No. 893,104. PATENTED JULY 14, 1908.

R. SCHORR.

CONTINUOUS FILTER.

APPLICATION FILED MAR. 30, 1907.

2 SHEETS—SHEET 1.

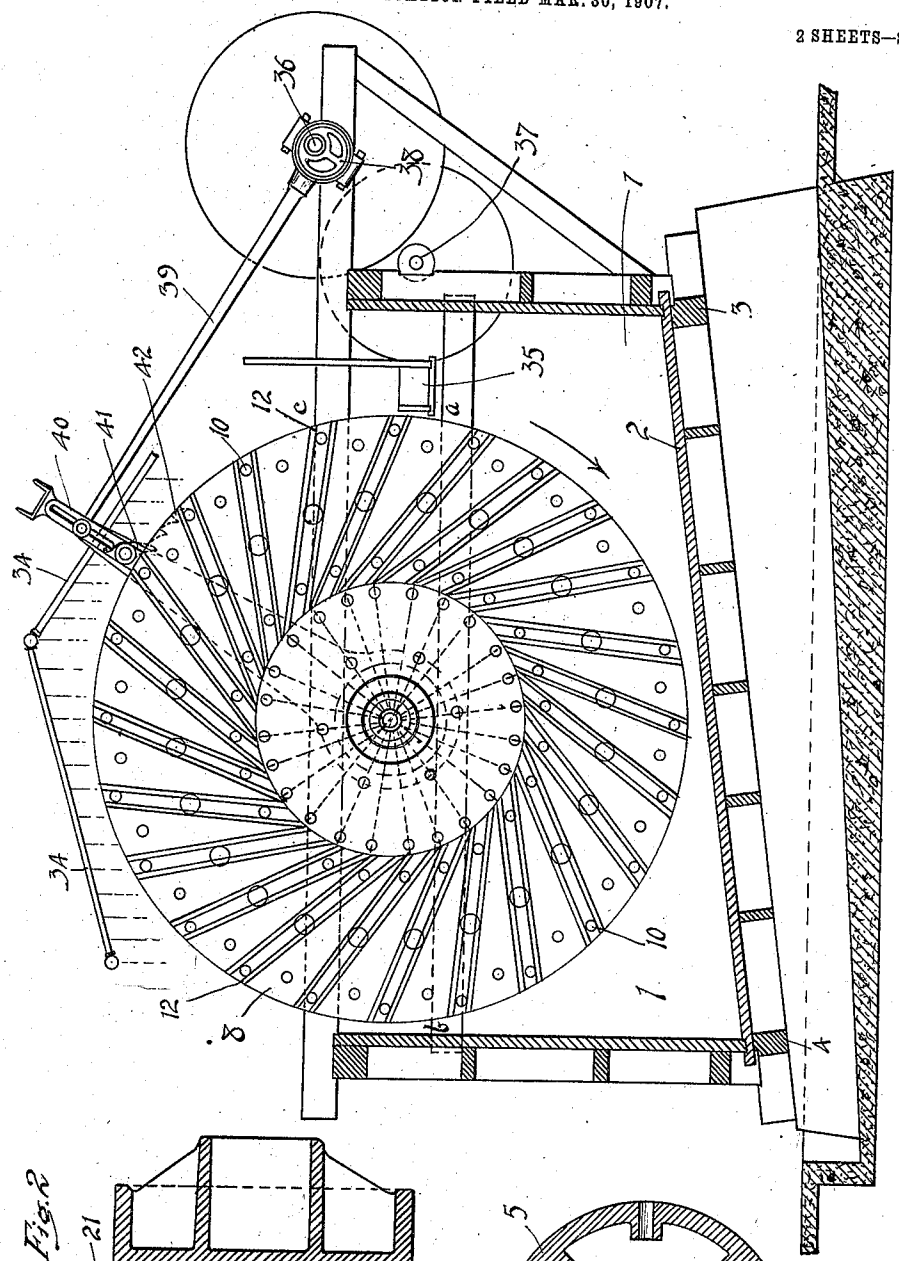

Fig. 1

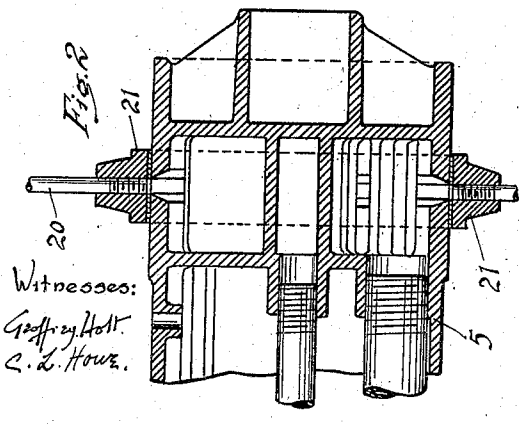

Fig. 2

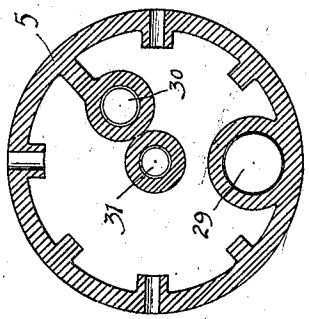

Fig. 3

Witnesses:
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2 SHEETS—SHEET 2.

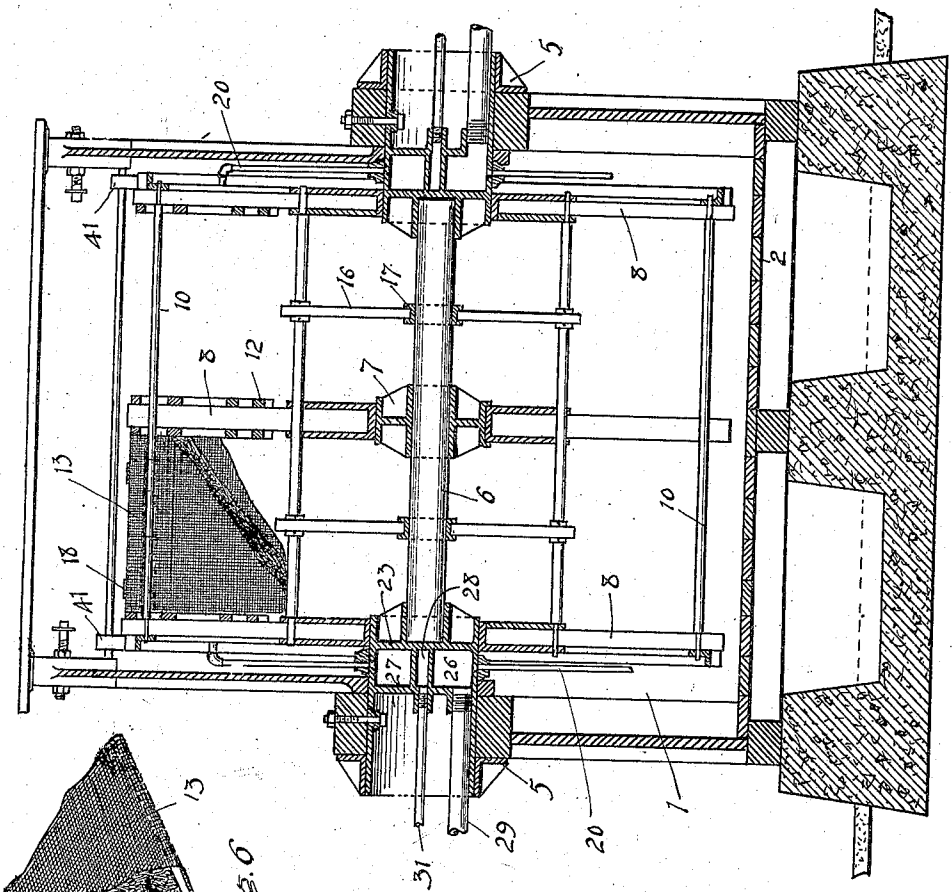

Fig. 5

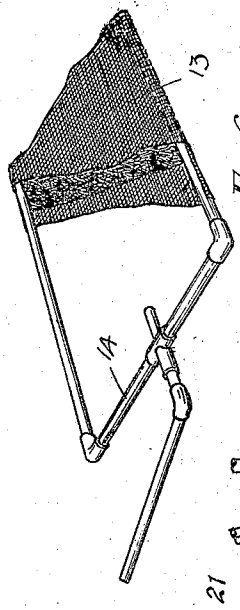

Fig. 6

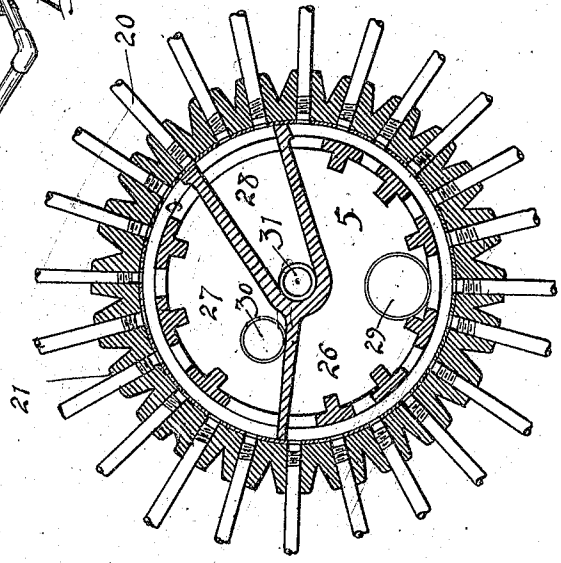

Fig. 4

Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT SCHORR, OF SAN FRANCISCO, CALIFORNIA.

CONTINUOUS FILTER.

No. 893,104. Specification of Letters Patent. Patented July 14, 1908.

Application filed March 30, 1907. Serial No. 365,594.

To all whom it may concern:

Be it known that I, ROBERT SCHORR, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Continuous Filters, of which the following is a specification.

The object of the present invention is to provide a filter especially adapted for cyaniding or similar uses, which will be entirely automatic in its operation, that is to say, will withdraw the solution and form cakes of the material previously suspended therein, wash said cakes, and then discharge the same as tailings, and will repeat these operations in the order named for an indefinite period; which can be installed without requiring extensive excavation or grading; which will provide a large amount of filter area in proportion to the floor space occupied, which will require little attention, and which may be operated at a small expenditure of power.

In the accompanying drawings, Figure 1 is a transverse vertical section of the machine; Fig. 2 is an enlarged longitudinal section through one of the hollow pivots; Fig. 3 is a transverse section of the said pivot; Fig. 4 is a transverse section thereof in the plane of the radiating tubes, looking in the opposite direction to Fig. 3; Fig. 5 is a longitudinal section of the machine on the same scale as Fig. 1; Fig. 6 is a broken perspective view of one of the filter pivots.

Referring to the drawing, 1 indicates a tank or box which forms a receptacle for the pulp, said box having a sloping bottom 2. Supported upon upper and lower beams 3, 4, at each side of the box is a hollow pivot 5, said pivots being connected by a shaft 6, and upon the center of said shaft is also secured a cylindrical bearing 7. Upon the inner ends of the pivots 5 and upon the bearing 7 rotates the filter wheel 8, which consists of three disks connected together by longitudinal steel rods 10. On the face of the disk are secured pairs of cleats 12 each pair forming a groove, said cleats and grooves arranged in a direction tangential to a circle of smaller diameter than the wheel. In said grooves are supported the filter units 13, each unit consisting of a frame 14 made of standard pipe, cast iron, or wood, filter cloth, preferably canvas, being sewed around the frame, and matting or other porous material filling the space between the two sides of this filter cloth. Both of the cloth sides of each filter unit thus formed are effective filters. To prevent the bending of the filter frames are provided supports 16 extending from hubs 17 around the central shaft 6 and said filter frames are tied at the circumference by steel hoops 18. Said cylinder units being arranged to overlap one another, a large amount of filtering surface is obtained. The interior of the filter units are severally connected by means of pipes 20 with an iron ring 21 which revolves with the wheel upon the hollow pivot at the corresponding end. Said pivot is divided by transverse walls 23 and three longitudinal walls 25 into three chambers 26, 27, 28, each chamber being connected with a separate pipe. Thus the chamber 26 is connected by a pipe 29 with a suction pump, not shown, for drawing off the solution. The other chamber 27 is connected by a pipe 30 with a water suction pump, not shown, for drawing off the wash water, and the chamber 28 is connected by a pipe 3 with a force pump, not shown, for supplying pressure water. Thus the radial pipes 20, connected to the several filter units, perform in succession three functions. First, they draw off the solution in which the material was suspended, thereby forming cakes; next they serve to draw off the water with which the cakes are washed; and, lastly, they serve to discharge the washed cakes by forcing them off by means of pressure water or compressed air. The wash water is supplied by pipes 34, having outlets from which the water flows on to the material in the top of the wheel.

35 represents a tailing launder into which the washed cakes are discharged. In said launder the tailings may be carried away either mechanically or by means of water.

Any suitable means may be used to rotate the filter wheel. The one shown consists of a shaft 36 rotatably mounted on extensions of the sides of the box 1, driven by a pulley 37 from any suitable source of power, and carrying eccentrics 38 connected with rods 39, the other ends of which are adjustably connected with arms 40 swinging on the hollow pivots, and carrying pawls 41 which engage ratchet teeth 42 on the outer sides of the outer disks. This construction is adapted for a slow rotation of the wheel with a small expenditure of power.

The operation is as follows:—The pulp, or the slimes from reduction machinery, is led into the box 1 and its level is maintained as high as the launder 35 for the tailings. The

wheel rotates in the direction of the arrow shown in Fig. 1, and during the very slow movement of the filter units through the pulp between the points *a*, *b*, the pipes connected with the filter units are all connected with the chamber 26, which, by means of the pipe 29, is connected with the solution exhaust pump. Consequently, at this time, cakes are formed on the cloth sides of the filter units, as the pulp is drawn up against the filter cloth by reason of the vacuum formed in the interior of the filter units and the solution is drawn through the cloth. As the filter units emerge from the box at the point *b*, the corresponding pipes 20 are no longer connected with the chamber 26, but are now connected with the chamber 27. At the same time the material lying between the filter units is washed by water discharged thereon from the wash water pipes 34. This water is drawn through the filter cloth into the interior of the filter units, and thence by means of the pipes 20, corresponding to said filter units, into the chamber 27, and thence by the pipe 30 to the water suction pumps. The several filter units are operated upon in this manner until they arrive at such a position, marked *c* in Fig. 1, that they slope downwards in the direction of the tailings launder 35. The pipes 20 connected with the filter units passing this point in succession are now shut off from the chamber 27 and are connected with the chamber 28, which chamber, by means of the pipe 31, is connected with a force pump or with an air compressor. By this means pressure water or compressed air is admitted, first to the interior of the filter units, and then outward through the filter cloth, washing all the tailings off from said filter cloths and discharging them into the launder 35. As the tailings are completely discharged from said filter units, said units arrive again at the point *a*, at which they begin to pass through the pulp, and the operation is thus repeated by each filter unit in succession.

I claim:—

1. In an apparatus of the character described, the combination of a hollow pivot, a filter wheel rotatably supported thereon, a circular series of filter units carried by said filter wheel, means for supplying to said filter units the material to be filtered, means for drawing the filtered liquid from said units comprising conduits leading from said pivot severally to the interiors of said units, a pipe leading to the filter wheel, and means whereby, in the rotation of said wheel, said conduits are connected in succession to said pipe, substantially as described.

2. In an apparatus of the character described, the combination of a wheel, a circular series of filter units carried thereby, said units overlapping one another, and means, automatically operated in the rotation of the wheel, for passing fluids in opposite directions alternately through said filter units, substantially as described.

3. In an apparatus of the character described, the combination of a rotating wheel, a series of hollow filters carried thereby, a receptacle adapted to contain the material to be filtered, hollow filter units contacting in succession with the material in said receptacle, conduits severally connecting with said filter units, a ring with which the conduits connect at the outer ends, a hollow pivot upon which said ring rotates with the wheel, said pivot being divided into compartments, and pipes connected with the several compartments, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ROBERT SCHORR.

Witnesses:
FRANCIS M. WRIGHT,
D. B. RICHARDS.