SPECIFICATION

HIGH-TEMPERATURE STEAM-WATER FILTERING UNIT AND COMBINED ~~TYPE~~ HIGH-TEMPERATURE STEAM-WATER FILTERING DEVICE

TECHNICAL FIELD

The present invention belongs to the technical field of steam purification treatment, and particularly relates to a high-temperature steam-water filtering unit and a combined high-temperature steam-water filtering device.

BACKGROUND

During the operation of the boiler, a large amount of high-temperature and high-salinity wastewater is generated and can be discharged after being desalted. The traditional high-salinity wastewater treatment method is relatively complex and high in cost. Since the wastewater has the characteristics of high temperature and high pressure, the wastewater is subjected to flash evaporation and mixing by using saturated steam of a boiler, so that the wastewater is gasified instantly, and then salts which cannot be evaporated in the wastewater are removed through adsorption and filtration. In order to make the treated high-temperature "mixed steam" be continuously supplied to equipment such as a steam turbine or other high-grade heat users for use, the steam needs to be further purified to meet the requirements of the heat users.

Chinese Patent CN 101091848 discloses a combined filter vat, which is characterized in that a plurality of filter screen drums are arranged in a vat body, a liquid inlet groove is used for conveying a filtrate to be filtered to each filter screen drum, and the filtrate flows out from a liquid outlet pipe at the lower part of the vat body after being filtered by the filter screen drums. The whole volume is too large to adapt to mounting

The filter frame 2 is divided into an upper layer and a lower layer which are relatively independent by the interlayer 3, the side wall of the lower layer 21 is provided with a feed inlet 211 from bottom to top, and the side wall of the upper layer 22 is provided with a discharge port 221 from top to bottom; as shown in FIGs. 1 to 3, the feed inlet 211 and the discharge port 221 are not required to be disposed on the same side wall of the filter frame 2, but may be disposed on adjacent or opposite side walls, that is, the feed inlet 211 and the discharge port 221 may be disposed opposite to each other or may be disposed in a staggered manner.

As shown in FIGs. 4-6, the filter 4 comprises a flange bottom plate 42 fixedly mounted on a circular opening of the interlayer 3 by bolts, and a plurality of filter cartridges 41 vertically mounted on the flange bottom plate 42, wherein the plurality of filter cartridges 41 are arranged in parallel at intervals, outlets 411 of the filter cartridges 41 are located above the interlayer 3, the material of the filter cartridges 41 is made of micro-ceramic or stainless steel powder by sintering, the precision of the filter cartridges can be customized as required, and a plurality of inlets of the filter cartridges 41 are located on the side wall and are all located below the interlayer 3. The minimum filtration accuracy of the filter cartridges 41 is typically less than 0.1 μm, which can be selected based on filtration accuracy and grade.

As shown in FIG. 7, the communicating channel 5 is parallel to the filter frame 2, extends along the vertical height direction of the filter frame 2, and is a cavity structure, and the communicating channel 5 is in communication with the discharge port 221.

As shown in FIG. ~~6~~ 8, the steam inlet 6 may be arranged on one side of the filtering unit to be in communication with the feed inlet 211, so that the steam enters the lower layer 21 of the filter frame 2 through the feed inlet 211, then passes through the filter cartridge 41 with its filtration action, enters the upper layer 22 of the filter frame 2 through the outlet 411 of the filter cartridge 41, and then enters the communicating channel 5 through the discharge port 221.

As shown in FIG.~~7~~ 9, two filters 4 may be arranged in parallel, that is, two filters 4 are

mounted on the interlayer 3 of one filter frame 2, the spaces of the upper layer 22 of the interlayer 3 corresponding to the two filters 4 are communicated, and the spaces of the lower layer 21 of the interlayer 3 corresponding to the two filters 4 are also communicated, and at this time, the two filters 4 may share one feed inlet 211, and two discharge ports 221 are respectively arranged at positions corresponding to the two filters.

As shown in FIG. 10, in order to facilitate the cleaning of the filter frames 2, drain outlets 23 are arranged at the bottoms of the filter frames 2; in order to facilitate the maintenance and replacement of the filters 4, access manholes 24 with the same number as the filters 4 are formed in the filter frames 2.

Embodiment I

As shown in FIGs. ~~9-13~~ 10-14, a combined high-temperature steam-water filtering device is shown, comprising two or more filtering units 1, in this embodiment, the number of the filtering units 1 is three, and the filtering units are arranged in series.

The filtering unit 1 comprises a filter frame 2, a filter 4 mounted on the filter frame 2, and a communicating channel 5, wherein the filter frame 2 is divided into an upper layer and a lower layer which are relatively independent by an interlayer 3, the side wall of the lower layer 21 is provided with a feed port 211 from bottom to top, and the side wall of the upper layer 22 is provided with a discharge port 221 from top to bottom, the feed inlet 211 and the discharge port 221 being arranged opposite to each other.

The structure of the filter 4 is the same as that described above and is not be repeated herein.

The communicating channel 5 is parallel to the filter frame 2, extends along the vertical height direction of the filter frame 2, and is a cavity structure, and the communicating channel 5 is in communication with the discharge port 221 and with the feed inlet of an adjacent filtering unit.

As shown in FIG.~~10~~11, the steam inlet 6 is arranged on one side of one filtering unit 1 to be in communication with the feed inlet 211; the steam outlet 7 is arranged at a top

of the communicating channel 5 at a tail end, and may also, in other embodiments, be arranged directly at the discharge port of the filtering unit 1 at a tail end, being in communication therewith.

As shown by the arrows in FIG. ~~10~~ 11, the steam enters the lower layer 21 of the filter frame 2 of the first filtering unit 1 from the steam inlet 6 after passing through the feed inlet 211, then passes through the filter cartridge 41 with its filtration action, enters the upper layer 22 of the filter frame 2 after passing through the outlet 411 of the filter cartridge 41, and then enters the communicating channel 5 after passing through the discharge port 221; then the steam enters an adjacent filtering unit from the communicating channel 5 after passing through the feed inlet of the adjacent filtering unit for filtering, with the filtration repeated for three times, and then is discharged from the steam outlet 7.

In order to conveniently find whether the filter cartridge 41 is blocked in time, a pressure sensor 8 is mounted between the feed inlet 211 and the discharge port 221 of each filtering unit 1 and is used for detecting and sending a signal to a control system at any time; when the filter cartridge 41 is blocked, the differential pressure between the feed inlet 211 and the discharge port 221 of each filtering unit 1 is increased, and when the differential pressure reaches a set value, the control system receives the signal and gives an alarm and terminates the operation of the equipment; the pressure sensor 8 is typically constituted by a pressure transmitter or an electric contact pressure gauge.

In order to facilitate transportation after assembly or to limit a plurality of filtering units 1, an outer shell 9 may be arranged around the plurality of filtering units 1 in a sleeving manner, and the shape of the outer shell 9 may be a cube or a cylinder, and the size of the outer shell is determined by the number and combination mode of the filtering units 1.

In order to facilitate the maintenance and replacement of the filters 4, access manholes 24 with the same number as the filters 4 are formed in the filter frame 2; the access manholes 24 are mounted, right above the filtering units 1, on the outer shell 9, and