W. P. WIEMANN.

DEVICE FOR PURIFYING WATER IN STEAM BOILERS.

APPLICATION FILED MAY 12, 1908.

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*Fig. 1.*

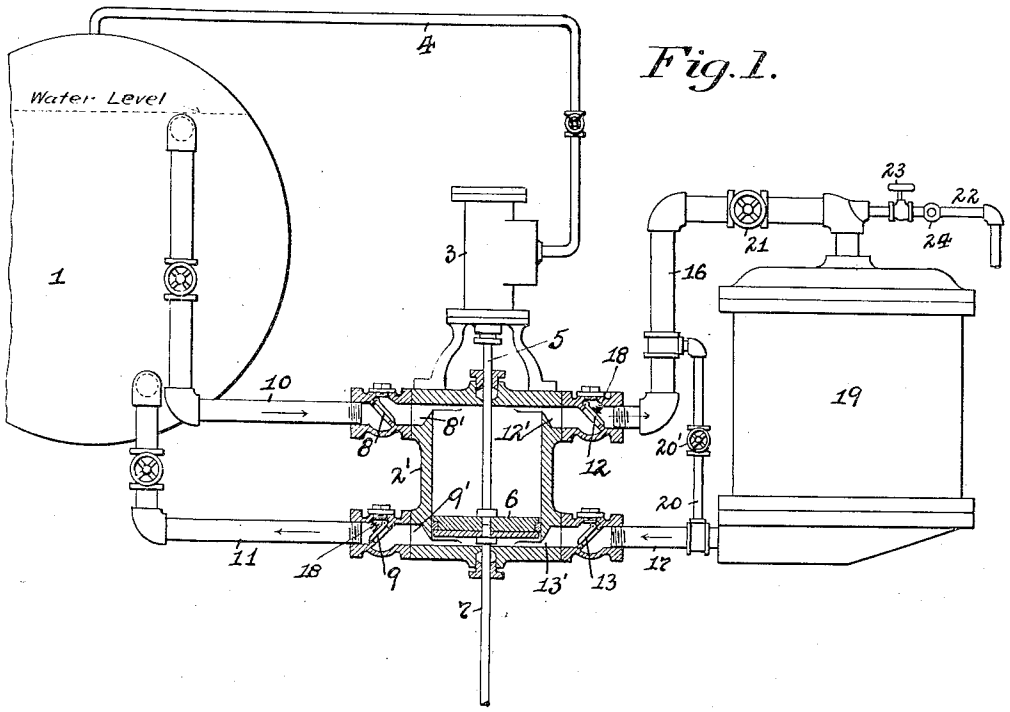
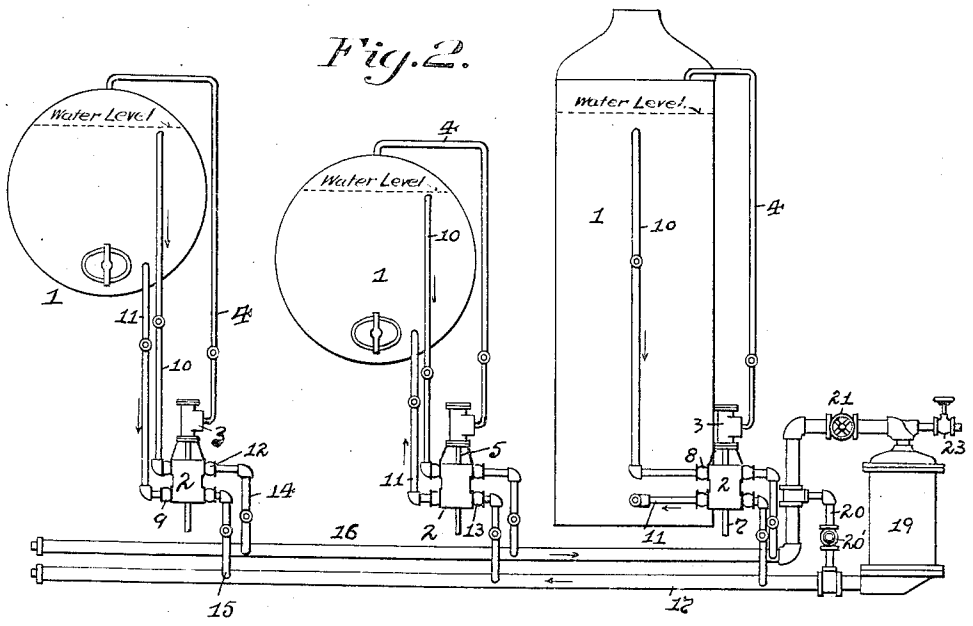



*Fig. 2.*




WITNESSES

Walter Samariss

O. L. Thompson

INVENTOR

William P. Wiemann,

By J. N. Cooke

Attorney.

# UNITED STATES PATENT OFFICE.

WILLIAM P. WIEMANN, OF PITTSBURG, PENNSYLVANIA.

## DEVICE FOR PURIFYING WATER IN STEAM-BOILERS.

No. 903,931. Specification of Letters Patent. Patented Nov. 17, 1908.

Application filed May 12, 1908. Serial No. 432,458.

*To all whom it may concern:*

Be it known that I, WILLIAM P. WIEMANN, a resident of Pittsburg, (North Side,) in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Devices for Purifying Water in Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a device for purifying water in steam boilers, and has general reference to such device as in U. S. Letters Patent granted to me on July 24, 1906, No. 826,811, for water purifying device for steam boilers.

The object of this invention is to provide a cheap, simple and efficient device for purifying the water in a number of steam boilers simultaneously by circulating the water from all the boilers through a single filter, and at the same time not interfere with the water level in any boiler connected thereto.

To these ends my invention consists, generally stated, in the novel arrangement, construction and combination of parts, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved device for purifying water in steam boilers, I will describe the same more fully, referring to the accompanying drawing, in which—

Figure 1 is an elevation of my improved device for purifying water and showing the same applied to a boiler and with some of the parts in section. Fig. 2 is a side elevation of the device and showing the same applied to a number of different types of boilers of different heights and water levels.

Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing, 1 represents a steam boiler, and as shown in Fig. 2 a number of such boilers can be placed in different positions and at different heights. A pump 2 is connected to each of the boilers 1 and is operated through a steam head 3 of the pump, which is connected by a valve controlled pipe 4 to the steam space of its boiler for the operation of the pump by its usual reciprocating motion to the piston rod 5 carrying the piston 6 in the pump cylinder 2′, and said rod is provided with the tail-rod 7 for giving the same amount of displacement in its end of the cylinder as the rod 5 does in the other end, thereby permitting the same amount of water in one end of said cylinder as in the other end. On one side of and at each end of the pump cylinder 2′ are the check valves 8 and 9, which connect with ports 8′ and 9′ in the said cylinder and with the valve controlled pipes 10 and 11 connected respectively to the upper and lower parts of the boiler or within the water space of the same, and on the opposite side of the said cylinder and at each end thereof are the check valves 12 and 13, which connect with ports 12′ and 13′ in said cylinder and with valve controlled pipes 14 and 15 connected respectively to the circulating filter lines 16 and 17. These valves are of the ordinary check type and the valves 9 and 12 are provided with springs 18 bearing against the outer face of the same to hold the same normally closed, and against a pressure greater than that caused by the difference in the water levels of the several boilers.

The pipes 16 and 17 connect respectively with the upper and lower ends of a filter 19, which is of the ordinary sand type, having the flow downward, and said pipes have a by-pass 20 controlled by a valve 20′ connected to and between the same. A valve 21 is connected to the pipe 16 adjacent to the filter 19 and leading off from said pipe and adjacent to said filter is the blow-off pipe 22, which has a valve 23 thereon and a sight 24 connected thereto for noting the condition of water passing through said blow-off pipe.

The operation of my improved device for purifying water in steam boilers is as follows:—When the pumps 2 are in action from the boilers 1 the downward movement of the piston 6 in said pumps draws the water from its boiler through the pipe 10 and valve 8 into the upper end of the cylinder 2′ of said pumps, and returns the same amount from the lower end of the cylinder to said boiler through the valve 9 and pipe 11. The upstroke of the piston 6 in the pump 2 for its particular boiler 1 draws water from the filter 19 through the pipe 17, pipe 15, and valve 13 into the lower end of the cylinder 2′ of said pumps, and returns the same amount from the upper end of said cylinder to said

filter through the valve 12, and pipes 14 and 16. This will thus cause one end of the pump to circulate impure water from the boiler to the filter 19 and the other end of the pump to circulate an equal amount of purified water from said filter to the boiler, while a single stroke of the pump exchanges an equal amount of water either with the boiler or with said filter. The springs 18 arranged in connection with valves 9 and 12 will prevent the flow of water from or to another boiler having a higher or lower water level, and these valves act as outlet or discharge valves from the pumps.

When it is desired to clean the filter 19, the by-pass 20 is opened by its valve 20′, valve 21 is closed, and valve 23 is opened to permit the water to flow from the boilers through the pipe 10 and valve 8 into the pumps 2, and thence from said pumps through the valve 12, pipes 14 and 16 and by-pass 20 to the bottom of the filter 19 and be discharged at the blow-off pipe 22 at the top of said filter, which is a reverse flow, and when the water has become clear, which may be seen through the sight 24 in said pipe 22, the valve 20′ in the by-pass 20 and valve 23 is closed, valve 21 opened, and then the circulation can continue, as hereinbefore described.

It will be evident that all of the pumps 2 will circulate the water independently from and to their own boiler 1, and collectively to and from the filter 19, although it must be understood that the same water that leaves a boiler will not always return to that particular boiler, as it may find its way through several boilers before it evaporates, which is a distinct advantage in a large plant, as it will prevent accumulation of water in any one boiler, and will force an even water condition of circulation throughout the system.

It will be obvious that my improved device can be used on a boiler set somewhat high or low, on different sizes and types of boilers connected in the system and necessarily carrying a different relative water level, and on any boiler in the system that is fired harder than the others, in which case it would cause unbalancing when two boilers are connected with a drum or pipe. No part of the system can rob any other part of the same, as all the pumps contribute to the filter and each pump contributes to its own boiler only.

It will thus be seen that with my improved device each boiler is operated independently of all the rest and a single filter will operate the entire system, while any number or type of boilers may be added to the system, and at different distances apart from the filter. As the pumps employed are of low duty type, no injury can occur to them or system if main circulation through the filter be entirely stopped, and a shut down of filter or pump would not unbalance the water level in the boiler. Any pump or boiler in the system may be shut down without interfering with the others in the same, and the filter capacity may be added to without changes in the balance of the system. Different sized pumps suited to different sized boilers in the same system may be used and boilers at varied distances may be added to the system if desired. The water in all the boilers will be purified continuously and an even condition in all the boilers in regard to the accumulation of scaling matter is maintained in the use of the system. The pump works on both circulating lines, which insures same flow in both directions, and such pump being of a reciprocating type will enable the same to be run at a low speed, whereas in other pumps, such as a rotary, and connected to one line only, the speed is necessarily high. This arrangement also permits the use of more than one boiler on a single filter, and as filters are hard to keep clean, it will be obvious that a single filter is easier to keep clean than a number of them.

What I claim as my invention and desire to secure by Letters Patent, is:—

1. In an apparatus for purifying water in steam boilers, the combination of a series of boilers, a filter having two main circulating lines, and a circulating pump connected to two independent lines connected to each boiler and to said main lines.

2. In an apparatus for purifying water in steam boilers, the combination of a series of boilers and a filter, and means between said boilers and filter for circulating a fixed quantity of water from and to each individual boiler simultaneously through the filter to purify the same.

3. In an apparatus for purifying water in steam boilers, the combination of a series of boilers, a filter having main circulating lines connected thereto, and means connected between each boiler and said lines for pumping an equal amount of impure and pure water from and to each boiler.

4. In an apparatus for purifying water in steam boilers, the combination of a series of boilers, a filter having boiler circulating pipes, and an independent circulating pump connected to said pipes and having spring operated discharge valves to prevent the flow of water from one boiler to another and permit the flow of the water through the pump by the movement of the pump piston.

5. In an apparatus for purifying water in steam boilers, the combination of a series of boilers, a filter having circulating lines connected thereto, and means connected to said lines for circulating the boiler water through said filter and for maintaining the proper height of the water levels in said boilers.

6. In an apparatus for purifying water in steam boilers, the combination of a filter, a series of boilers, and an independent circulating pump connected to each of said boilers

for circulating the water from and to the boilers separately and to and from the filter collectively.

7. In an apparatus for purifying water in steam boilers, the combination of a filter, a series of boilers, each having independent circulating pumps, and valve controlled circulating lines connected to said filter and boilers whereby any or all of said pumps may be shut down.

In testimony whereof, I, the said WILLIAM P. WIEMANN, have hereunto set my hand.

WILLIAM P. WIEMANN.

Witnesses:

J. N. COOKE,

JAMES L. WEHN.