

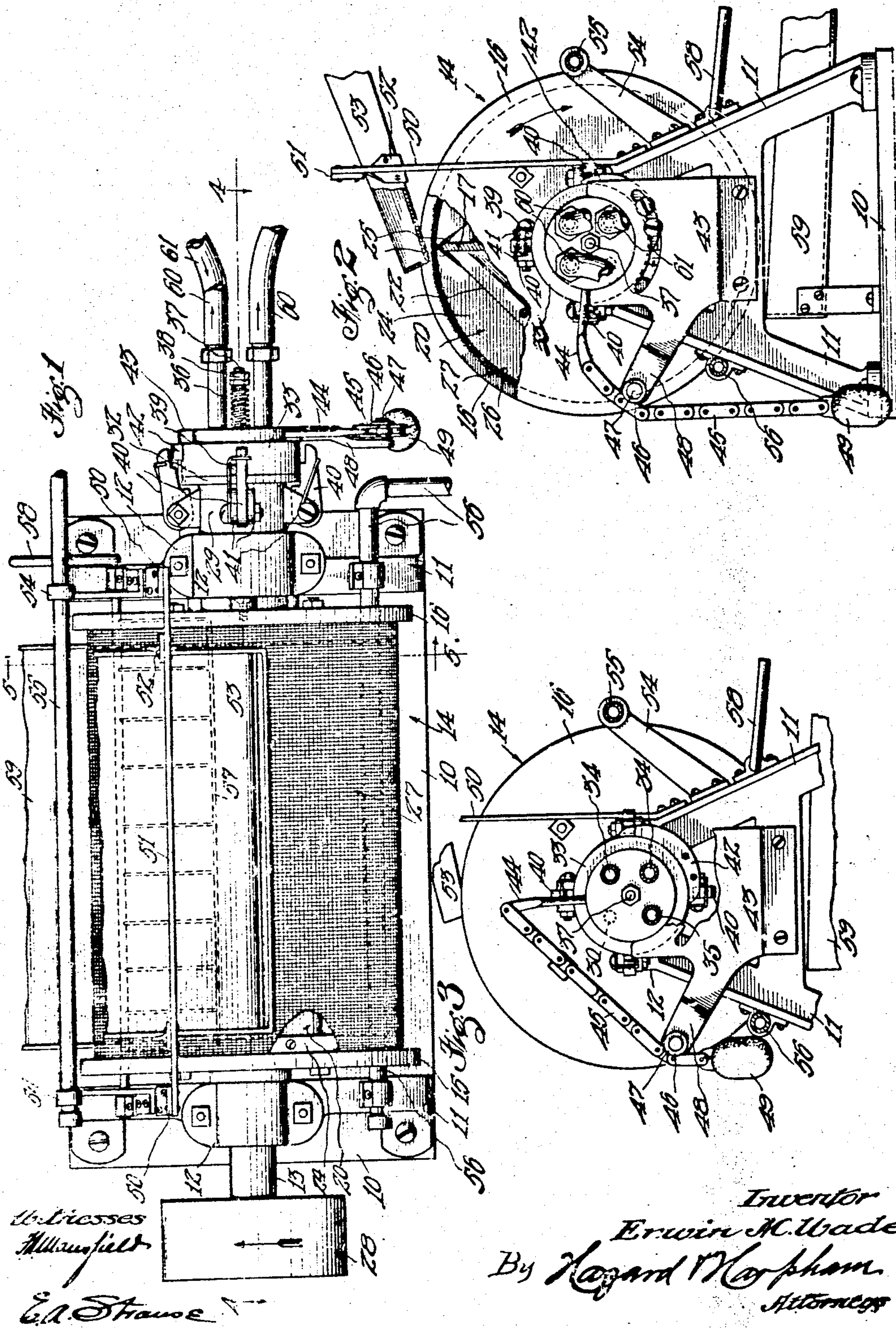
No. 854,972.

PATENTED MAY 28, 1907.

E. M. WADE.  
FILTER.

APPLICATION FILED NOV. 15, 1908.

2 SHEETS—SHEET 1.





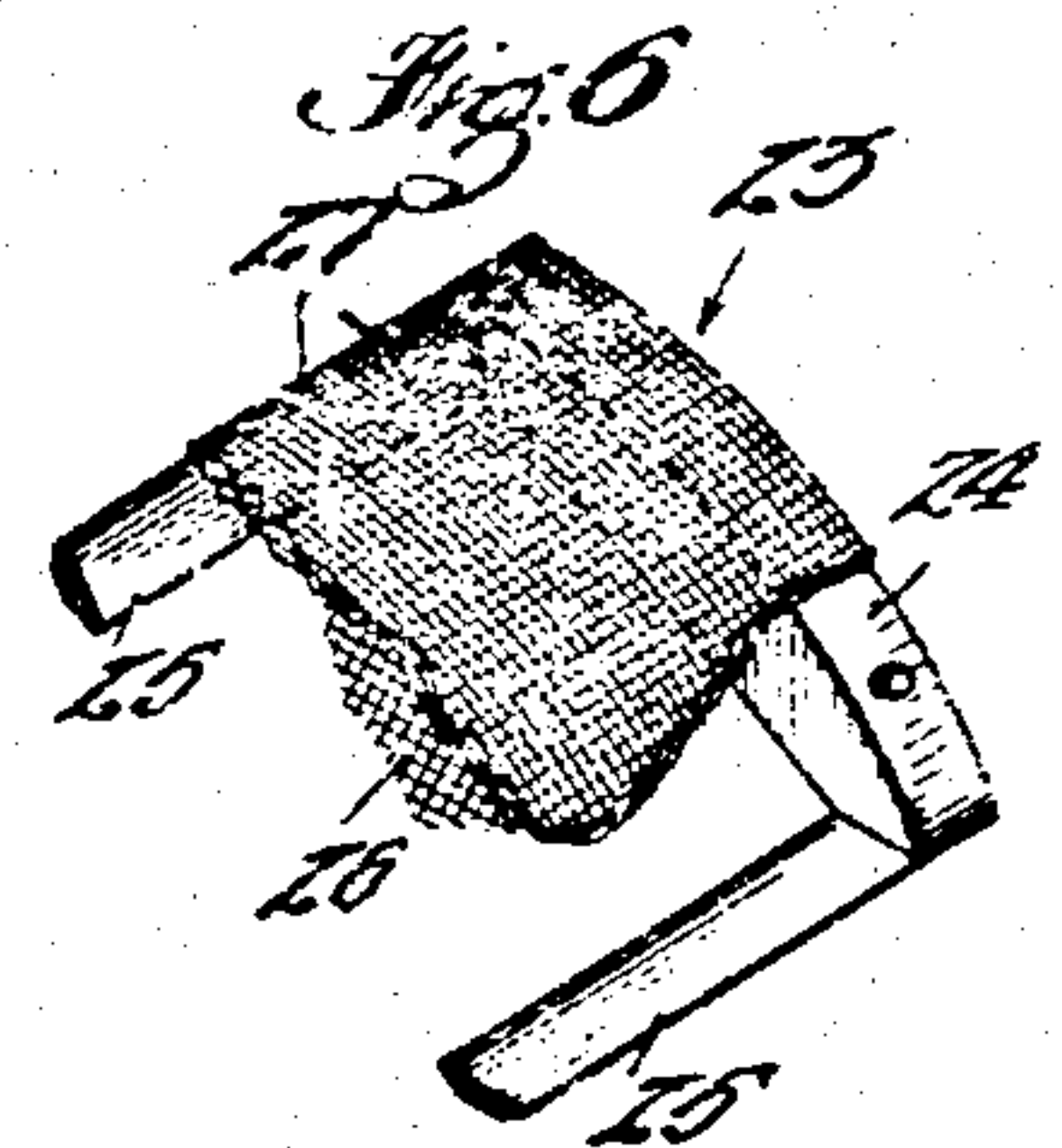
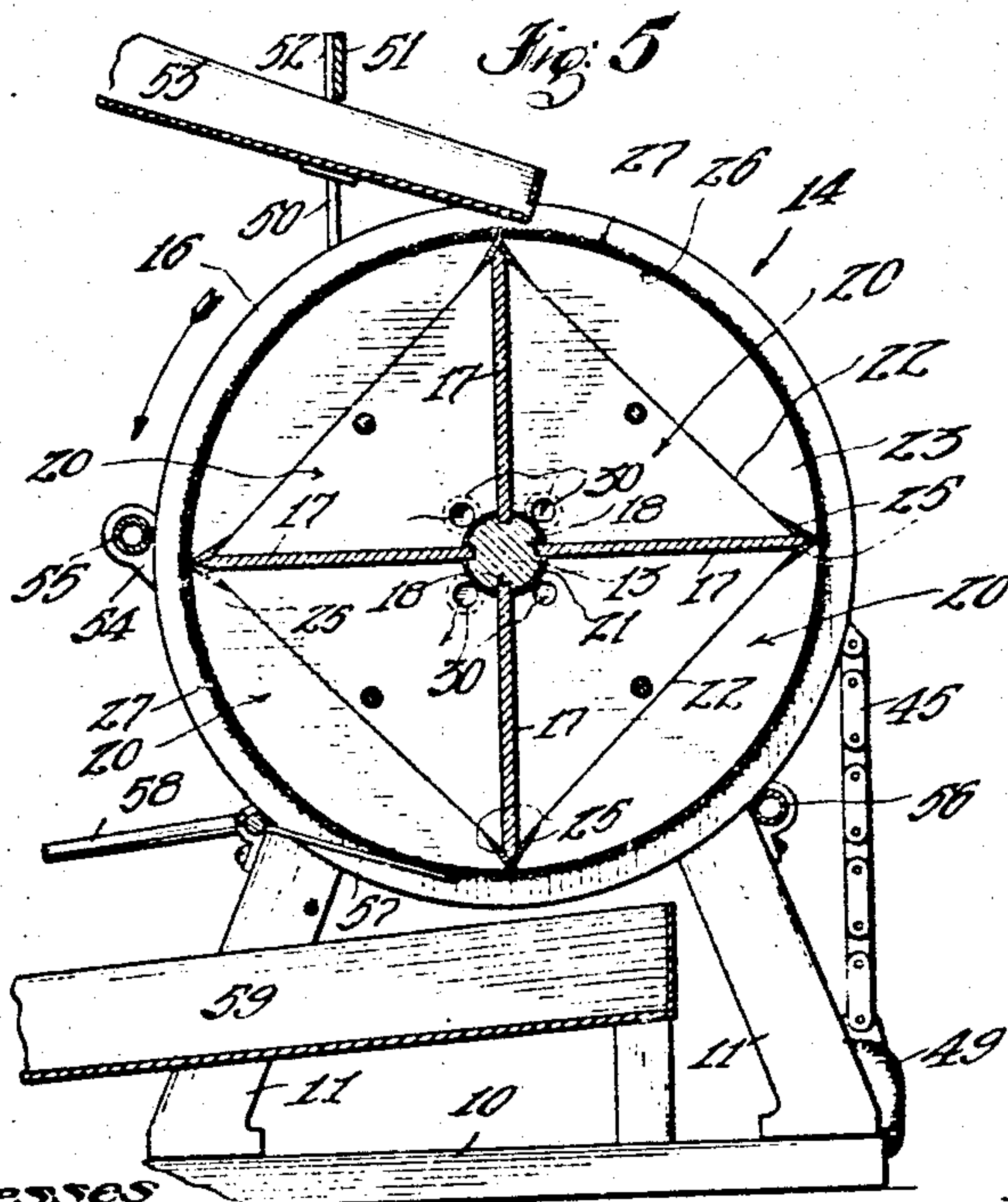
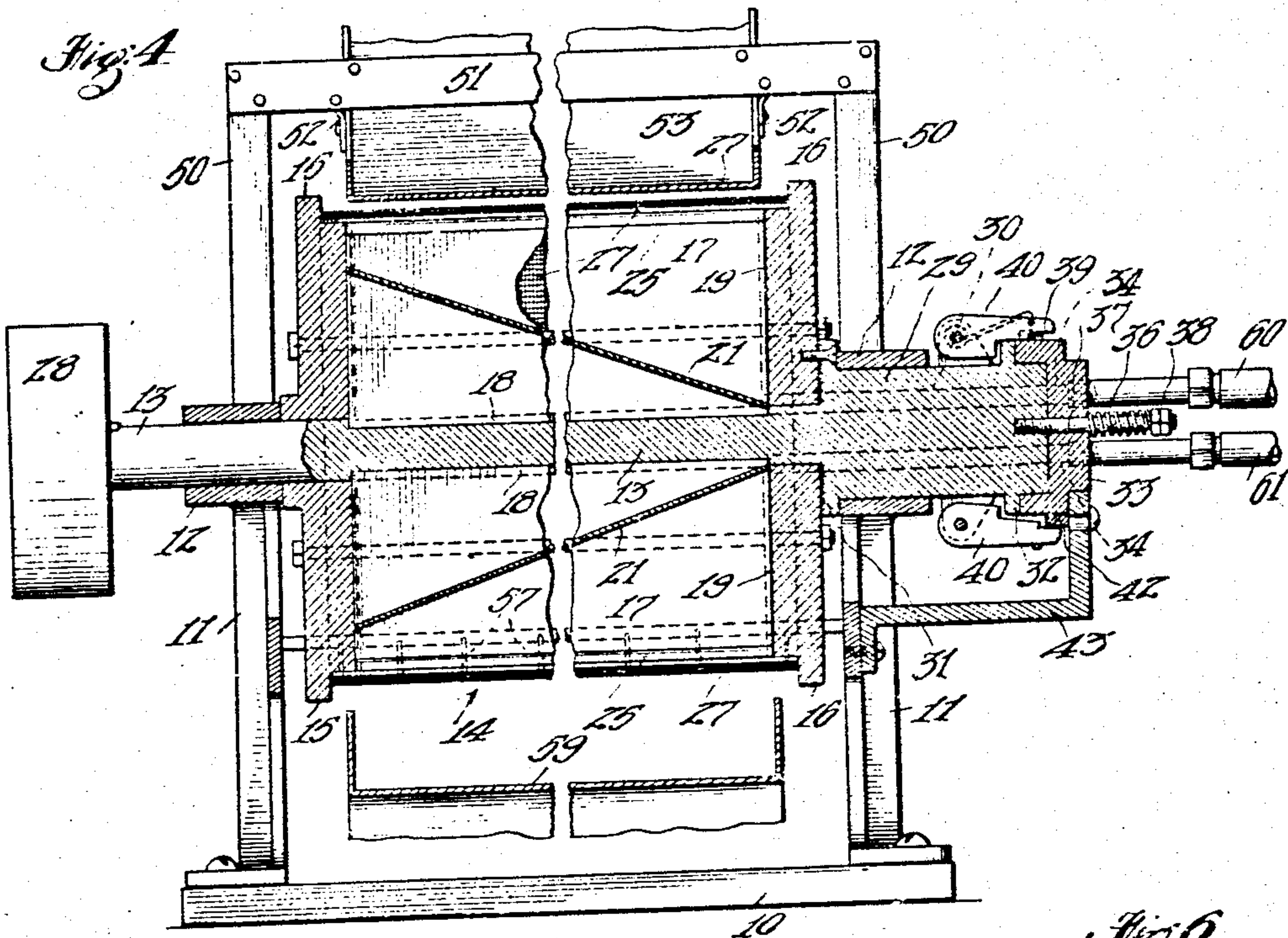
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2 SHEETS—SHEET 2.



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# UNITED STATES PATENT OFFICE.

ERWIN M. WADE, OF LOS ANGELES, CALIFORNIA.

## FILTER.

No. 854,972.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed November 15, 1906. Serial No. 343,583.

*To all whom it may concern:*

Be it known that I, ERWIN M. WADE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Filters, of which the following is a specification.

My invention relates to that class of filters in which the material being filtered is subjected to the vacuum process with the resulting adhesion of a cake to the outside of the filtering medium; and an object thereof is to provide an apparatus which is composed of a plurality of chambers in which a vacuum or suction is created at intervals, after which the chambers are subjected to a cleaning or blowing operation.

Another object of this invention is to provide an apparatus in which the chambers are subjected to an alternate suction, blowing and washing operation, which operations are continuous while the machine is in operation.

Another object of this invention is to provide an apparatus which may be utilized in the filtration or extraction of the cyanid solutions from slimes.

Another object of this invention is to provide an apparatus that may be used in the clarification of sugar juices or in any other work in which a filter press could be used.

A further object is to provide an apparatus which is simple in construction and highly efficient in operation.

I accomplish these objects by means of the apparatus described herein and illustrated in the accompanying drawings in which:—

Figure 1—is a plan view of my apparatus with parts broken away so as to more clearly disclose the construction. Fig. 2—is an end elevation partly in section of the apparatus in its normal position. Fig. 3—is an end elevation partly in section of the apparatus showing the limit of movement of the valve cap. Fig. 4—is a central longitudinal section of the complete apparatus taken on line 4—4 of Fig. 1. Fig. 5—is a transverse section taken on line 5—5 of Fig. 1. Fig. 6—is a perspective detail showing the method of securing the screens to the revolving drum.

Referring to the drawings 10 indicates a suitable base to which are secured bearing frames 11. These frames are provided with journal boxes 12, in which is mounted a revoluble shaft 13. Rigidly secured upon this revoluble shaft is a drum 14, which is com-

posed of heads 15 and 16. These heads are connected by means of longitudinal partitions 17, the inner longitudinal edges of which enter grooves 18 in the shaft 13, the transverse edges entering grooves 19 in the heads 15 and 16 so as to form liquid tight compartments 20. Each of these compartments are provided with inclined bottoms 21, the purpose of which is to rapidly direct the liquid that is drawn into them toward their outlets. The inner faces of the heads 15 and 16 are offset as at 22 to form seats for the reception of the filtering frames 23. These filtering frames (here shown as four in number to correspond with the number of compartments) preferably consist of end pieces 24, suitably joined together by means of braces 25. Secured to the top of these frames in a suitable manner are screens 26, preferably formed of wire, on the outside of which is secured the filtering medium 27, which is shown in this instance as consisting of a number of layers of fabric, preferably burlap or canvas.

On one end of the shaft 13 is mounted a pulley 28 to which power may be applied to operate the apparatus, and the other end of the shaft is enlarged as at 29, and has a series of ports 30 drilled longitudinally therein, each of which communicates with a separate compartment of the drum. The periphery of the enlarged portion of the shaft 13 is provided at its inner end with an annular flange 31, by means of which the drum 14 is rigidly secured to the revoluble shaft and its outer edge is provided with an annular shoulder 32 against the outer face of which an annular valve cap 33 is adapted to bear. This valve cap is provided with a series of ports 34 and 35, which in this instance are illustrated as three in number, which are adapted to register with ports 30 in the enlarged portion 28 of shaft 13, as will hereinafter be more particularly described. Valve cap 33 is held in engagement with the end of the shaft 13 by means of tension spring 36, which is mounted on a bolt 37 which is secured to the enlarged end of shaft 13, the outer end of bolt 37 is provided with nuts 38 by means of which the tension on the valve cap through the medium of the spring may be increased or diminished. The periphery of the valve cap near the face which contacts with the annular shoulder 32 is provided with a lug 39, which is adapted to be engaged by a plurality



of spring pressed dogs 40, which are pivotally mounted in bearings 41 secured to the enlarged end of shaft 13.

During the operation of the apparatus and as soon as the outer end of one of the spring pressed dogs that happens to be in engagement with lug 39 on the valve cap contacts with cam 42 which is adjustably secured on bracket 43, the dog is released from engagement with lug 39 and the valve cap resumes its normal position as shown in Fig. 2 of the drawings. Radially secured to valve cap 33 is an arm 44 on the outer end of which is attached a chain 45, which is adapted to pass over a roller 46 revolvably mounted on a pin 47, which is secured to an arm 48 of the bracket 43. The lower end of chain 45 is provided with a weight 49 by means of which the valve cap is returned to its normal position when the spring pressed dog is released by the cam, the arm 44 contacting with bracket 43 which serves to limit its further movement. If desired a coil spring (not shown) having its lower end secured to the base could be substituted for the weight.

Secured to one side of each of the frames 11 are vertical uprights 50, which are connected at their outer ends by means of cross piece 51. Depending from cross piece 51 is a bracket 52 which is adapted to hold the outer end of the distributing trough 53 clear of the revolving drum.

Secured to frames 11 by brackets 54 is a spray pipe 55 by means of which a spray of water or a weak solution of cyanid may be applied to the outer periphery of the drum so as to thoroughly extract all of the remaining solutions that they may be held by the slimes after the initial suction has been applied.

If it is found desirable the drum 14 can be divided into a greater number of compartments than are here shown and a number of spray similar to the one above described can be located adjacent the periphery of the drum at points where the several compartments are under suction. On the opposite side of frames 11 and secured thereto in bearings is a similar spray pipe 56, which facilitates the cleansing process of the filtering medium.

Journalled in brackets secured to frames 11 is a scraper 57, which preferably consists of a wire frame which is held in contact with the drum 14 by means of a weighted handle 58. The purpose of this scraper is to remove the cake formation which rapidly accumulates on the filtering medium. Located beneath the drum and at the point where the scraper 57 contacts with the drum is a launder 59, into which the cake that is scraped off will fall and be carried off by the water from the spray 55, to some convenient point (not shown).

The operation of the apparatus is as follows:

Power is applied to pulley 28 by means of which a continuous rotary motion is imparted to drum 14. The slimes containing the cyanid solutions are then fed to the outer surface of the drum from the distributing trough 53, and at the same time the exhaust and pressure pumps (not shown) are put in operation. Flexible pipes 60 which are connected from ports 34 to the exhaust pump maintain a continuous exhaust on two of the compartments of the drum which are in register with the ports 34 in the valve cap. Pipe 61 which leads from port 35 in the valve cap 33 connects to a pressure pump by means of which a continuous pressure of air is supplied to one of the lower chambers. This pressure of air is sufficient with the aid of the water from the spray pipe 56, to dislodge the cake formation from the filtering medium. The ports 34 in the valve cap 29 from which lead exhaust pipes 60 are held in engagement with the ports leading from the compartments that they are in register with until the spring pressed dog that is in engagement with the lug on the cap is released by the cam 42, the weight 47 returning the cap to its normal position as shown in Fig. 2 of the drawings, so that while two of the compartments are being continually exhausted one of the remaining compartments is under pressure from pipe 61, thereby relieving the filtering medium of the cake formation. As the drum revolves the compartment under pressure recedes from the pipe 55 until it is about 90° therefrom, when the latch 40 is tripped and the valve cap is returned to the position shown in Fig. 2 bringing a compartment under pressure adjacent to pipe 55.

It will be noted from the foregoing description that I have produced an apparatus by means of which a great saving is effected in the filtration of slimes resulting from the cyanid process.

It will be further noted that the apparatus can be used in any work where a filter press is used, thereby promoting economy in such processes.

It will also be observed that I have provided an apparatus by means of which a continuous and simultaneous filtering, washing, and removal of the slimes is accomplished.

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

1. A device of the class described, comprising a revolving drum having a plurality of compartments therein provided with ports, said drum having a periphery of filtering material; mechanism for connecting said ports to exhaust during a portion of the revolution of said drum; means for shifting said exhaust connection to a following compartment; and means to rotate said drum.

2. A liquid filter comprising a frame; a



drum having a filtering medium secured to its periphery revolubly mounted in said frame, said drum having a plurality of compartments therein and a port leading from each compartment; a valve cap rotatably secured to said drum, said cap having a plurality of ports adapted to register with the ports of the drum during its rotation; mechanism for connecting said last named ports to exhaust during a portion of the revolution of said drum; means for shifting said exhaust connection to the following compartment; and means to rotate said drum.

3. A liquid filter comprising a revoluble shaft mounted in a frame; a drum rigidly secured to said shaft having a plurality of compartments with a port leading from each compartment and a periphery of filtering material; a valve cap rotatably secured to said drum having a plurality of ports adapted to register with the ports leading from the drum during the rotation of said drum; means to create an exhaust in some of said compartments and pressure in other of said compartments simultaneously; means for securing the valve cap to the drum during its rotation; means for releasing said valve cap from engagement with the drum at a predetermined point during its rotation; means for returning said valve cap to its initial position; and means to rotate said drum.

4. A liquid filter comprising a revoluble shaft mounted in a frame; a drum rigidly secured to said shaft having a plurality of compartments with a port leading from each

compartment and a periphery of filtering material; a valve cap rotatably secured to said drum having a plurality of ports adapted to register with the ports leading from the drum during the rotation of said drum; means to create an exhaust in some of said compartments and pressure in other of said compartments simultaneously; means for securing the valve cap to the drum during a portion of its rotation; means for releasing said valve cap from engagement with the drum at a predetermined point during its rotation; means for returning said valve cap to its initial position; liquid sprays secured to the frame adjacent the periphery of the drum; detaching means secured to the frame adapted to bear against the periphery of the drum; and means to rotate said drum.

5. A liquid filter, comprising a frame, a drum provided with a periphery of filtering material and having a plurality of compartments therein provided with ports, said compartments having bottoms inclined toward said ports; mechanism for connecting said ports to exhaust during a portion of the revolution of said drum; means for shifting said exhaust connection to a following compartment; and means to rotate said drum.

In witness that I claim the foregoing I have hereunto subscribed my name this 9th day of November, 1906.

ERWIN M. WADE.

Witnesses:

EDMUND A. STRAUSE,  
G. E. HARPHAM.