No. 841,247. PATENTED JAN. 15, 1907.

G. HIGGINSON.

MANUFACTURE OF AERATED WATER.

APPLICATION FILED NOV. 21, 1904.

3 SHEETS—SHEET 1.

Fig. 2.

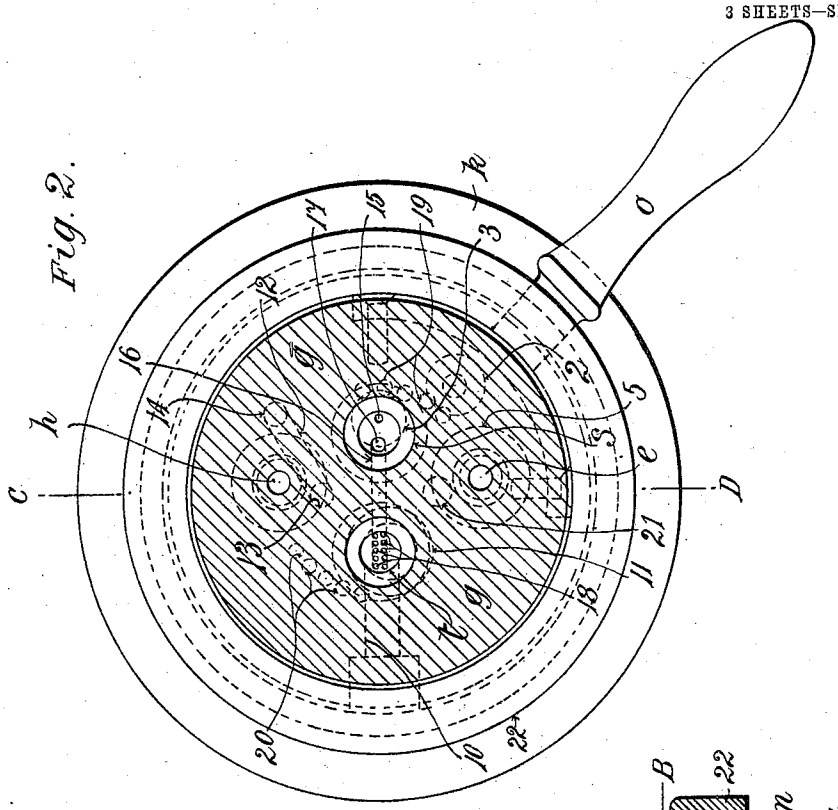
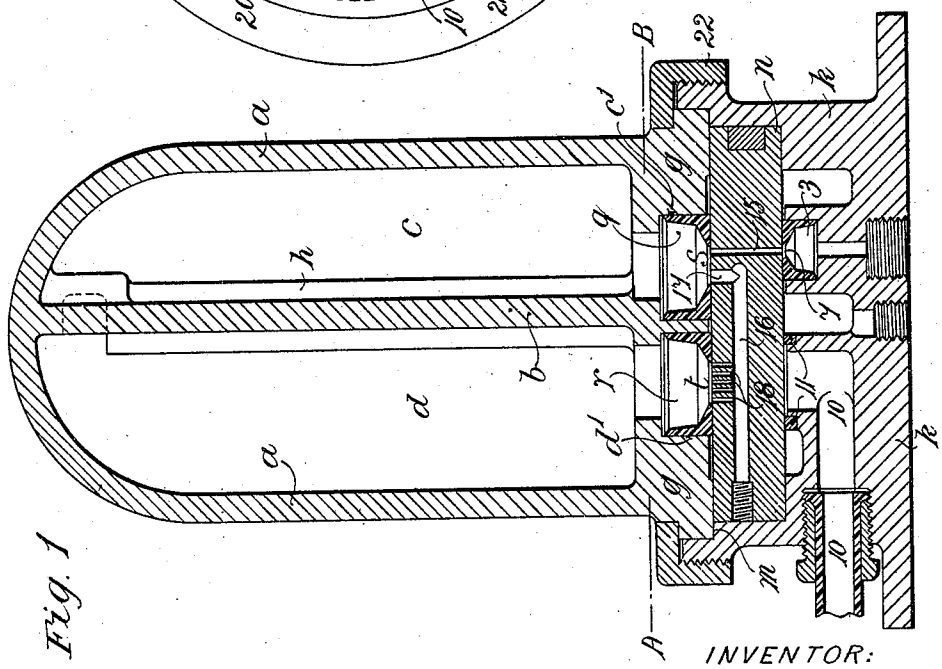


Fig. 1



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3 SHEETS—SHEET 2.

Fig. 4.

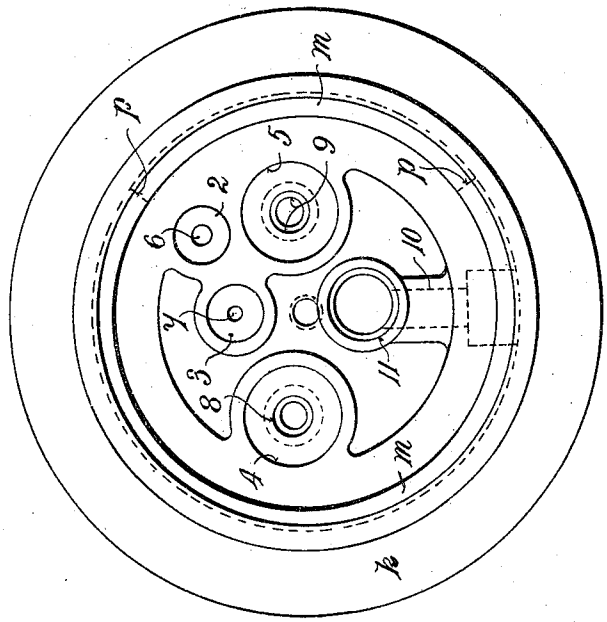
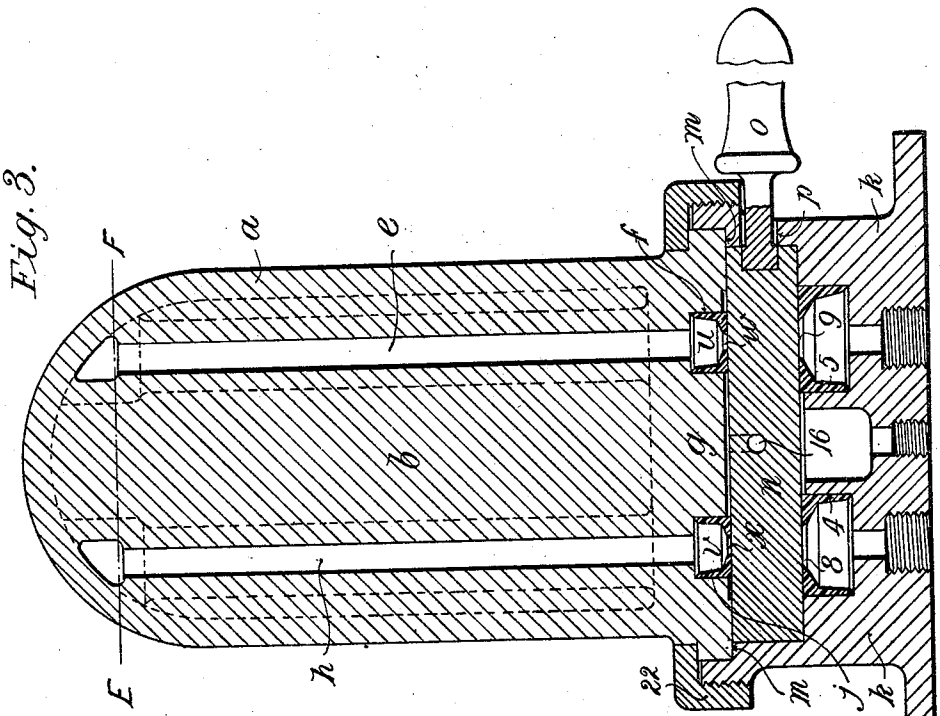


Fig. 3.



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3 SHEETS—SHEET 3.

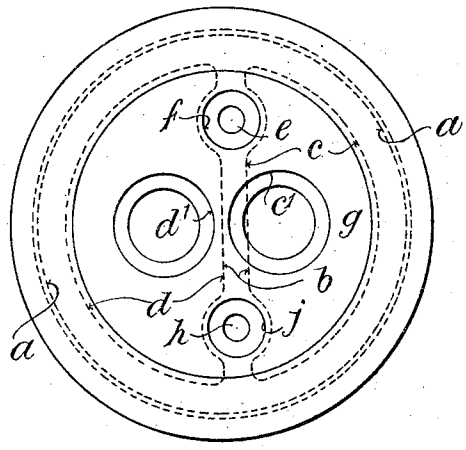


Fig. 5.

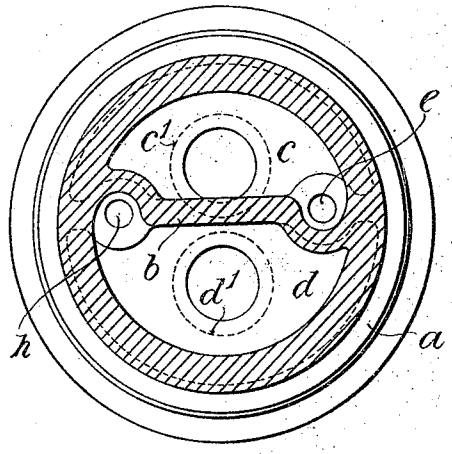
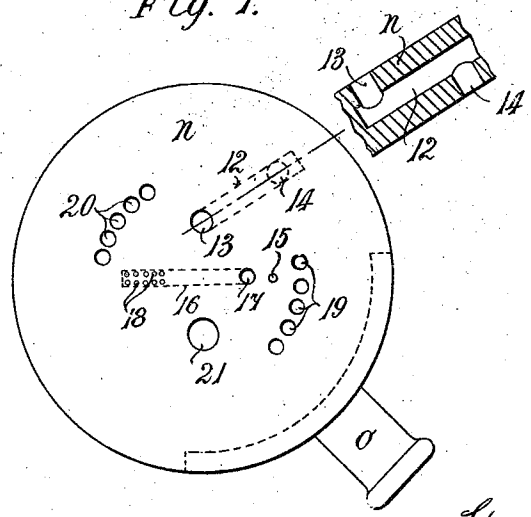


Fig. 6.

Fig. 7.



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UNITED STATES PATENT OFFICE.

GEORGE HIGGINSON, OF LONDON, ENGLAND.

MANUFACTURE OF AERATED WATER.

No. 841,247. Specification of Letters Patent. Patented Jan. 15, 1907.

Application filed November 21, 1904. Serial No. 233,599.

To all whom it may concern:

Be it known that I, GEORGE HIGGINSON, mechanical engineer, of 1 and 2 Ham Yard, Piccadilly Circus, London, England, have invented certain new and useful Improvements in and Relating to the Manufacture of Aerated Water, of which the following is a specification.

This invention relates to the manufacture of aerated water, and has for its object to provide a simple and efficient apparatus for producing the same.

Apparatus made in accordance with my invention comprises a dome with two chambers, a base upon which the dome rests, a partially-rotatable disk disposed between the dome and the base. In the bottom of the dome and in communication with each chamber is disposed a cup-shaped packer or washer which rests on the disk and in certain positions of the disk communicates with ports therein. In the bottom of the dome are also disposed two cup-shaped packers or washers which rest on the disk, and in certain positions of the disk each packer or washer connects a vent-pipe disposed in each chamber to ports in the disk, the said vent-pipes leading from the top of each chamber to the packer or washer. In the base are disposed a water-inlet, a gas-inlet, and an aerated-water outlet. The water and gas inlets are each provided with cup-shaped packers or washers which are adapted to press up against the disk and in certain positions of the disk to communicate with ports therein. In the base are also disposed two cup-shaped packers or washers adapted to bear against the disk and in certain positions thereof to communicate with ports therein.

The cup or packer or washer is preferably L-shaped in section, with external angle thereof being a right angle and the internal angle obtuse. The edges of the cup are chamfered or tapered so as to be thin where they meet the sides of the supporting tube or chamber and the disk or plate. The disk is provided with ports to connect the various parts of the apparatus during the following cycle.

Assuming the first chamber to be filled with water and the parts in their normal position, gas is free to enter into the first chamber, and communication is established through the disk from the first to the second chamber. As the disk is turned out of its normal position, the gas is cut off, the communication between the two chambers broken, the snift-ports are traveled across the corresponding valves, so as to allow the escape of gas in both chambers, and when the disk is traveled to the end of its movement the outlet from the aerated water from the second chamber and the water-inlet to the first chamber are opened. On the disk being returned the water-supply is cut off, the gas-inlet opened, and communication between the two chambers restored.

Referring now to the drawings, Figure 1 is a sectional elevation of one form of apparatus made in accordance with my invention, showing the parts in their normal positions. Fig. 2 is a sectional plan of the same on the line A B, Fig. 1. Fig. 3 is a sectional elevation on the line C D, Fig. 2, showing the parts in position for delivery of aerated water. Fig. 4 is a plan of the base with fittings removed. Fig. 5 is an inverted plan of the dome. Fig. 6 is a section on line E F of Fig. 3. Fig. 7 is a plan of the disk.

a is a dome divided by the partitions *b* into two compartments *c* and *d*, *d* being preferably the larger.

e is a vent leading from the top of the chamber *c* through an orifice *f* in the bottom plate *g* of the dome. *h* is a similar vent leading from the top of the chamber *d* through an orifice *j* in the bottom plate *g* of the dome.

k is the base, having a shoulder *m*, upon which the bottom plate *g* of the dome rests.

n is a disk of vulcanite or other suitable material disposed between *g* and *k* and adapted to be partially rotated therebetween by the handle *o*, which protrudes through a slotted hole *p* in the base *k*.

In the cylindrical recesses or apertures *c'* and *d'* in the bottom plate *g* are disposed two cup-shaped packers *q* and *r*, which rest on the disk *n*. The packer *q* has an open mouth at the top and a small orifice *s* at the bottom. The mouth opens into the chamber *c*, and the packer *r* opens into the chamber *d* and has a small orifice *t* at the bottom. In the orifices *f* and *j* in the plate *g* are likewise disposed two other packers *u* and *v*, similar to the packer *q*. The said packers *u* and *v* rest on the disk *n* and are disposed immediately below the vent-pipes *e* and *h* and have small orifices *w* and *x* adjacent to the disk *n*. In the base *k* are disposed four cup-shaped packers 2 3 4 5, similar in form to the packer *q* and having small orifices 6 7 8 9, which bear against the disk *n*. The packer 2 is for the water-supply, the packer 3 for the gas-supply, and the

packers 4 and 5 are packing devices adapted to make tight joints between the disk and the base *k* at the orifices 8 and 9.

10 is a discharge-pipe having a packing 11 between the same and the disk *n*. In the disk *n* is disposed a water-duct 12, having an upper port or orifice 13 and a lower port or orifice 14.

15 is a gas-port passing vertically through the disk *n*.

16 is a duct adapted to connect the chamber *c* to the chamber *d* in certain positions of the disk *n* and having ports 17 and 18 in the upper surface of the disk. The port 18 is preferably in the form of several small orifices.

19 19 and 20 20 are snift-ports passing through the disk *n* and adapted to put the chambers *c* and *d* into communication with atmosphere through the vents *e* and *h* when the said disk is in certain positions.

21 is a discharge-port passing through the disk adapted to put the chamber *d* in communication with the discharge-pipe 10 when the disk is in one position.

The dome *a* is adapted to be secured to the base *k* by a screwed collar 22.

In operation, assuming the chamber *c* to be filled with water and the disk in its normal position and as shown in Figs. 1 and 2 and the water and gas lead from a source of supply to the water-packer 2 and gas-packer 3, respectively, the gas passes through the port 15 and bubbles up through the water in the chamber, thereby aerating it, and collects at the top of the said chamber and simultaneously drives the water out of the chamber *c* through the orifice *s* of the packer *q*, the port 17, the duct 16, up through ports 18, and the orifice *t* of the packer *r* into the chamber *d*. In taking this course it meets the inrush of gas as it issues from the port 15, thereby becoming further aerated, and in issuing from the port 18 the baffling action has a very beneficial effect on the state of aeration. After sufficient time has elapsed all the water is expelled from the chamber *c* to the chamber *d*, and the gas now bubbles up through the water in the chamber *d* and continues to pass through the water until the pressure in the chambers is the same, thereby further aerating the water. On moving the handle *o* on the disk *n* from the normal position to the discharging position the port 15 is moved from above the orifice 7 of the packer 3, so that a blind portion of the disk *n* comes over the packer 3, thereby cutting off the gas-supply. On further rotation of the disk *n* the port 17 is moved from below the orifice *s* of the packer *q* and the ports 18 are moved from below the orifice *t* of the packer *r*, thereby cutting off communication between the chambers *c* and *d*. On further rotation ports 19 and 20 are brought below the orifices *w* and *x* of the packers *u* and *v*, respectively, thereby allowing gas under pressure in the chambers *c* and *d* to discharge into the atmosphere. The series of ports 19 and 20 are so provided as to enable the gas to escape while the disk *n* is being rotated. When the disk has traveled to the end of its movement, the discharge-port 21 establishes communication between the chamber *d* and the discharge-pipe 10 through the orifice *t* of the packer *r* at the same time the ports 13 and 14 come opposite to the orifices *s* and 6 of the packers *q* and 2, respectively, and permit water to enter the chamber *c* through the duct 12 while the aerated water is being discharged from the chamber *d*. When the aerated water has been drawn off from the chamber *d*, the handle *o* is returned to its normal position, thus cutting off the water and recommencing the operation.

In use it has been found that aerated water made in accordance with my invention is well saturated with gas and aeration continues for a considerable time after being drawn off. I have further found that I can obtain very beneficial results with a much lower pressure of gas than it is possible with other machines now in use. The apparatus is compact and the use of a third chamber such as hitherto employed is dispensed with. The special construction of packers avoids all wear and knock on the packer-seatings, which enables me to construct them of vulcanite, tin, soft metal, or other suitable material or metal on which no verdigris collects or other chemical action takes place.

What I claim, and desire to secure by Letters Patent, is—

1. In apparatus for manufacturing and dispensing aerated liquids, the combination of chambers *c* and *d*, the chamber *c* having at its bottom a passage *s*, the chamber *d* having at its bottom a passage *t*, a valve having a passage 16 connected with the chamber *c* and a plurality of small passages 18 leading from said passage 16 to the chamber *d*, and said valve having a port adapted to connect the passage *s* with the gas-supply.

2. In apparatus for manufacturing aerated liquids, a chamber, a passage connected therewith, a valve controlling said passage, and a cup-shaped packer or washer the bottom of which bears against said valve and the sides of which bear against the walls of said passage, said packer having its edges tapered to bear closely against such parts.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE HIGGINSON.

Witnesses:
REGINALD EATON ELLIS,
GORDON MELVILLE CLARK.