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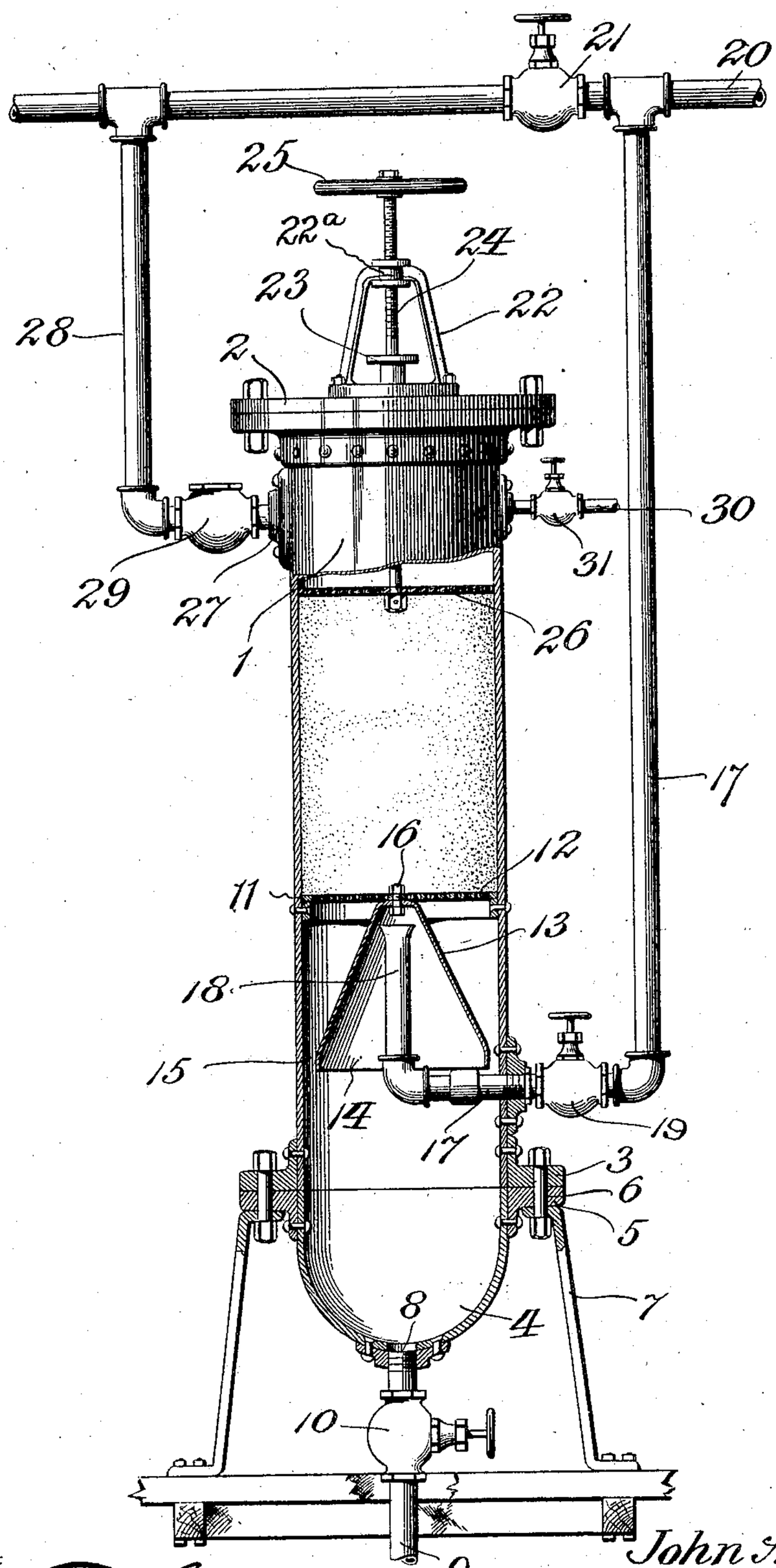
J. A. COTTER.

FILTER.

APPLICATION FILED JAN. 30, 1908.



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FILTER.

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To all whom it may concern:

Be it known that I, JOHN A. COTTER, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and useful Filter, of which the following is a specification.

This invention relates to improvements in filters; and the objects of the invention are to provide a filter especially adapted for filtering the feed-water used in boilers, and hence designed for use in connection with a boiler and its feed-water heater, whereby feed-water so heated, and which may be taken from any source of supply, as for instance, a muddy river, is thoroughly filtered before being fed to the boiler.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

Referring to the drawing, which represents in side elevation, partly in section, a filter embodying my invention, 1 designates the cylindrical body-portion of the filter-case, the upper end of which is flanged and has bolted thereto a removable head 2. The bottom or lower end of the filter-case is also flanged, as at 3, and to the same is bolted the upper flanged end of a substantially hemispherical catch-basin or chamber 4, the upper edge of the basin being similarly flanged, as at 5, to receive the securing-bolts 6, whereby the basin and filter-body are removably secured together. The flange 5 of the catch-basin may also be connected to the upper ends of suitable supporting-legs 7 by means of the before-mentioned bolts 6, the latter resting upon any suitable foundation or support. The lower end of the basin 4 is provided with a drain-opening 8, from which leads a drain-pipe 9, normally closed by a valve 10.

At an intermediate point the filter-body is provided with an internal supporting-ring 11, the same being bolted in position, and upon the ring is removably seated and rests a circular perforated plate 12. Depending from the center of this plate, or it may be supported in some other suitable manner within the filter-body or case, is a hollow cone-shaped separator 13, the base of the same being of less diameter than the filter-body or case, and preferably terminating in a cylindrical depending portion 14. The base of this cone-shaped separator is of somewhat less diameter than the filter-body or case and combines with the same to form an annular water-passage 15. In the present instance, a bolt, 16, passing through and depending from the center of the plate 12, serves as a means for suspending the cone 13.

At a point below the cone an inlet-pipe 17 enters the filter, and to the inner end thereof is fitted a nozzle 18, preferably flared at its delivery-end, which latter is situated at the center and immediately below the crown of the cone-shaped separator 13. A valve 19 controls the supply of water to the nozzle. The inlet-pipe 17 is connected to or tapped into the feed-water pipe 20, and between the point of connection or tapping aforesaid and the boiler, the said pipe 20 is provided with a valve 21, by which the feed-water may be by-passed direct from the feed-water heater to the boiler, or diverted to the filter, as desired.

Mounted upon the removable head 2 of the filter, is a spider 22, having a suitable bearing 22^a in vertical alinement with a stuffing-box 23, located in the center of the head 2. Threaded through the bearing 22^a and passing downwardly through the stuffing-box into the filter, is a screw 24, at the upper end of which is located a hand-wheel 25, by which the screw may be regulated. At the lower end of the screw, and therefore, within the filter, is swiveled a follower-plate 26. This follower-plate, like the stationary plate 12, to which it is opposed, is provided throughout its area with perforations. The intermediate space thus produced by the two heads is filled with any suitable filtering media, and the latter, as will be apparent, is held firmly in place. The filter is further provided with an outlet-opening 27, near its upper end, and from the same leads a delivery-pipe 28, the outer end of which is connected to the feed-water pipe 20, between the boiler (not shown), and the by-pass valve 21. The pipe 28 is also provided near its connection with the filter with an outwardly opening check-valve 29. This completes the invention with the exception that it is preferred to connect the steam-space of the boiler with the upper end of the filter by a steam-pipe 30, in which is located a valve 31, whereby, when desired, live steam under pressure may be admitted to the upper end of the filter direct from the boiler.

In operating the filter, the valve 21 is closed and the valve 19 opened, and water at the boiling point passes from the feed-water heater, through the pipes 20, and 17, to the

nozzle 18, the latter delivering the boiling water in a flaring stream and with considerable force against the underside of the crown of the cone-shaped separator, whereby the mud and other foreign matter is separated from the water and precipitated down the inclined wall of the cone to the vertical flange thereof and dropped or deposited into the catch-basin 4, in which latter it is collected and remains until discharged. The latter operation—discharging this deposit—may be accomplished by opening the drain-cock or valve 10. After being thus liberated from the foreign matter the water rises through the annular passage 15 and is forced upwardly through the perforated plate 12, the filtering media, by which latter means it is clarified, and through the plate 26, into the upper end of the filter. From this point the filtered water passes through the outwardly opening check-valve, the pipe 28 and pipe 20, (at the opposite side of the valve 21 at which it entered), to the steam-boiler. As will be readily apparent, any ordinary muddy river water otherwise unfit for use, may thus be successfully filtered and prepared for use in steam-boilers.

At any time the filter may be cut out and the water caused to pass by the same simply by closing the valve 19 and opening the valve 21. The valve 29 being an outwardly opening check-valve, prevents the water from entering the upper end of the filter. In fact the filter may be taken either entirely or partially apart, for the purposes of repair, cleaning, &c., without disturbing in the least the water supply-system to the steam-boiler.

By opening the valve 31, live steam from the boiler may be injected into the upper end of the filter through the pipe 30, the steam being forced downwardly under pressure through the perforated plate 26, the filtering media, the plate 12, and over all parts of the filter below the latter. In this manner the filter-bed or filtering media as well as the parts composing the interior of the filter, may all be thoroughly cleansed, the foreign matter collected in the filter-bed being blown out and down into the catch-basin where it is collected and immediately discharged through the drain-pipe, the valve in the latter having been previously opened for this purpose. In order that the filtering media or particles composing the same may be rendered more accessible to the cleansing action of the live steam, the pressure of the follower-plate thereon is removed, which permits the particles to be agitated and cleansed of all adhering matter. After cleansing, the pressure of the follower-plate may be again renewed. It will be observed that in the operation of cleansing through the agency of live-steam under pressure, the check-valve will be prevented from opening by reason of the pressure against the back or outside of the same inasmuch as pipes 20 and 30 both lead from the boiler and the pressure is therefore about equalized. It will further be observed that where extensive cleaning, renewing of filtering media, or repairing is necessary, the filter may be readily cut out of the system and the parts composing the filter readily disconnected and separated.

Having described my invention, what I claim, is:

The combination, in a filter of the class described, of a filter case, a body of filtering media located therein, a hollow conical separator or precipitator located below said filtering media, and a supply-pipe entering the filter-case and provided with a flared nozzle extending into and under the crown of said separator or precipitator.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN A. COTTER.

Witnesses:
W. S. DUVALL,
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