CLAIMS

Claim 1. An in-pipe purification apparatus comprising: a volume flow rate-securing section which secures a volume flow rate of water and has water permeability; and a water purification section which is located below the volume flow rate-securing section and purifies water supplied from the volume flow rate-securing section,

the volume flow rate-securing section having an opening section through which the water is supplied from the volume flow rate-securing section to the water purification section.

Claim 2. The in-pipe purification apparatus according to claim 1 comprising a double pipe structure formed of an outer pipe and an inner pipe having water permeability, wherein the inside of the inner pipe serves as the volume flow rate-securing section, and the opening between the outer pipe and the inner pipe serves as the water purification section.

Claim 3. The in-pipe purification apparatus according to claim 2, wherein the inner pipe is installed on a mount frame installed in the outer pipe.

Claim 4. The in-pipe purification apparatus according to claim 3, wherein the mount frame is fixed to the outer pipe.

Claim 5. The in-pipe purification apparatus according to claim 3 or 4, wherein the mount frame is fixed to the inner pipe.

Claim 6. The in-pipe purification apparatus according to claim 3, 4, or 5, wherein a contact position of the mount frame and the inner pipe is located lower than the center of the inner pipe.

Claim 7. The in-pipe purification apparatus according to claim 2, 3, 4, 5, or 6, wherein an opening is provided between the upper portion of the inner pipe and the upper portion of the outer pipe.

Claim 8. The in-pipe purification apparatus according to claim 1, comprising a water-permeable partition which divides the inside of the pipe into an upper section and a lower section, wherein the upper section serves as the volume flow rate-securing section, and the lower section serves as the water purification section.

Claim 9. The in-pipe purification apparatus according to claim 1, 2, 3, 4, 5, 6, 7, or 8, wherein microorganism carriers are filled in the water purification section.

Claim 10. The in-pipe purification apparatus according to claim 9, wherein the microorganism carriers are repeatedly immersed in sewage and exposed to air according to the level of water in the pipe.

Claim 11. The in-pipe purification apparatus according to claim 9 or 10, wherein the microorganism carriers are fixed to the water purification section by a carrier holding member having water permeability.

Claim 12. The in-pipe purification apparatus according to claim 11, wherein the carrier holding member is a tubular carrier holding pipe and has functions of

adjusting and holding the capacity of the water purification section.

Claim 13. The in-pipe purification apparatus according to claim 11 or 12, comprising a plurality of the carrier holding members, wherein openings serving as flow passages are provided between the respective carrier holding members.

Claim 14. The in-pipe purification apparatus according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, or 13, wherein a bottom portion continuous opening serving as a flow passage continuous in the pipe axis direction is provided at a bottom portion of the in-pipe purification apparatus.

Claim 15. A connection structure of the in-pipe purification apparatuses according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14,

wherein an in-pipe purification apparatus A on the upstream side and an in-pipe purification apparatus B on the downstream side are connected to each other via a manhole having a water passage, and

the in-pipe purification apparatus A and the in-pipe purification apparatus B are connected to each other in the manhole so that water flowing through the water purification section of the in-pipe purification apparatus A is made to flow into the volume flow rate-securing section of the in-pipe purification apparatus B.

CLAIMS

Claim 1. An in-pipe purification apparatus comprising: a volume flow rate-securing section which secures a volume flow rate of water and has water permeability; and a water purification section which is located below the volume flow rate-securing section and purifies water supplied from the volume flow rate-securing section,

the volume flow rate-securing section having an opening section through which the water is supplied from the volume flow rate-securing section to the water purification section,

comprising a double pipe structure formed of an outer pipe and an inner pipe having water permeability, wherein the inside of the inner pipe serves as the volume flow rate-securing section, and the opening between the outer pipe and the inner pipe serves as the water purification section,

wherein microorganism carriers are filled in the water purification section.

Claim 2. The in-pipe purification apparatus according to claim 1, wherein the inner pipe is installed on a mount frame installed in the outer pipe.

Claim 3. The in-pipe purification apparatus according to claim 2, wherein the mount frame is fixed to the outer pipe.

Claim 4. The in-pipe purification apparatus according to claim 2 or 3, wherein the mount frame is fixed to the inner pipe.

Claim 5. The in-pipe purification apparatus according to claim 2, 3, or 4, wherein a contact position of the mount frame and the inner pipe is located lower than the center of the inner pipe.

Claim 6. The in-pipe purification apparatus according to claim 1, 2, 3, 4, or 5, wherein an opening is provided between the upper portion of the inner pipe and the upper portion of the outer pipe.

Claim 7. An in-pipe purification apparatus comprising: a volume flow rate-securing section which secures a volume flow rate of water and has water permeability; and a water purification section which is located below the volume flow rate-securing section and purifies water supplied from the volume flow rate-securing section,

the volume flow rate-securing section having an opening section through which the water is supplied from the volume flow rate-securing section to the water purification section,

comprising a water-permeable partition which divides the inside of the pipe into an upper section and a lower section, wherein the upper section serves as the volume flow rate-securing section, and the lower section serves as the water purification section,

and wherein microorganism carriers are filled in the water purification section.

Claim 8. The in-pipe purification apparatus according to claim 1 or 7, wherein the microorganism carriers are repeatedly immersed in sewage and exposed to air according to the level of water in the pipe.

Claim 9. The in-pipe purification apparatus according to claim 1, 7 or 8, wherein the microorganism carriers are fixed to the water purification section by a carrier holding member having water permeability.

Claim 10. The in-pipe purification apparatus according to claim 9, wherein the carrier holding member is a tubular carrier holding pipe and has functions of adjusting and holding the capacity of the water purification section.

Claim 11. The in-pipe purification apparatus according to claim 9 or 10, comprising a plurality of the carrier holding members, wherein openings serving as flow passages are provided between the respective carrier holding members.

Claim 12. The in-pipe purification apparatus according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11, wherein a bottom portion continuous opening serving as a flow passage continuous in the pipe axis direction is provided at a bottom portion of the in-pipe purification apparatus.

Claim 13. A connection structure of the in-pipe purification apparatuses according to claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 or 12,

wherein an in-pipe purification apparatus A on the upstream side and an in-pipe purification apparatus B on the downstream side are connected to each other via a manhole having a water passage, and

the in-pipe purification apparatus A and the in-pipe purification apparatus B are connected to each other in the manhole so that water flowing through the water purification section of the in-pipe purification apparatus

A is made to flow into the volume flow rate-securing section of the in-pipe purification apparatus B.