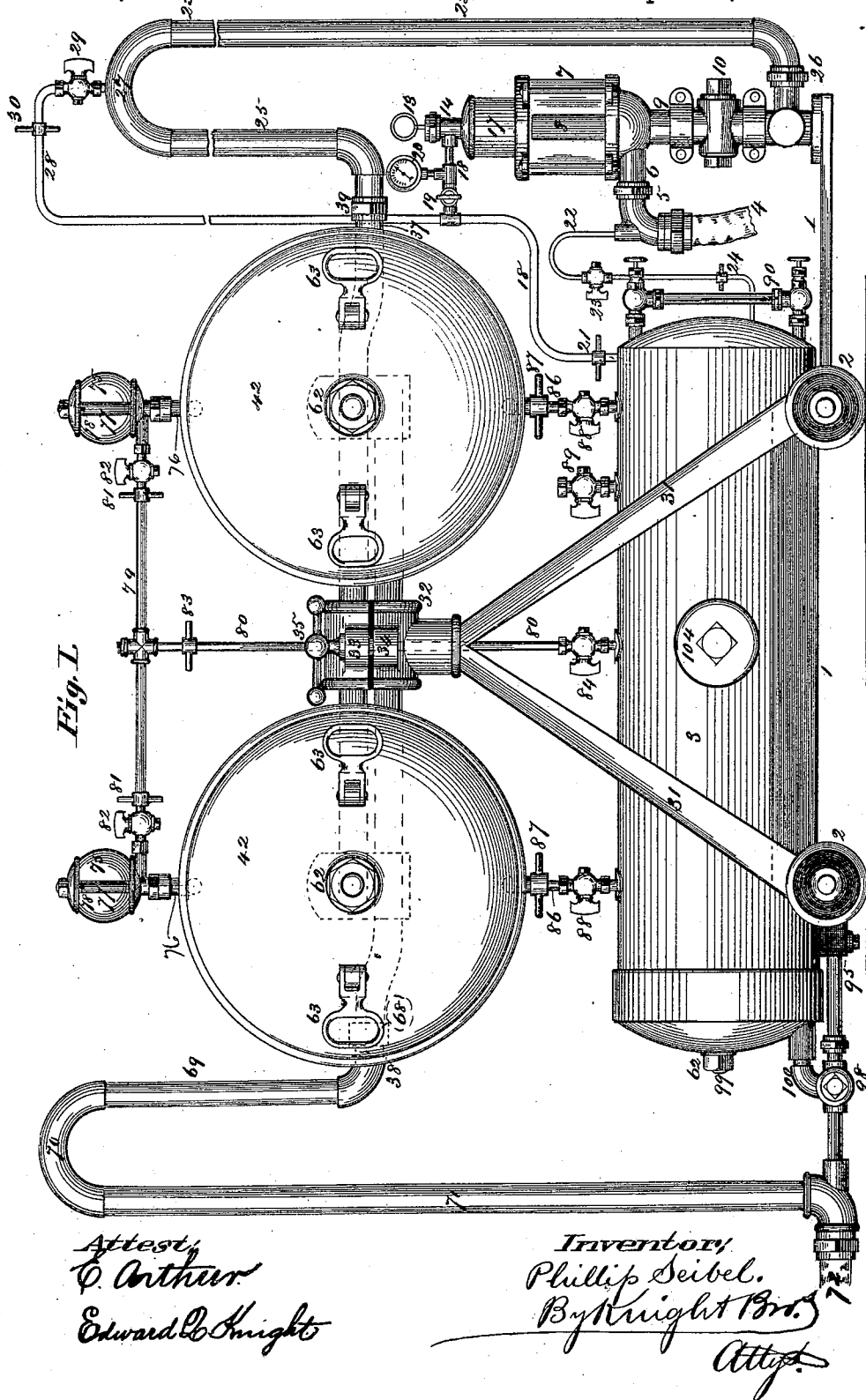


P. SEIBEL.
BEER FILTERING APPARATUS.

No. 426,965

Patented Apr. 29, 1890.



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Fig. II

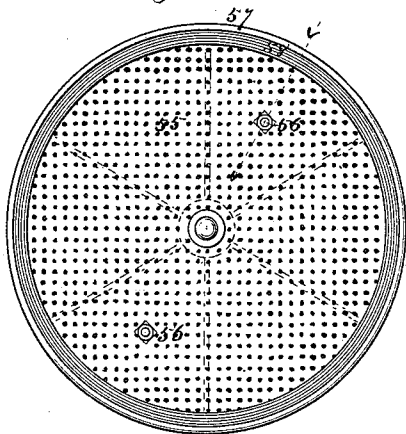


Fig. III

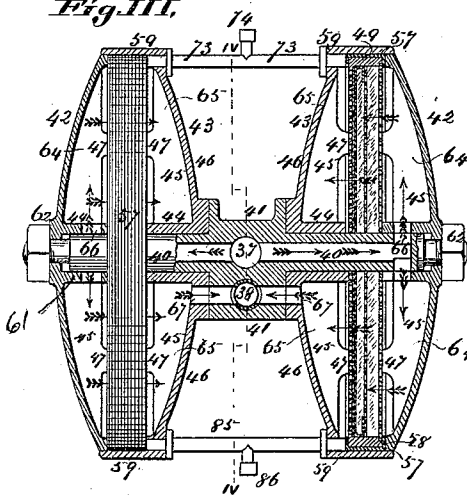


Fig. IV

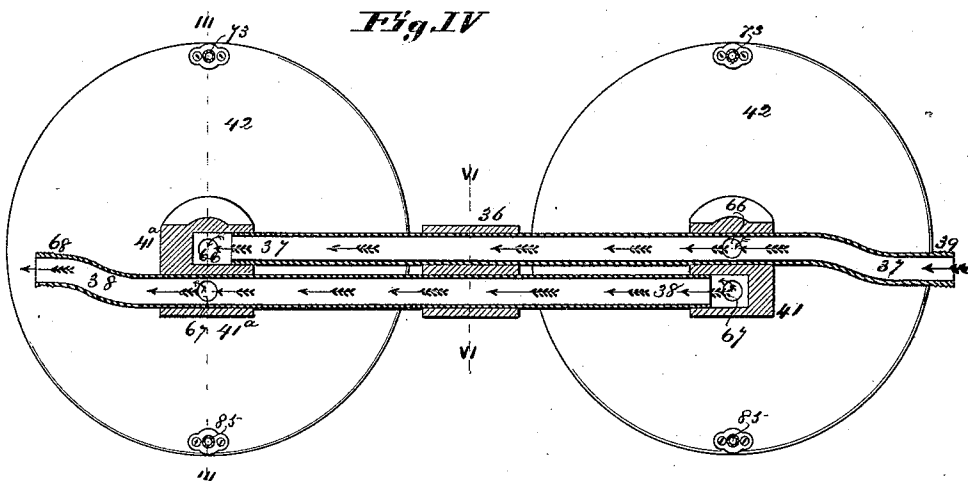


Fig. V

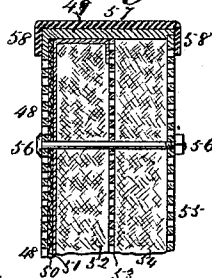


Fig. VI

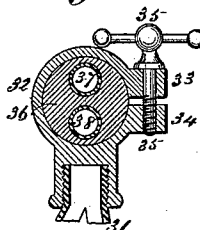
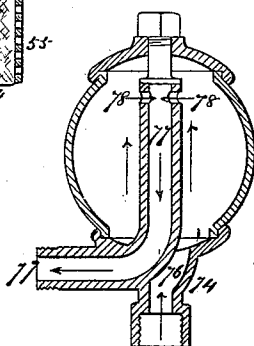


Fig. VII



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(No Model.)

3 Sheets—Sheet 3.

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Fig. VIII.

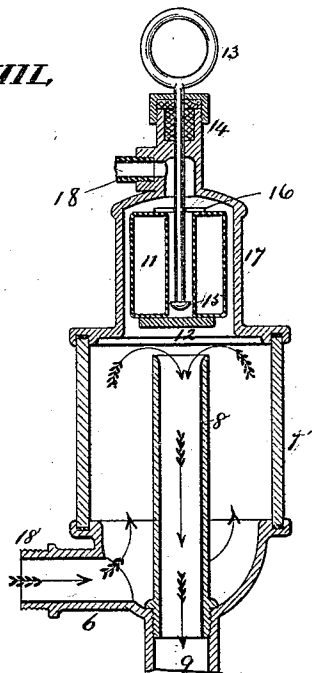
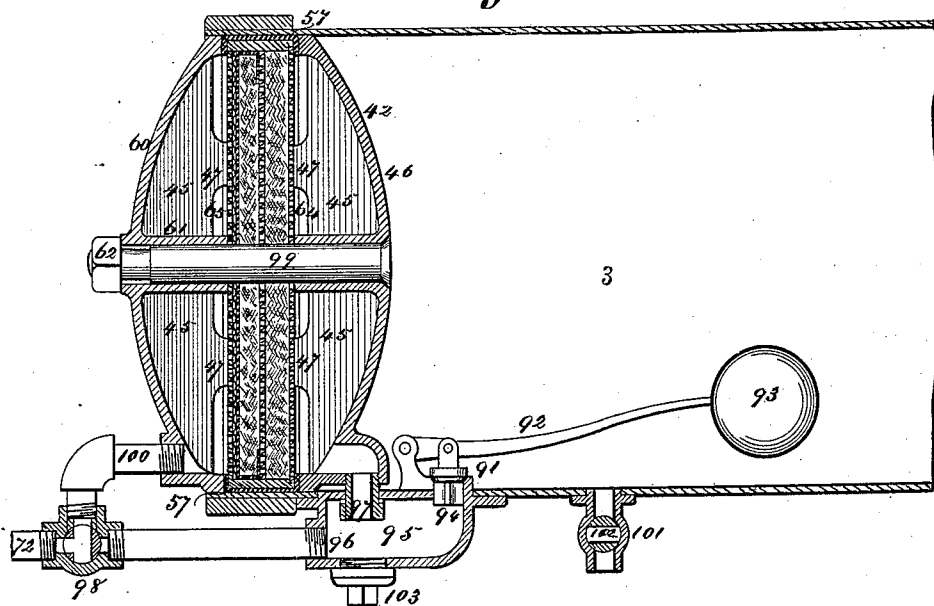


Fig. IX.



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UNITED STATES PATENT OFFICE.

PHILLIP SEIBEL, OF ST. LOUIS, MISSOURI.

BEER-FILTERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 426,965, dated April 29, 1890.

Application filed June 14, 1889. Serial No. 314,272. (No model.)

To all whom it may concern:

Be it known that I, PHILLIP SEIBEL, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Beer-Filtering Apparatuses, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This filtering apparatus is intended especially for beer or other liquids liable to foam, and has means for the removal of the foam into a settling-chamber, from which the liquid is withdrawn as it subsides. The apparatus is composed of two or more similar filters connected with the same system of circulating-pipes.

Figure I is a side elevation of the apparatus. Fig. II is a side elevation of one of the filters with a head removed. Fig. III is a detail transverse section at III III, Fig. IV. Fig. IV is a detail vertical longitudinal section at IV IV, Fig. III. Fig. V is an enlarged detail section at V V, Fig. II. Fig. VI is a transverse vertical detail section at VI VI, Fig. IV. Fig. VII is an enlarged vertical longitudinal section of one of the upper transparent froth-chambers. Fig. VIII is an enlarged vertical longitudinal section of the lower transparent froth-chambers. Fig. IX is a detail vertical longitudinal section of part of the settling-chamber.

Referring to the drawings, 1 is a frame, shown as supported on wheels 2.

3 is a settling-chamber, shown to be of cylindrical form.

4 is the induction pipe or hose through which the beer enters the apparatus. This pipe is connected by union-couplings 5 or otherwise with the pipe 6, leading to the glass chamber 7.

8 is an open-topped pipe standing upright in the chamber 7, so that beer entering the chamber 7 will overflow into the pipe 8. The pipe 8 forms the upper end of a pipe 9, descending from the chamber and furnished with a valve or cock 10, by which it may be partly or wholly closed.

11 is a float having at bottom a valve 12, arranged to settle by gravity upon the top of the pipe 8 and close it, thus closing communication between the chamber 7 and pipe 8.

(See Fig. VIII.) This float works on a stem 13, passing through a stuffing-box 14, and having at bottom a head 15, which works in an axial socket of the float.

16 is a plate attached to the top of the float and through which the stem passes. The construction is such that when the stem is drawn upward the head 15 comes against the plate 16, and the valve is lifted from the top of the pipe 8. The float 11 works in a chamber 17, forming an extension of the chamber 7. The chamber 17 communicates with the settling-chamber by a pipe 18, having a valve 19 and having a pressure-gage 20.

21 is a union-coupling allowing the disconnection of the pipe 18. The purpose of the pipe 18 is to allow the air and foam to pass from the chamber 17 into the settling-chamber 3.

22 is a pipe leading from the upper part of the induction-pipe 4 to the settling-chamber and having a stop-cock or valve 23 and union-coupling 24. This pipe 22 is to allow the escape of air and foam from the induction-pipe of the settling-chamber.

From the lower part of the pipe 9 extends an upright pipe 25, the pipes being connected by a union or other coupling 26. This pipe 25 has at top a return-bend at 27, from which extends a pipe 28, leading to the pipe 18, and so to the settling-chamber. This pipe has a stop-cock or valve 29 and coupling 30.

31 is a standing frame having at top a trunnion-bearing consisting of a contractile ring 32, open at one side, where are lugs 33 and 34, connected by a screw 35, which passes through a plain hole in the lug 33 and engages in a screw-threaded hole of the lower lug 34. Within the bearing is a trunnion-block 36, traversed by two longitudinal pipes 37 and 38. To the pipe 37 is connected the descending end of the pipe 25, the connection being made by a coupling 39. By turning down the screw 35 the bearing is closed tight upon the block 36 and prevents its turning.

40 is a tube having at the middle a collar or block 41, through which passes transversely the pipe 37, the joint being made tight between the pipe 37 and the collar. The end of the pipe 37 is screwed or otherwise fitted tight in the collar 41 of a tube 40. The tubes 40 and 40^a have similar construction. They pass

axially through the four filters 42, which filters are constructed alike, a description of one applying equally to the others. Each filter has an open-ended shell 43, with an axial tube 44 open at both ends, and having radial ribs 45 extending from the tube 44 along the inside of the end 46, which forms part of the shell 43. These ribs have projections 47, forming bearing for a disk 48, of perforate metal, having around its margin a cylindrical flange 49. Upon the perforate disk 48 is laid a circular sheet 50, of wire-cloth, and upon the wire-cloth a cloth 51, of any suitable porous material, and upon this is put filtering material 52, such as charcoal or any other suitable substance. The edges of the cloth are folded over inward and upon the material 52, and upon the edge of the cloth and the material 52 is laid a disk 53, composed of perforate metal or wire-cloth, above which is put more charcoal or other suitable loose filtering material 54, which is held in place by another perforate disk 55. Screw-bolts 56 pass through the disks 48 and 55, and all between, to hold the parts together.

57 is a rubber band which surrounds the flange 49 and whose marginal intumed flanges 58 overlap the edges of the disks 48 and 55. Thus the filtering-head is composed of a number of layers, as described, surrounded by a packing-band 57 58, adapted to fit in the case 43, the rubber fitting tight inside the flange or wire 59 of the case.

60 is the removable end or head of the case, whose margin rests upon the outer flange 58 of the rubber packing and the projections 47 of whose ribs 45 bear against the disk 55. Thus the filtering-head is held in place and the rubber packing compressed so as to prevent the passage of any liquid between the rubber and the rim 59. The tube 40 passes centrally through the filtering-head and through the tube 44 and a tube 61, which projects inwardly from the casing-head 60 with a tight joint preventing any leak along the shaft. The tube 40 ends in a screw-threaded stud, which carries a nut 62, that bears against the outside of the head 60, and holds both it and the filtering-head in position. By the removal of the nut 62 the casing-head 60 and the filtering-head may be removed.

63 are handles by which the head 60 may be lifted. The ends of the tubes 44 and 61 bear, respectively, against the perforate disks 48 and 55. The ends 46 of the cases bear against the collars or blocks 41 or 41^a, as the case may be.

It will be seen that the filtering-head separates the filter into two chambers 64 and 65, the former of which is a receiving-chamber and the latter a discharging-chamber. The receiving-chamber communicates with the tube 40 by radial holes 66, which extend through the tubes 40 and 61. (See Fig. III.) The liquid, after passing from the chamber 64 through the filtering material, escapes from

the chamber 65 through a passage 67, made directly through the end 46 of the case, and through the collar or block 41, into the pipe 38, whose end is screwed or otherwise fitted tight in the collar 41, and which passes with a tight joint through the collar 41^a, within which it has holes 67, through which the liquid enters the pipe from two of the filter-chambers 65. The pipe 38 is coupled at 68 to an ascending pipe 69, having a return-bend 70, from which point it descends in a part 71, which is connected with the discharge-pipe 72.

73 are air and foam pipes in communication with upper parts of the discharge-chambers 65. The pipes 73 have upward extensions 74 from the middle connected with glass vessels or chambers 75, through passages 76. The return-bends 27 and 70 have the same altitude as that shown in respect to the latter, (70,) being at least equal in altitude with the top of the glass vessels, so that the latter will be kept full of liquid when the apparatus is working. The glass chambers have central overflow-pipes 77, into which the contents of the chamber escape by holes 78, the overflow passing through a pipe 79 and descending pipe 80 to the settling-chamber 3. The pipe 79 has couplings 81 and stop-cocks 82, and the descending pipe 80 has coupling 83 and stop-cock 84.

85 is a transverse pipe connecting the discharge-chambers 65 of each pair of filters together, the pipe connecting with the lower parts of the chambers. From each of the pipes 85 descends a pipe 86, which communicates at bottom with the settling-chamber. The pipes 86 have couplings 87 and stop-cocks 88.

89 is a stop-cock, with which may be connected a pipe leading to an air-compressor by which air is forced into the settling-chamber to force the contents out of the chamber.

90 is a surface-gage indicating the depth of liquid in the settling-chamber.

Within the settling-chamber is a valve 91, connected to the lever 92, whose free end carries a float 93, so that when the quantity of liquid in the settling-chamber increases above a given point the valve is opened and allows the beer to flow through the valve-port 94 into the chamber 95. The chamber 95 has two openings 96 and 97. The first (96) is connected directly with the discharge-pipe, a three-way cock 98 being, however, placed in the pipe to check or stop the discharge through the opening 96. The opening 97 connects the chamber 95 with the receiving-chamber 64 of a filter similar to the filters 42, already described, except that a simple axial screw-bolt 99 may be used to secure the parts together. The discharging-chamber 65 of this filter is connected by a pipe 100 with the discharging-pipe 72 of the apparatus, the three-way cock 98 being interposed.

The construction and arrangement are such that the beer may be made to pass directly from the chamber 95 to the discharge-pipe

72, or may be forced to pass through the filter. The latter position of the cock is shown in Fig. IX. The cock 98 may also be used to disconnect the discharge-pipe 72 from both

the filter and chamber 95.

101 is a waste-pipe from the settling-chamber, having in it a stop-cock 102.

103 is a plug stopping a discharge-hole in the chamber 95.

104 is the cover of a hand-hole through which access may be had to the settling-chamber.

The operation of the apparatus may be shortly described as follows: When the apparatus is first put in operation, the cock 10

may be closed and the pipe 8 is closed by the valve 12. The cocks 19 and 23 are open and the cock 29 closed. More or less froth or foam

may be mixed with the beer first entering through the pipe 4. The air contained in the pipes, &c., will be first forced through the pipes 22 and 18 into the settling cylinder

or chamber 3, and may be allowed to escape through the cock 89. As long as the glass vessel or chamber 7 contains foam the valve 12

is allowed to rest on and close the pipe 8, so that no foam can pass down the pipe 9, the foam passing up through the chamber 17 and through the pipe 18 to the settling-chamber.

As soon as the glass vessel 7 is seen to contain beer without foam the float 11 and valve 12 are lifted by the stem 13, and the cock 10

being open the beer passes down the pipes 8 and 9 into the ascending pipe 25. The air is

allowed to escape from the upper part of this pipe through the pipes 28 and 8 to the settling-chamber, the cock 29 having been

opened. As soon as the air and any froth or foam which may be present have escaped the cock 29 is closed and the beer passes

along the pipe 37 to the receiving-chambers 64 of all four of the filters 42 and drives the air therefrom through the filtering material into the discharging-chambers 65. The air

finds its way through the pipes 73 74, the glass chambers 75, and pipes 79 and 80 to the settling chamber or vessel 3. As soon as the

glass vessels 75 show that the air and foam have escaped by the vessels being filled with

beer without foam the cocks 82 are closed, but may be opened temporarily at any time if there is an accumulation of foam. The

beer flows from the discharging-chambers 65 of the four filters into the pipe 38 and pipe

69 70 71 to the discharge-pipe 72. It has been said that the cock 89 may be opened to allow the escape of air from the apparatus. This

cock may be closed at any time, or a compressed-air pipe may be connected with

it to reduce the quantity of foam and to force the beer from the settling-chamber. As the

surface-level of the beer ascends in the settling-chamber it escapes through the filter 42 of the settling-chamber, or directly through

the passage 96 to the discharge-pipe 72. It will be seen that when the apparatus is in regular operation the foam is treated with-

out exposure to the air, and under constant pressure, and as soon as the beer is freed from foam in the settling-chamber it is re-

turned to the main quantity. It will be seen by examination of Figs. I and IV that the

couplings 39 and 68 are in direct line with the axis of the block 36, so that the filters may be

turned upon the coupling 39 and 68 and the block 36 when the screw 35 has been loosened,

and any pipes which would interfere with such rotary movement uncoupled from the

filters. When it is desired to change the filtering material in the filters, they are turned

about one-fourth around, so as to bring the heads 43 of two of them upward, and after these have been repacked the filters are re-

versed and the other two repacked, when the filters are again turned edge up (in normal

position) and are ready for use.

I claim as my invention—

1. A filter divided into two chambers by a removable head composed of layers of filtering material, and a closed settling-chamber in

communication with the upper and lower parts of the discharging-chamber of the filter, with cocks governing such communication,

substantially as set forth.

2. The closed settling-chamber 3, having a filter 42, with discharge-openings 96 and 97, governed by a three-way cock, and leading to the discharge-passage 72 direct or by way

of the filter, substantially as set forth.

3. The combination, in a closed settling-chamber 3 for a beer-filtering apparatus, of the automatic discharge-valve 91, a filter, a

cock 98, connected with one side of said filter, and the chamber 95, connected with the other

side of said filter and with said cock and automatic valve, substantially as set forth.

4. The combination, in a filter and the closed settling-chamber, of a pipe leading from the upper part of the filter, a closed glass

vessel connected with said pipe, and an open-topped overflow-pipe within the vessel leading

to said closed settling-chamber, for the purpose set forth.

5. The combination of the induction 4, the glass vessel 7, the overflow-pipe 8, extending upward and terminating near the top of said

vessel, the float-valve 11 12, and the stem 13, provided with the head 15, and having limited vertical movement in the valve-float, substantially as set forth.

6. The combination of the closed settling-chamber, the induction-pipe 4, the glass vessel 7, connected with said pipe, the overflow-

pipe 8 in said vessel, the pipe 25, connected with said overflow, the float-valve adapted to close said overflow-pipe, and the air and foam

pipe 18, leading to the settling-chamber, substantially as set forth.

7. The combination, with the filter, the closed settling-chamber, and the induction-

said vessel above the overflow-pipe with the closed settling-chamber, and a pressure-gage connected with pipe 18, substantially as set forth.

5 8. The filters 42, supported centrally upon a trunnion-block 36, and having induction and eduction pipes 37 38 passing through the trunnion, and having couplings 39 68, in axial line with the trunnion, substantially as and
10 for the purpose set forth.

9. The combination, with the trunnion 36, the filter 42, the filter induction and eduction pipes 37 and 38, passing through the trunnion and giving support to the filters, and the con-
15 tractile bearing 32, substantially as set forth.

10. The combination of the induction passage or pipe 4, the glass vessel 7, the opened-top overflow-pipe 8, extending upward into said vessel, a float-valve adapted to rest upon the upper end of said overflow-pipe, the stuffing-box, 14 a valve-stem passing through said stuffing-box and being connected with said valve and having a limited range of movement independently of the latter, substantially as forth. 20

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Witnesses:

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THOMAS KNIGHT.