May 27, 1930. J. H. STOCKHOLDER 1,760,216

LIQUID PURIFYING DEVICE

Filed Dec. 26, 1928

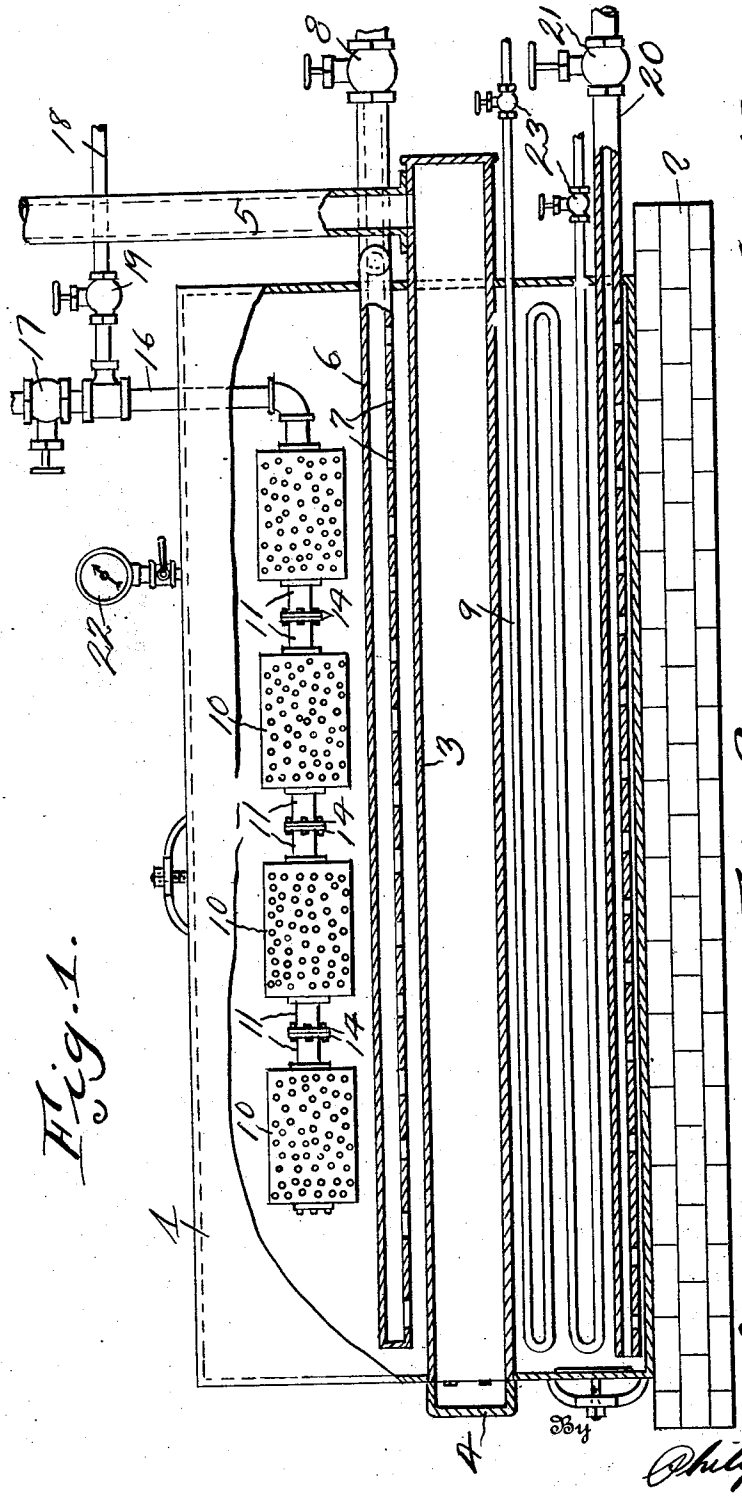


Fig. 1.

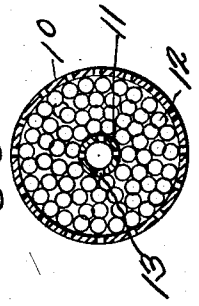


Fig. 3.

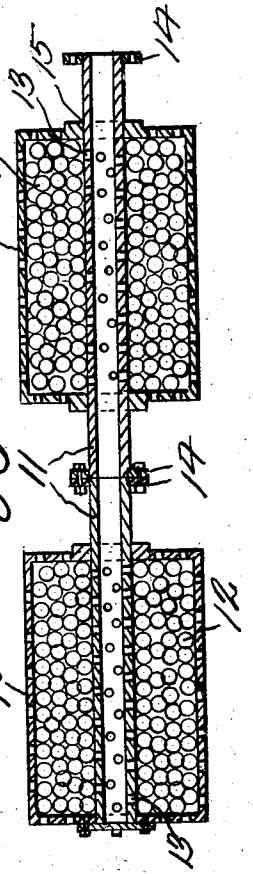


Fig. 2.

Inventor
John H. Stockholder

By Philip A. Ferrell
Attorney

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UNITED STATES PATENT OFFICE

JOHN H. STOCKHOLDER, OF NEW ORLEANS, LOUISIANA, ASSIGNOR TO MARY STOCKHOLDER, OF NEW ORLEANS, LOUISIANA

LIQUID-PURIFYING DEVICE

Application filed December 26, 1928. Serial No. 328,564.

The invention relates to liquid purifying devices and has for its object to provide a device of this character, in which various liquids, for instance oil and water, may be purified in a manner whereby the impurities will drop to the bottom of the boiler and the purified liquid will be forced under pressure through perforated drums surrounding a perforated discharge pipe and in which drums straining elements are disposed, for instance marbles.

A further object is to dispose the intake pipe above the fire box and to provide said pipe with perforations whereby the liquid will be forced downwardly against the fire box for heating purposes, and to provide a heating coil in the boiler beneath the fire box for heating the heavy liquid for forcing the light pure liquids therefrom.

A further object is to provide an apertured sediment discharge pipe in the bottom of the boiler and provided with a valve and a valve carried by the purified liquid discharge pipe which may be closed when the sediment pipe valve is opened, and means whereby steam may be forced through the straining cylinder and discharge pipe for cleaning the cylinders and for forcing the sediment through the sediment discharge pipe.

A further object is to extend the fire box entirely through the tank whereby a maximum heating efficiency is obtained.

A further object is to form the purified liquid discharge pipe from a plurality of sections having perforations and perforated drums around the perforated portions of the pipe sections and having straining members therein.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawing, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawing:

Figure 1 is a vertical longitudianl sectional view through the purifying device, parts being shown in elevation to better illustrate the structure.

Figure 2 is a vertical longitudinal sectional view through two of the strainer drums.

Figure 3 is a vertical transverse sectional view through one of the strainer drums.

Referring to the drawing, the numeral 1 designates the tank which is preferably cylindrical shaped, and which tank is mounted on a conventional form of foundation 2. Extending longitudinally through the tank 1 is a fire box 3 having a door 4 at one end thereof and having its other end terminating beyond the other end of the tank, and provided with a smoke stack 5, through which the products of combustion pass to the atmosphere. The fire box 3 acts as the main heating element of the device. Disposed above the fire box 3 is an intake pipe 6 having its under side provided with apertures 7 through which the liquid to be purified is discharged downwardly against the fire box 3 for heating purposes, and which heating causes the liquid to be purified whereby the lighter liquids will rise and the heavier liquids will fall to the bottom of the tank. The inlet pipe 6 is provided with a valve 8 for regulating the amount of liquid supply and for cutting off the supply of liquid for purposes hereinafter set forth. Disposed beneath the fire box 3 is a steam heating coil 9 which will heat the heavier liquids for separating the lighter liquids therefrom for increasing the efficiency of the device, and which lighter liquids will rise into the upper portion of the boiler, and as there is a constant pressure incident to the heating operation, and to the force supply through the pipe 6, said lighter liquids, which have been purified, will be forced through the perforated drums 10, which surround the discharge pipe sections 11 and will pass through the straining elements 12, which are preferably marbles, and thence through the perforations 13 of the pipe sections 11.

The pipe sections 11 are preferably provided with removable flanges 14, which are bolted together, thereby forming a continuous discharge pipe. Drums 12 may be brazed

or otherwise secured at 15 to the sections for preventing axial displacement of the drums on the section. One of the sections 11 terminates in an upwardly extending discharge pipe 16 having a valve 17 therein, which valve is closed under certain operations hereinafter set forth. Connected to the pipe 16 below the valve 17 is a steam pipe 18, and which steam pipe is provided with a valve 19, which valve 19 is closed under ordinary conditions of operation, but is opened during a drum cleaning operation hereinafter set forth.

Extending longitudinally through the lower end of the tank 1 is a perforated blow off pipe 20, through which heavy sediment is discharged when the valve 21 is opened and the valve 19 opened during the drum cleaning operation, and at which time the valve 17 is closed. When it is desired to clean the accumulated foreign matter from the strainer drums 10 the valve 8 is closed, which will cut off the supply of liquid to the tank, the valve 17 closed and the valve 21 opened, after which the valve 19 is opened, which will allow steam to pass through pipe 18, thence through pipe 16, pipe sections 11, into the drums 10, and thence into the tank. This pressure will create a pressure in the tank which will cause the sediment in the bottom of the tank to pass through the perforated sediment discharge pipe 20. After the drum cleaning and sediment cleaning operation, valves 19 and 21 are closed and then valves 18 and 17 are again opened for the purifying operation.

From the above it will be seen that a liquid purifying device is provided, which device is simple in construction, provided with means whereby the fire box is used for a heating element, means whereby liquids entering the device are projected against the fire box for maximum heating purposes, a heating coil for the heavier liquids and perforated strainer drums through which the purified liquids are forced to a discharge pipe. It will also be seen that means is provided whereby steam may be forced through the strainer drums in a reverse direction for cleaning the same and the pressure from the steam is utilized for forcing heavy sediment and impure liquid through the sediment discharge pipe.

Tank 1 is provided with a back pressure gage by means of which the pressure within the tank may be ascertained and the heating coil 9 is provided with valves 23, whereby the amount of steam passing therethrough may be regulated and controlled.

The invention having been set forth what is claimed as new and useful is:—

1. A liquid purifying device comprising a tank, a fire box extending through said tank, a valve controlled perforated intake pipe in the tank above the fire box and having its perforations downwardly disposed, a purified liquid discharge pipe above the intake pipe, said discharge pipe being formed from a plurality of sections, perforated drums surrounding said sections, said sections being perforated within the drums and straining elements within the drums around the sections.

2. A liquid purifying device comprising a tank, a perforated intake pipe extending into said tank, a fire box in the tank and against which the intake pipe discharges, a valve carried by said intake pipe, a discharge pipe, a valve carried by the discharge pipe, straining elements carried by the discharge pipe within the tank, a heating element within the tank, a sediment discharge pipe within the tank and having perforations, a valve carried by the sediment pipe and means whereby fluid force may be directed in reverse direction through the discharge pipe and strainer elements and simultaneously through the sediment discharge pipe.

In testimony whereof I hereunto affix my signature.

JOHN H. STOCKHOLDER.