Claims

1. Apparatus for the treatment of liquids, comprising
a filter module (10) with a filter (18), an inlet (12) for liquid, a first outlet (14) for liquid and a second outlet (16) for filtered liquid, wherein the inlet (12) and the first outlet (14) are positioned on a first side of the filter (18) and the second outlet (16) is positioned on the second side of the filter;
a first UV-treatment module (26) with a first UV-light source (28), wherein the first UV-treatment module (26) is connected with the first outlet (14) of the filter module (10) and is adapted to receive liquid from the filter module (10), and to expose said liquid to UV-light from the first UV-light source (28); and
a second UV-treatment module (40) with a second UV-light source (42), wherein the second UV-treatment module (40) is connected with the second outlet (16) of the filter module (10) and is adapted to receive filtered liquid from the filter module (10) and to expose said liquid to UV-light from the second UV-light source (42).

2. Apparatus according to claim 1, comprising a first vent (24) between the first outlet (14) of the filter module (10) and the first UV-treatment module (26) and a second vent (39) between the second outlet (16) of the filter module (10) and the second UV-treatment module (40), so that upon an open first vent (24) and a closed second vent (39) liquid from the filter module (10) only reaches the first UV-treatment module (26), and upon an open second vent (39) and closed first vent (24) liquid from the filter module (10) only reaches the second UV-treatment module (40).

3. Apparatus according to claim 1 or 2, further comprising a third UV-treatment module (46) with a third UV-light source, wherein the third UV-treatment module (46) is coupled in series with the second UV-treatment module (40) and is adapted to receive liquid from the second UV-treatment module (40) and to expose said liquid to UV-light from the third UV-light source.

4. Apparatus according to any of the preceding claims, wherein the second UV-treatment module (40) is connected with the first UV-treatment module (26) and adapted to receive liq-

uid from the first UV-treatment module (26) and to expose said liquid to UV-light from the second UV-light source (42).

5. Apparatus according to any of the preceding claims, wherein the inlet (12) of the filter module (10) is connected with the first UV-treatment module (26) and the filter module (10) is adapted to receive liquid from the first UV-treatment module (26).

6. Apparatus according to any of the preceding claims, wherein the filter (18) is positioned in the inside of the filter module (10) and has a cylindrical shape.

7. Apparatus according to any of the preceding claims, further comprising a filter purification device (20), which is adapted to clean the retentate side of the filter (18).

8. Apparatus according to claim 7, wherein the filter purification device (20) comprises at least one suction element (52) for a cleaning of the retentate side of the filter (18) and the suction element (52) is coupled to a pivotable pipe (56).

9. Apparatus according to claim 8, wherein one end of the pivotable pipe is connected with the first outlet (14) for unfiltered liquid of the filter module (10).

10. Apparatus according to any one of claims 7 to 9, wherein the filter purification device (20) comprises at least one first source for ultrasound, which is adapted to expose the filter (18) to ultrasound.

11. Apparatus according to any of the preceding claims, wherein at least one of the UV-treatment modules (26, 40, 46) comprises a second source for ultrasound (30, 44), which is adapted to expose the liquid in the respective UV-treatment module (26, 40, 46) to ultrasound.

Claims

1. An apparatus for the treatment of liquids, comprising:

a filter module with a filter, an inlet for liquid, a first outlet for liquid and a second outlet for filtered liquid, wherein the inlet and the first outlet are positioned on a first side of the filter and the second outlet is positioned on a second side of the filter;

a first UV-treatment module with a first UV-light source, wherein the first UV-treatment module is connected with the first outlet of the filter module and is adapted to receive liquid from the filter module, and to expose said liquid to UV-light from the first UV-light source;

a second UV-treatment module with a second UV-light source, wherein the second UV-treatment module is connected with the second outlet of the filter module and is adapted to receive filtered liquid from the filter module and to expose said liquid to UV-light from the second UV-light source; and

a first vent between the first outlet of the filter module and the first UV-treatment module anda second vent between the second outlet of the filter module and the second UV-treatment module, so that upon an open first vent and a closed second vent liquid from the filter module only reaches the first UV-treatment module, and upon an open second vent and closed first vent liquid from the filter module only reaches the second UV-treatment module,

wherein the second UV-treatment module is connected with the first UV-treatment module and adapted to receive liquid from the first UV-treatment module and to expose said liquid to UV-light from the second UV-light source.

2. The apparatus according to claim 1, further comprising a third UV-treatment module with a third UV-light source, wherein the third UV-treatment module is coupled in series with the second UV-treatment module and is adapted to receive liquid from the second UV-treatment module and to expose said liquid to UV-light from the third UV-light source.

3. The apparatus according to claim 1, wherein the inlet of the filter module is connected with the first UV-treatment module and the filter module is adapted to receive liquid from the first UV-treatment module.

4. The apparatus according to claim 1, wherein the filter is positioned inside the filter module and has a cylindrical shape.

5. The apparatus according to claim 1, further comprising a filter purification device, which is adapted to clean a retentate side of the filter.

6. The apparatus according to claim 5, wherein the filter purification device comprises at least one suction element for a cleaning of the retentate side of the filter and the suction element is coupled to a pivotable pipe.

7. The apparatus according to claim 6, wherein one end of the pivotable pipe is connected with the first outlet for unfiltered liquid of the filter module.

8. The apparatus according to claim 5, wherein the filter purification device comprises at least one first source for ultrasound, which is adapted to expose the filter to ultrasound.

9. The apparatus according to claim 1, wherein at least one of the UV-treatment modules comprises a source for ultrasound, which is adapted to expose the liquid in the respective UV-treatment module to ultrasound.

10. A method for treating a liquid wherein said method comprises introducing the liquid into an apparatus of claim 1.