

No. 891,048.

PATENTED JUNE 16, 1908.

P. J. DONOVAN.
FILTER.

APPLICATION FILED JUNE 14, 1907.

3 SHEETS—SHEET 1.

Fig. 1.

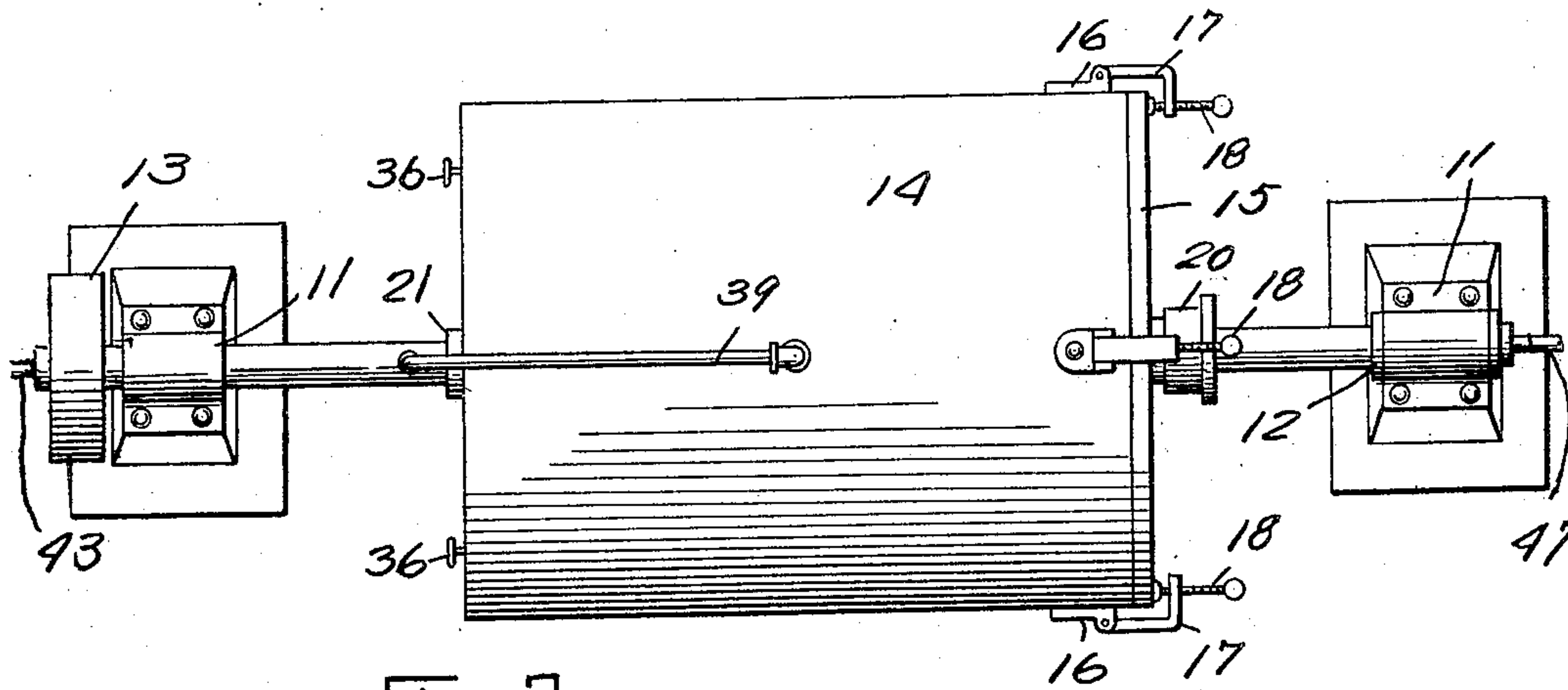
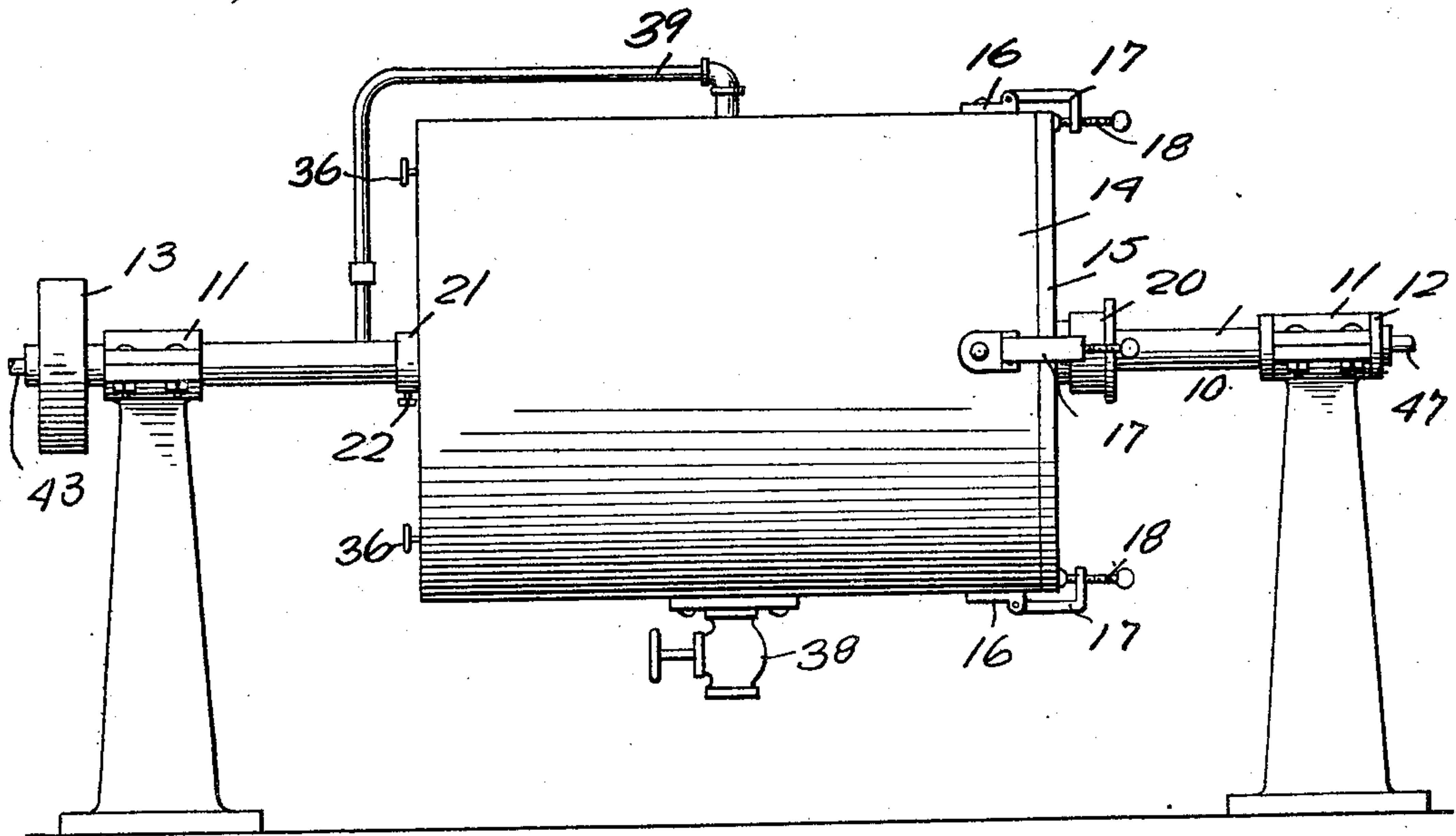


Fig. 2.

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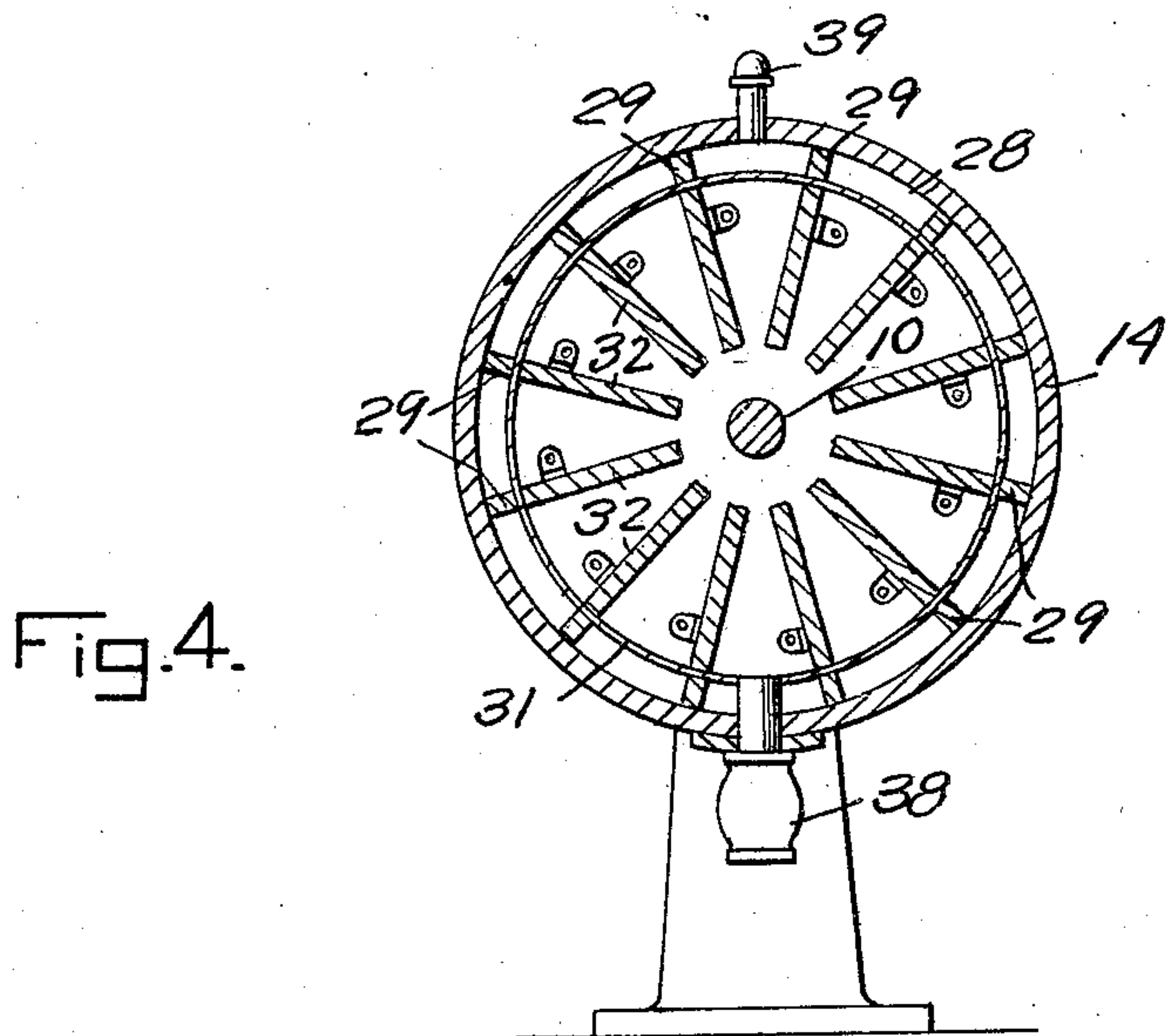
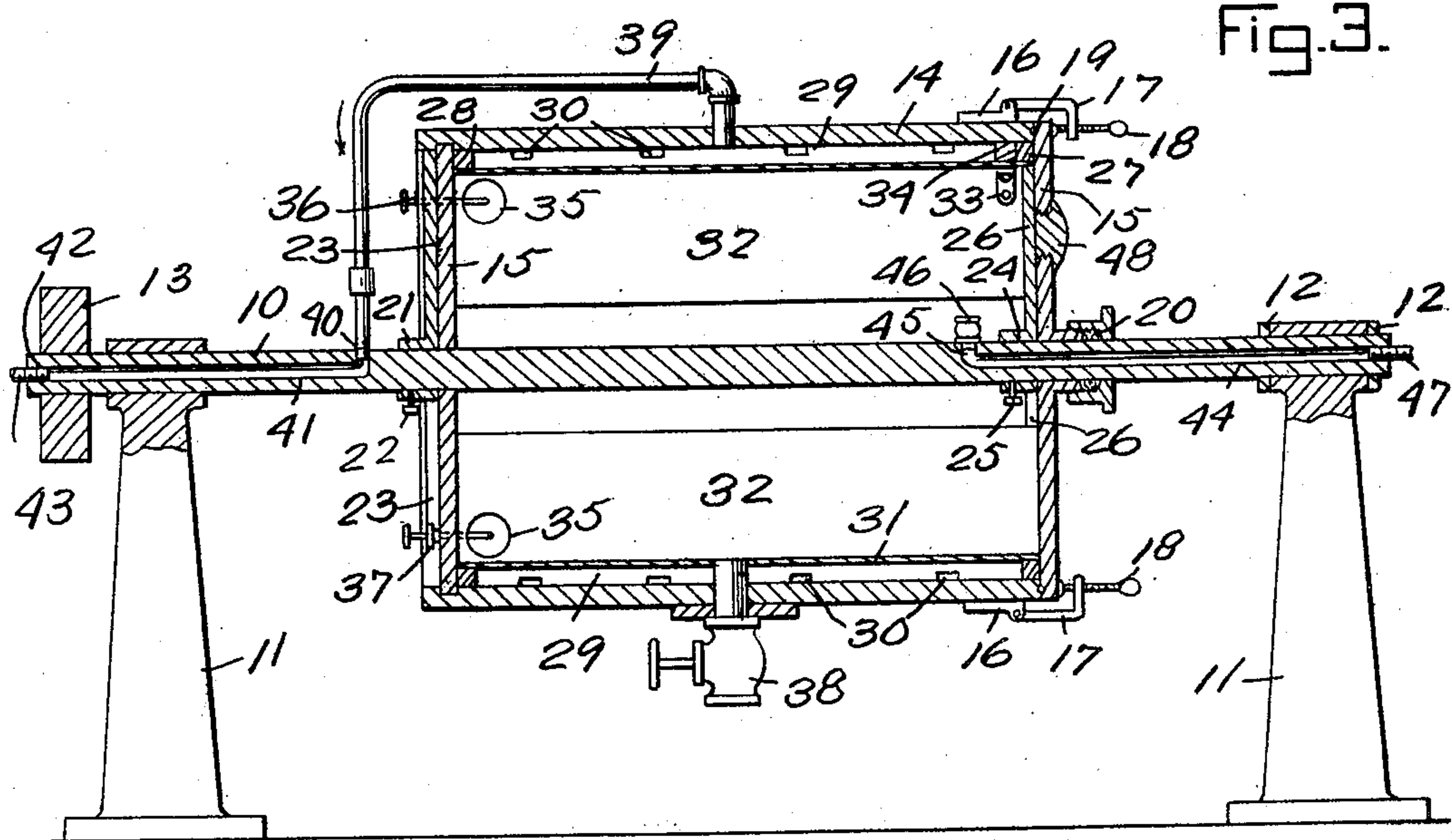
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3 SHEETS—SHEET 3.

Fig. 5.

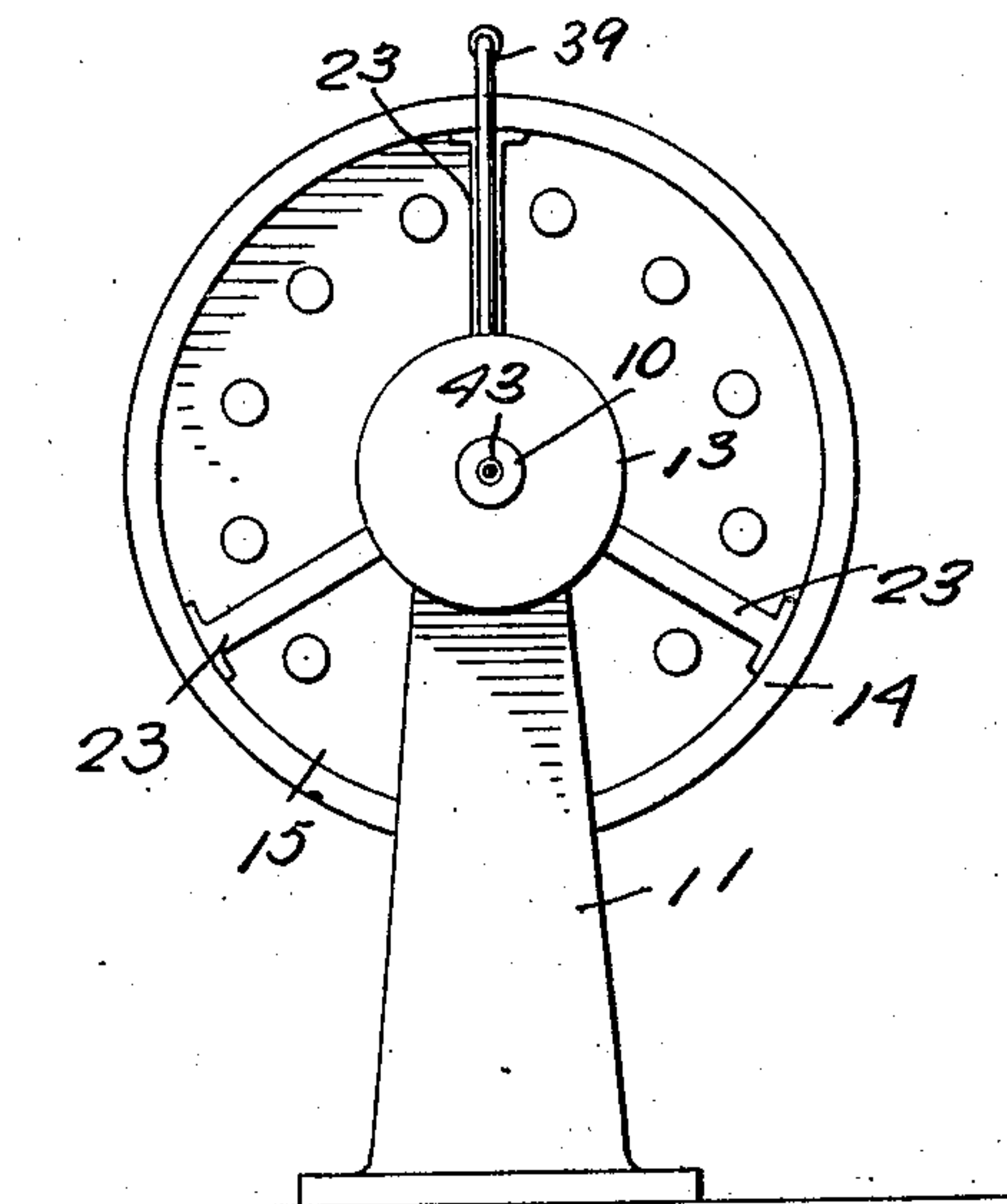
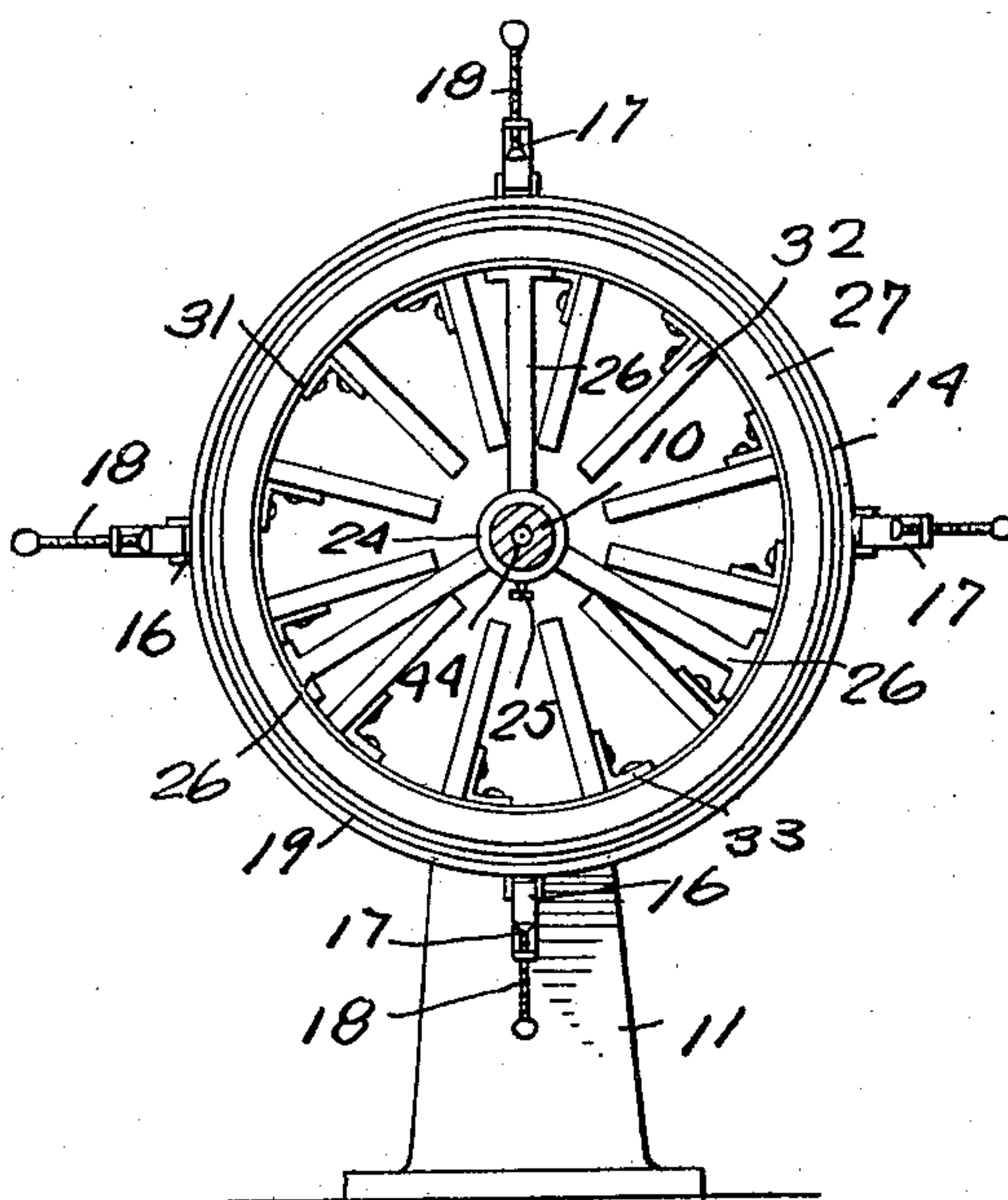


Fig. 6.



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UNITED STATES PATENT OFFICE.

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FILTER.

No. 891,048.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed June 14, 1907. Serial No. 378,962.

To all whom it may concern:

Be it known that I, PATRICK J. DONOVAN, a citizen of the United States, residing at Grass Valley, in the county of Nevada, State of California, have invented certain new and useful Improvements in Filters; and I do hereby 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.

This invention relates to filters and more particularly to that class designed for use in metallurgy and the invention has for its object the provision of a filter which will be efficient in operation and will operate to completely separate values from the ore being treated.

The filter is designed principally for use in the treatment of slimes, sands or sulfurets by the cyanid process in which process the values are dissolved, and in my filter are obtained in this state by filtering the cyanid solution in which they are dissolved, from the mass from which they were separated.

The filter embodied in my invention is so constructed that the solution in which the values are contained, may be filtered or drawn off either by compressed air or the creation of a vacuum, or both as conditions may indicate most desirable.

In the accompanying drawings, Figure 1 is a front elevation of the filter, Fig. 2 is a top plan view thereof, Fig. 3 is a vertical longitudinal sectional view, Fig. 4 is a vertical transverse sectional view, Fig. 5 is an end elevation, and, Fig. 6 is a similar view but with the near cylinder head removed.

In the drawings the filter is shown as comprising a drum which is mounted for rotation upon a shaft and the shaft which is indicated by the numeral 10 is mounted for rotation in suitable bearings 11 and held against longitudinal movement in the bearing by means of collars 12 which are fixed upon the shaft adjacent one end thereof and are positioned one upon each side of one of the bearings. A pulley 13 is fixed upon the shaft at the opposite end and serves as a means whereby the shaft may be driven from any suitable motor or engine (not shown).

The body of the drum mentioned above is indicated by the numeral 14 and is substantially cylindrical in form and closed at each of its ends by heads 15, one of the said heads being removable and being held in place

when in position to close the corresponding end of the drum by means of clamps 16 including each a pivoted portion 17 which may be swung to permit removal of the head or, when the heads are to be clamped to the drum, to position from reaching the edge of the periphery of the head, the clamp screw 18 being engaged through the said member 17 and being designed to bear against the head. In order that the connection between the end of the drum and the head may be an air tight one, the said end edges of the drum and the head are provided with annular grooves in which a packing ring or gasket 19 is received, the said ring being of rubber or other suitable material which forms a connection of the class described. The removable head 15 is of course provided centrally with an opening for the passage of the shaft 10 therethrough and a stuffing box 20 is employed in connection with the removable head and the shaft to insure an air tight connection between the shaft and the head.

A collar 21 is secured upon the shaft directly outwardly of the fixed head 15 by means of a set screw 22 and radiating from this collar are arms 23 which are secured at their outer ends to the corresponding end of the body 14 of the drum. A similar collar 24 is held upon the shaft by means of a set screw 25 but this latter collar is located within the drum and directly inwardly of the head 15 and arms 26 radiate from this collar 24 and are secured at their outer ends to a ring 27 which is fixed inside of the drum at the said end and against which the removable head 15 abuts when in place upon the drum, there being a similar ring 28 fixed at the opposite end of the drum and in engagement with the fixed head at the said end.

Secured to the inner periphery of the drum 14 and equidistantly spaced with respect to each other are strips 29 which extend longitudinally of the drum and from the ring 27 to the ring 28. These strips are provided in their outer edges with openings 30 so that liquid contained in the drum may pass around the inside of the drum by passing through the openings. A sheet 31 of canvas is secured to these strips 29 and at its end edges to the rings 27 and 28 after having been drawn from the said rings, it being understood that in this manner what may be termed a canvas drum is formed, the said drum being open at each end. Extending inwardly in a radial direction from each of the strips 29 is a pad-

dle or blade 32 the said paddle being held rigid by means of an angle bracket 33 one of which is secured to each paddle adjacent each end thereof and to a block 34 secured upon the inner periphery of the drum body 14 at the corresponding end. These brackets 33 are preferably located only at that end of the drum at which the removable head 15 is located and the paddles are braced at their opposite ends from the fixed head 15 at the opposite end of the drum. In each of the paddles and at that end thereof adjacent the fixed head there is placed a valve 35 the stem 36 of which projects through a stuffing box 37 upon the said head whereby the valves may be opened and closed from the outside of the drum. The purpose of these valves will be presently explained, as will also the function of the paddles which paddles by the way have their inner edges terminated short of the shaft 10. A filling and discharge valve 38 is arranged upon the drum and opens through the canvas 31 therein so that material introduced into the drum through the valve will not pass between the canvas and the drum body 14 but will be discharged directly into the canvas cylinder heretofore referred to. A pipe 39 has communication at one of its ends with the drum at a point diametrically opposite to the valve 38 and this pipe has its opposite end threaded into the shaft 10 as indicated at 40, the said shaft being provided with a bore 41 which communicates with the threaded bore into which the end 40 of the pipe is engaged. This bore 41 opens through the adjacent end of the shaft 10 and connected with the shaft as at 42 is one end of a pipe 43 which leads from the vacuum pump or other vacuum creating device (not shown).

A bore 44 is formed in the shaft 10 and opens through the end thereof opposite to that end through which the bore 41 opens and this bore includes a branch 45 which opens laterally through the shaft and into the drum, there being a check valve 46. A pipe 47 connects with this end of the shaft 10 and leads to an air compressor (not shown).

A man hole 48 is provided in the removable head of the drum so that the drum may be flushed when necessary.

The operation of the filter is as follows: The slimes, sands or sulfurets to be treated are introduced into the drum through the valve 38 until the drum is one-third full. The cyanid solution used in the process is then introduced into the drum until the drum has become filled, the valves 35 being left open during the filling operation. After the drum has been filled however the valves 35 are closed as is also the valve 38 and the drum rotated to the required speed, this rotation being continued until all of the values have been dissolved out of the mass. When sufficient time has elapsed for these values

to dissolve as stated, the vacuum creating device is set in operation and the vacuum is created between the drum body 14 and the canvas drum, this vacuum serving to draw the solution through the canvas and in this manner filter it. To insure complete extraction of the solution from the gangue, the air compressor is set in operation in conjunction with the vacuum creating device and air is forced into the canvas drum at the same time it is drawn out of the space between the drum body 14 and the canvas drum.

It will be understood that the drum is rotated continuously during these several operations so that the slimes, sands or sulfurets will not cake in one place but will be evenly divided. When all of the solution has been extracted the drum is stopped and flushed and the process repeated. It will be obvious that during the time of rotation of the drum, the slimes, sands or sulfurets will be carried up by the paddles 32 and will fall therefrom and in this manner be thoroughly mixed and subjected to the best advantage of the action of the cyanid solution.

Broadly stated the apparatus might be described as comprising a drum having a portion for containing the slimes or the like to be treated, a vacuum chamber, a filter diaphragm separating the container and the vacuum chamber and it is to be understood that I am not to be limited to the exact construction herein shown and described as obvious modifications will occur to those skilled in the art.

What is claimed is—

1. An apparatus of the class described comprising a shaft, a drum fixed upon the shaft for rotation therewith, a filtering drum disposed concentrically within the first mentioned drum in spaced relation with respect thereto, the shaft being formed with an air inlet passage which opens into the filtering drum and being also formed with an air outlet passage, and a pipe communicating with the air outlet passage at one end and opening at its other end into the interspace between the drums.

2. An apparatus of the class described comprising a drum mounted for rotation, a filtering drum disposed concentrically within the first mentioned drum and having its wall spaced with respect thereto, paddles disposed radially within the first mentioned drum and extending into the filtering drum, said paddles having their outer edges disposed against the inner face of the wall of the first mentioned drum except at points where said paddles are recessed in their said edges, and means whereby a vacuum or plenum may be induced in the drum.

3. An apparatus of the class described comprising a drum mounted for rotation, a filtering drum disposed concentrically within

the first mentioned drum and having its walls in spaced relation with respect to the walls of the first mentioned drum, paddles disposed radially within the filtering drum, 5 valves located upon the paddles and operable from without the drum, means whereby air may be exhausted from the interspace between the walls of the two drums, and

means whereby air may be forced into the filtering drum. 10

In testimony whereof, I affix my signature, in presence of two witnesses.

PATRICK J. DONOVAN.

Witnesses:

D. T. DONOVAN,

P. J. RILEY.