38, and the valves 28, 34, 36, and 39, substantially as described.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

NESTOR A. WAHTOLA.

Witnesses:

BELMONT WAPLER,
CURTIS BUCK.