F. E. ACKERMAN.

FEED WATER PURIFIER.

APPLICATION FILED MAY 18, 1911.

1,051,182.

Patented Jan. 21, 1913.

Fig. 1.

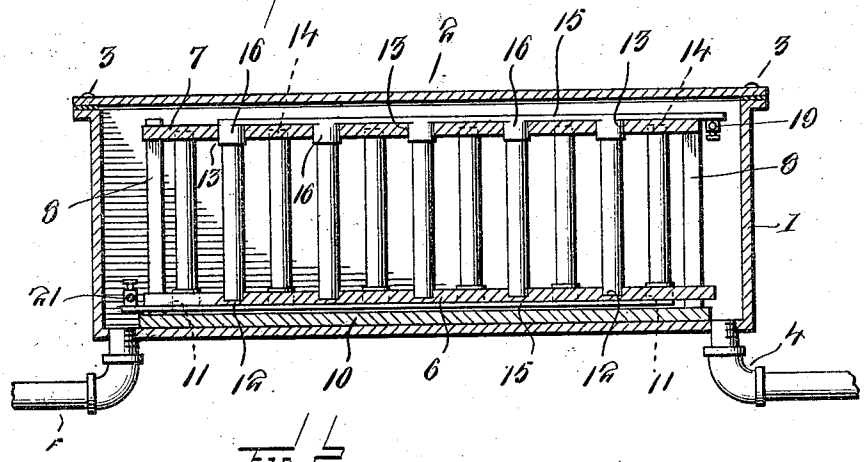


Fig. 2.

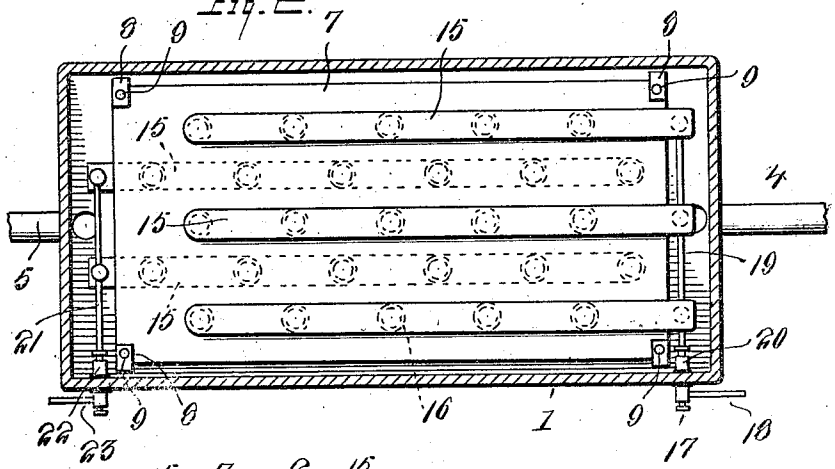
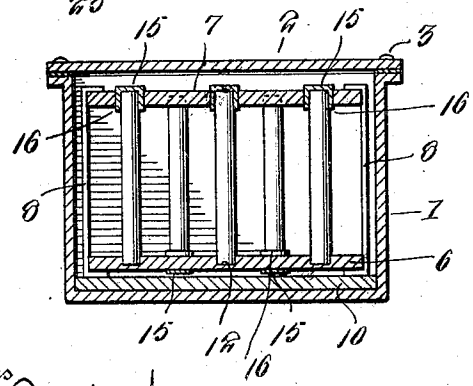


Fig. 3.



Witnesses

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FEED-WATER PURIFIER.

1,051,182. Specification of Letters Patent. Patented Jan. 21, 1913.

Application filed May 18, 1911. Serial No. 628,016.

To all whom it may concern:

Be it known that I, FRANK E. ACKERMAN, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented new and useful Improvements in Feed-Water Purifiers, of which the following is a specification.

This invention relates to water purifying apparatus and has particular application to an apparatus for purifying the feed water for boilers.

In carrying out my invention, it is my purpose to provide a receptacle through which the water for the boiler is adapted to pass, and in such passage said water is subjected to the action of an electric current passing through a grid formed with a plurality of carbon electrodes, whereby the water is purified of scale-forming matter, and may be conducted directly to the boiler.

Still a further object of my invention is to provide a water purifying apparatus, whereby the water in any desired quantity may be rapidly, quickly and economically treated and purified, and it is also my purpose to produce an apparatus embracing the desired features of simplicity, durability and efficiency.

With the above-recited objects and others of a similar nature in view, the invention consists in the construction, combination and arrangement of parts, set forth in and falling within the scope of the appended claims.

In the accompanying drawing:—Figure 1 is a vertical longitudinal sectional view, taken through the apparatus embodying my invention. Fig. 2 is a top plan view, with the cover removed. Fig. 3 is a transverse vertical sectional view.

In the present instance, I have shown the preferred form of my apparatus wherein I employ a suitable form of receptacle having an inlet or supply pipe leading from a suitable source, and an outlet pipe preferably leading directly to the boiler, so that after the water is admitted to the tank or receptacle it is not exposed to the air in its passage to the boiler, and thus retains the gases which are liberated by the electrolytic action caused by the passage of an electrical current through the water within the tank.

Referring now to the accompanying drawing in detail, the numeral 1 designates a tank of any suitable size and form and is preferably constructed of metal, said tank being provided with a suitable cover 2 secured by bolts 3 or otherwise, so that a completely closed receptacle is formed. Leading to this tank or receptacle from any suitable source of supply is an inlet pipe 4, while an outlet pipe 5 leads from said tank to the boiler, (not shown). Within this tank is located my apparatus for setting up electrolytic action, and in the present instance comprises a base board 6, and a top board 7, the two boards being spaced apart a suitable distance, and preferably arranged parallel one to the other, the boards being connected at the four corners by vertically arranged U-shaped connecting strips 8 which are fastened by rivets or bolts 9. Resting upon the bottom of the tank, and between the base board 6 of the frame formed as just described is a board or plate 10 of wood or other suitable material. The base board 6 of the frame is provided with longitudinally extending rows of apertures 11, suitably spaced apart, while between each row of apertures, is a row of recesses 12, so that the rows of apertures and recesses alternate. Similarly, the top board is provided with longitudinally extending rows of apertures 13, and rows of recesses 14 arranged between or alternating with rows of apertures.

The numeral 15 designates a metallic conducting strip, preferably of copper, carrying sockets 16. At the bottom of the frame, I employ two of these strips 15, the sockets thereof projecting through the apertures in the base board, as clearly shown in Figs. 1 and 3. At the top of the board of the frame, I employ three of these strips 15, the sockets 16 thereof projecting downward through the apertures 13, and in the direction reverse to the sockets projecting through the board. Each of the sockets 16 carries a carbon stick or electrode extending vertically between the top and bottom boards of the frame, the carbons carried by the sockets at the top board having their lower or free ends fitted into the recesses 12 of the base board, while the carbons carried by the sockets 16 at the base board extend upwardly and have their upper ends seated in the recesses 14 in the top board. Connected to the tank near the top thereof is a binding post 17 to which is connected the cable or wire 18 leading from a suitable source of electrical energy while 19 designates a conductor bar or wire connecting the ends of the top bars 15, said conductor 19 being connected to the binding post at

20. Similarly the lower conducting strips 15 are connected by the conductor 21 terminating at the binding post 22, from which leads the conductor wire 23 of the electric circuit. It will thus be noted that when the current is turned on, it flows through the conductor 18 and to the frame carrying the electrodes within the tank. The current in its passage from the conductor 18 to the return conductor 23 passes through the frame and through the body of water between the electrodes, thereby setting up electrolytic action, causing the formation of gases within the water and destroying or purifying the water of the scale-forming solids. Should any solid matter pass from the tank to the boiler, it will be in a precipitated state and will not form any incrustation within the boiler, but may be easily removed from the latter through the blow-off pipe. If desired, the water as it comes from the purifying tank may be passed through a suitable filtering medium so as to prevent the percipitated matter from entering the boiler with the water.

It will be noted that I have provided an exceedingly simple yet effective means for purifying water for boiler use, and one which requires a comparatively small electrode surface for the treatment of a given amount of water, thus necessitating the use of a minimum amount of electric current so that the cost of maintenance and use of the apparatus is relatively low.

While I have herein shown and described one particular embodiment of my invention, I wish it to be understood that I do not confine myself to all the precise details herein set forth, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims. Furthermore, it will be seen that by arranging all of the carbon electrodes as shown in my preferred form, the electric current is thoroughly distributed through the water, and when desired the apparatus may be easily and readily taken apart.

I claim:—

1. In a water purifying apparatus, the combination with a tank having an inlet and an outlet at the opposite ends thereof, a cover for said tank, a frame within the tank between the inlet and outlet thereof, said frame comprising top and bottom members, connections holding said members spaced apart, each of said members having apertures formed therein and recesses also formed therein, metallic strips provided with sockets projecting through the apertures, an electrode carried by each socket at one end and having the opposite end thereof extending into the alining recess of the opposite member and arranged transversely of the passage of the water through the tank, and electric conductors connected to the frame.

2. In a water purifying apparatus, the combination with a tank having an inlet and an outlet, of a frame within the tank between the inlet and outlet thereof, said frame comprising top and bottom members, connections at the ends of said members for holding the same spaced apart, each of said members having rows of apertures formed therein and rows of recesses also formed therein, sockets projecting through the rows of apertures, an electrode for each socket connected at one end to its socket and having the opposite end extending into the adjacent recess of the opposite member and arranged transversely of the passage of the water through the tank, and electric conductors connected to the frame.

3. In a water purifying apparatus, the combination with a tank having an inlet and an outlet, a cover for said tank, a baseboard within the tank, a frame resting upon said baseboard between the inlet and outlet of the tank and comprising top and bottom plates and U-shaped connecting strips between the corners of the plates, each of said plates having rows of apertures therein alternating with rows of recesses also formed therein, the apertures and recesses of one plate registering with the recesses and apertures respectively of the adjacent plate, metallic strips provided with sockets formed integral therewith, said sockets being projected through the apertures in the respective plates, electrodes fastened in the sockets and disposed transversely of the passage of the water through the tank, the free ends of the electrodes projecting into the recesses in the opposite member, and electric conductors connected to the frame.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK E. ACKERMAN.

Witnesses:
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