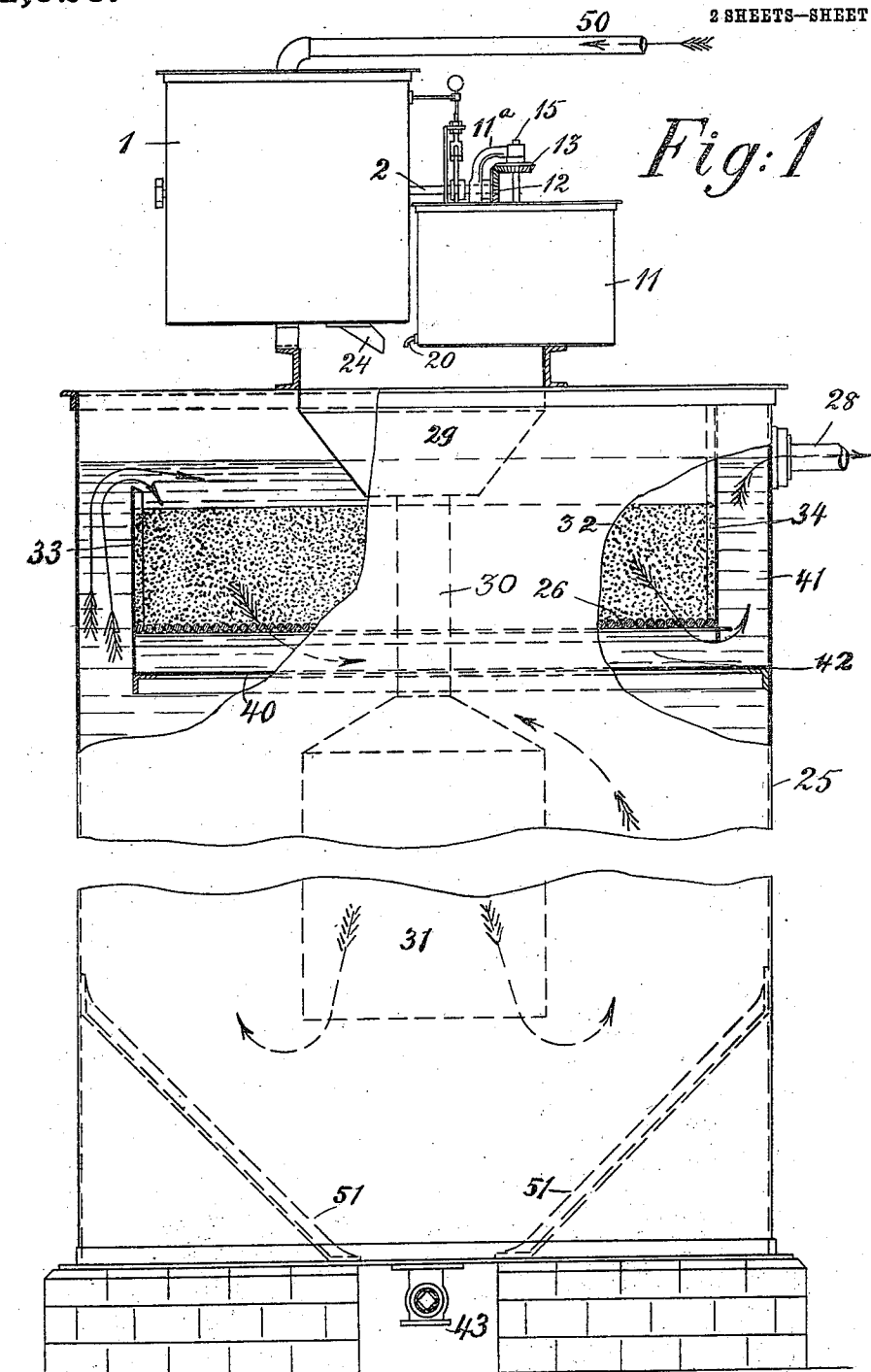


A. O. ANDERBERG.
 APPARATUS FOR PURIFICATION OF WATER.
 APPLICATION FILED SEPT. 30, 1909.

961,926.

Patented June 21, 1910.

2 SHEETS—SHEET 1.



Witnesses.
P. E. Babcock
Harry F. Ruelth

Inventor
Anders Olson Anderberg
 by *Wm. H. Babcock*
 Attorney

A. O. ANDERBERG.
 APPARATUS FOR PURIFICATION OF WATER.
 APPLICATION FILED SEPT. 30, 1909.

961,926.

Patented June 21, 1910.

2 SHEETS—SHEET 2.

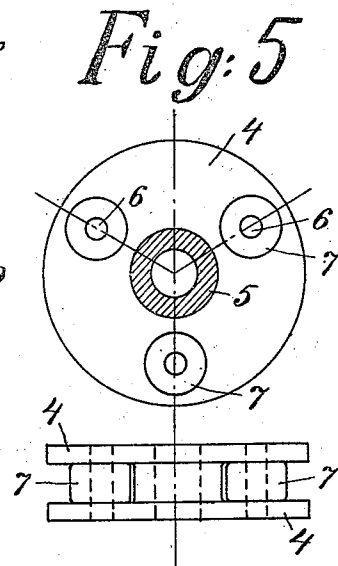
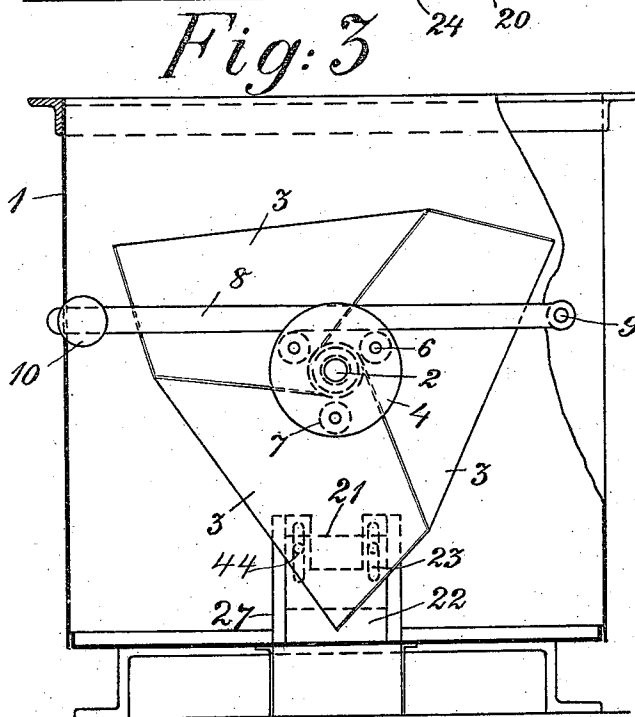
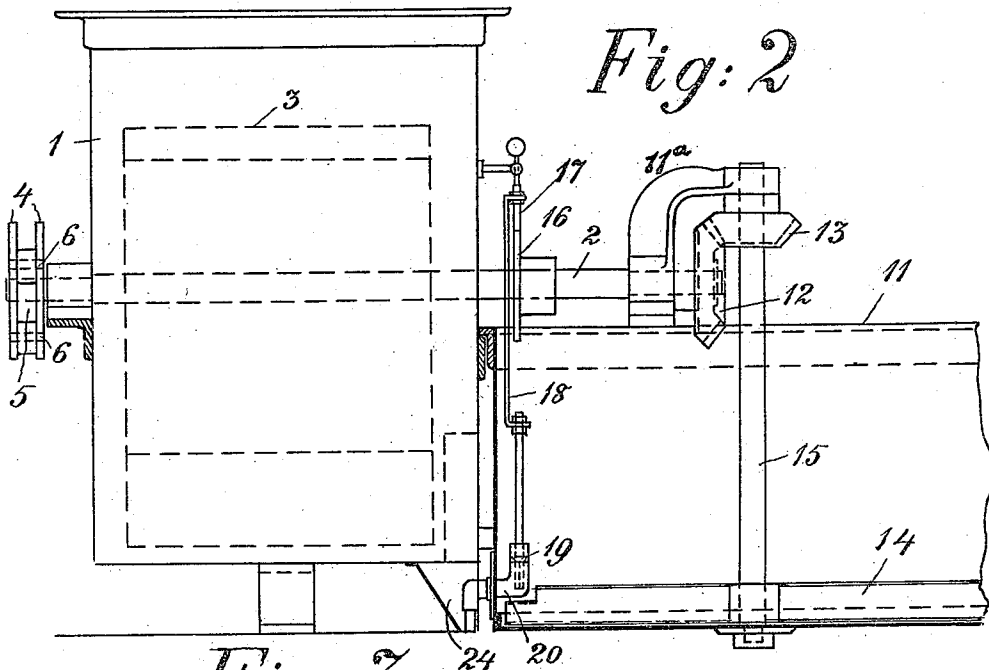


Fig: 4

Witnesses,
P. E. B. Brock
Harry F. Rueth

Inventor
Anders Olsen Anderberg
 by
Wm. A. Balcock
 Attorney.

UNITED STATES PATENT OFFICE.

ANDERS OLSSON ANDERBERG, OF MALMÖ, SWEDEN, ASSIGNOR TO AKTIEBOLAGET
MERKANTILA INGENIÖRSBYRÅN, OF STOCKHOLM, SWEDEN.

APPARATUS FOR PURIFICATION OF WATER.

961,926.

Specification of Letters Patent. Patented June 21, 1910.

Application filed September 30, 1909. Serial No. 520,363.

To all whom it may concern:

Be it known that I, ANDERS OLSSON ANDERBERG, citizen of Sweden, residing at Malmö, Sweden, have invented certain new and useful Improvements in Apparatus for Purification of Water; 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 devices for purifying liquid mechanically and chemically, and consists in the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings Figure 1 represents a side elevation of the devices embodying my invention, parts of the casing of the main reservoir being broken away to show interior parts; Fig. 2 represents a similar view on a larger scale of the devices above the main reservoir for regulating the supply of water and chemical solution; Fig. 3 represents an end elevation of the same, at right angles to Fig. 2 and Figs. 4 and 5 represent detail views of the flanged hub 5, in front and side elevation respectively.

The upper receptacle 1 supports a horizontal shaft 2 extending through it. This shaft carries within said receptacle three buckets 3, identical in form and size, arranged equidistantly around said shaft and in contact with each other. Each bucket 3 is an irregular parallelogram in outline, except where it is attached to the curved surface of said shaft. The mouth of each bucket 3 is of greater area than the base, applying the latter term to the part which is lowest when the mouth of the bucket is presented upward, as shown on the left side of Fig. 3. The center of gravity of the buckets and contents will then be at a considerable distance from a vertical plane coinciding with the axis of said shaft, so that the said bucket will have the benefit of leverage in turning the shaft, whereas the counterbalancing effect of the empty buckets will be very slight. The shaft 2 carries on one end outside of said casing a hub 5, having peripheral annular parallel flanges 4, provided at equal intervals with pins 6, extending across the space between them, said pins having rollers 7 mounted thereon, which

however may be omitted as not strictly necessary. On said rollers rests a bar 8, pivoted at one end on a stud 9 of casing 1 and having a longitudinally adjustable weight 10 on its free end. The other end of shaft 2 protrudes from the opposite side of said casing and extends above a chemical receptacle 11, being arranged to turn in a bearing of bracket 11^a on the top of the latter. Beyond this bearing the extremity of said shaft is provided with a bevel pinion 12, which meshes with another horizontal pinion 13 on a vertical stirring shaft 15 journaled at its upper end in another bearing of said bracket and at its lower end in a bearing fixed to the bottom of receptacle 11, said shaft extending down through the latter and being provided with stirring arm 14 within the same. Said receptacle is provided with a bent outlet pipe 20, containing an outlet valve 19 operated by a rod 18, and a cam wheel 16, the latter turning with shaft 2. This wheel has cam faces corresponding to the buckets 3 in number and position, each of which faces lifts in turn a lateral pin 17 of rod 18, said pin being arranged to bear thereon. This action of course lifts also rod 18 and as this is attached to the stem of valve 19, the latter is simultaneously lifted and opened. Thus, at regular intervals, a certain amount of chemical solution from receptacle 11 is permitted to descend through discharge pipe 20 into the main receiver 25, wherein the mechanical purification of the water takes place.

Water, or other liquid to be purified, is supplied to the interior of receptacle 1 at the top thereof through pipe 50, as indicated by the arrow (Fig. 1) and falls into the upper bucket 3 (Fig. 3) filling the same. The weighted bar 8 resting on rollers 6 (Fig. 3) or on the pins without the rollers or on any other suitable projecting frictional parts, acts as a brake on shaft 2, preventing the latter from turning until the accumulation of water in the upper bucket 3 overcomes its resistance and that of the water in the bottom part of receiver 1 and causes the shaft 2 to turn one third of a revolution. At the end of this movement the pressure and friction of the bar 8 and the resistance of the accumulated water again stop the shaft. By adjusting the said

weight along the said bar 8 I may vary the amount of liquid received in the bucket 3 before such turning and emptying action and the corresponding opening of valve 19 by one of the cams.

An adjustable overflow gate 21 is provided in the lower part of receiver 1. This gate consists of a vertical plate or partition vertically adjustable by means of bolts 44 and slots 23 in a wall 22, which is connected to two parallel side walls or supports 27, these parts 22 and 27 extending vertically up from the bottom of said receiver 1 and together constitute the entrance to the outlet 24 of the latter.

The middle part of wall 22 is cut away at the top and closed more or less by said gate according to the vertical adjustment of the latter. Water will always accumulate in the bottom of receiver 1 until its level reaches the top of the gate 21. Of course the resistance of this water to buckets 3 as the latter are carried around through it reinforces that of bar 8 already described and reduces the speed of each fractional rotation and by raising or lowering the gate this resistance is increased or decreased at will, determining the supply of water and chemical solution so long as the weight 10 retains the same position on bar 8. Either of these means of adjustment and regulation may be used alone, or both may be used concurrently to get a proper resultant regulation.

Receiver 25 contains in its upper part a filter consisting of a layer 32 of any suitable filtering material resting on parallel bars 26, which constitute a supporting bed and are arranged contiguously or in close proximity to each other. In case of corrosion or fracture, any bar may be removed and a new one substituted without reconstructing the bed as a whole.

The water from outlet 24 and the purifying solution from discharge pipe 20 flow together down through a hopper 29, fitted into the top of receiver 25, a vertical passage 30 and a flaring lower space 31, said hopper, passage and space making a continuous conduit or passage into the lower part of receiver 25, where the fluids accumulate and mix, thereafter rising high enough to overflow a wall 33 of the filter. Another wall 34 of said filter extends to the top of the receiver in proximity to the outlet 28, preventing direct access to said outlet from the upper part of said receiver 25. This compels the liquid mixture to first pass down through the filter. A horizontal partition 40 below the said filter provides between them a space or receptacle 42, which receives the liquid thus descending and directs it into a passage 41 leading to said outlet 28. The wall 33 and corresponding side walls of the filter prevent the liquid from escaping from

this space 42, except under the wall 34, which is cut away at the lower end to permit outflow into said passage 41. The filter may of course consist of several compartments, divided by partitions as is usual. The lower part of receiver 25 is preferably given a hopper or funnel form as shown at 51 for directing any residuum to a central point whence it may be withdrawn through a bottom discharge pipe 43.

The course of the liquid during the purifying operation is as follows: through pipe 50 to receiver 1 and buckets 3, then over an adjustable gate 21, to outlet 24, into hopper 29 and passage 30, where it is joined by the chemical solution from discharge pipe 20; then through space 31 into the bottom part of the receiver where it is thoroughly mixed with the said solution and acted on chemically thereby, depositing in the bottom of said receiver any solid product of such reactions or solid matter which may have been carried into the apparatus; then into the upper part of said receiver, over the wall 33 upon the filtering layer 32, then down through the same to the space 42; thence up through passage 41 to the outlet 28.

Of course I do not confine myself to the particular details or number of buckets nor to the details of material form and arrangement precisely as mentioned since these may obviously be varied without departing from the spirit and scope of my invention.

This apparatus may be used for the purification of any other liquid as well as of water.

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

1. A rotary shaft provided with a series of buckets for receiving the liquid to be purified and carrying a correspondingly constructed cam-wheel and series of projecting parts, in combination with an outlet valve opened at regular intervals by said cam, a weighted bar in contact with said projecting parts to hold said shaft against turning, means for supplying a purifying solution to said valve, means for supplying liquid to said buckets and thereby turning said shaft, a receiver for said liquid and said solution and an outlet and overflow gate arranged to hold a body of water in position to resist the turning of said shaft, the said gate being adjustable to regulate the degree of such resistance and consequently the amount of water receivable in the bucket before turning the shaft, substantially as set forth.

2. A rotary shaft provided with a series of buckets and corresponding frictional parts and valve operating means, in combination with a bar bearing against said frictional parts, an outlet valve for a purifying solution arranged to be operated by said means, means for adjustably varying the

pressure of said bar on said parts, an outlet
gate for the liquid from said buckets ar-
ranged to regulate the accumulation of
water below the shaft and the consequent
5 amount of resistance to its rotation and a
receiver permitting the mixture of this
liquid and such solution.

In testimony whereof, I have signed my
name to this specification in the presence of
two subscribing witnesses.

ANDERS OLSSON ANDERBERG.

Witnesses:

A. W. ANDERSON,
H. BRAUZELL, JR.