(No Model.) 2 Sheets—Sheet 1.

S. L. WEST.

APPARATUS FOR PURIFYING, STERILIZING, AND FILTERING DRINKING WATER OR OTHER POTABLE LIQUIDS.

No. 491,828. Patented Feb. 14, 1893.

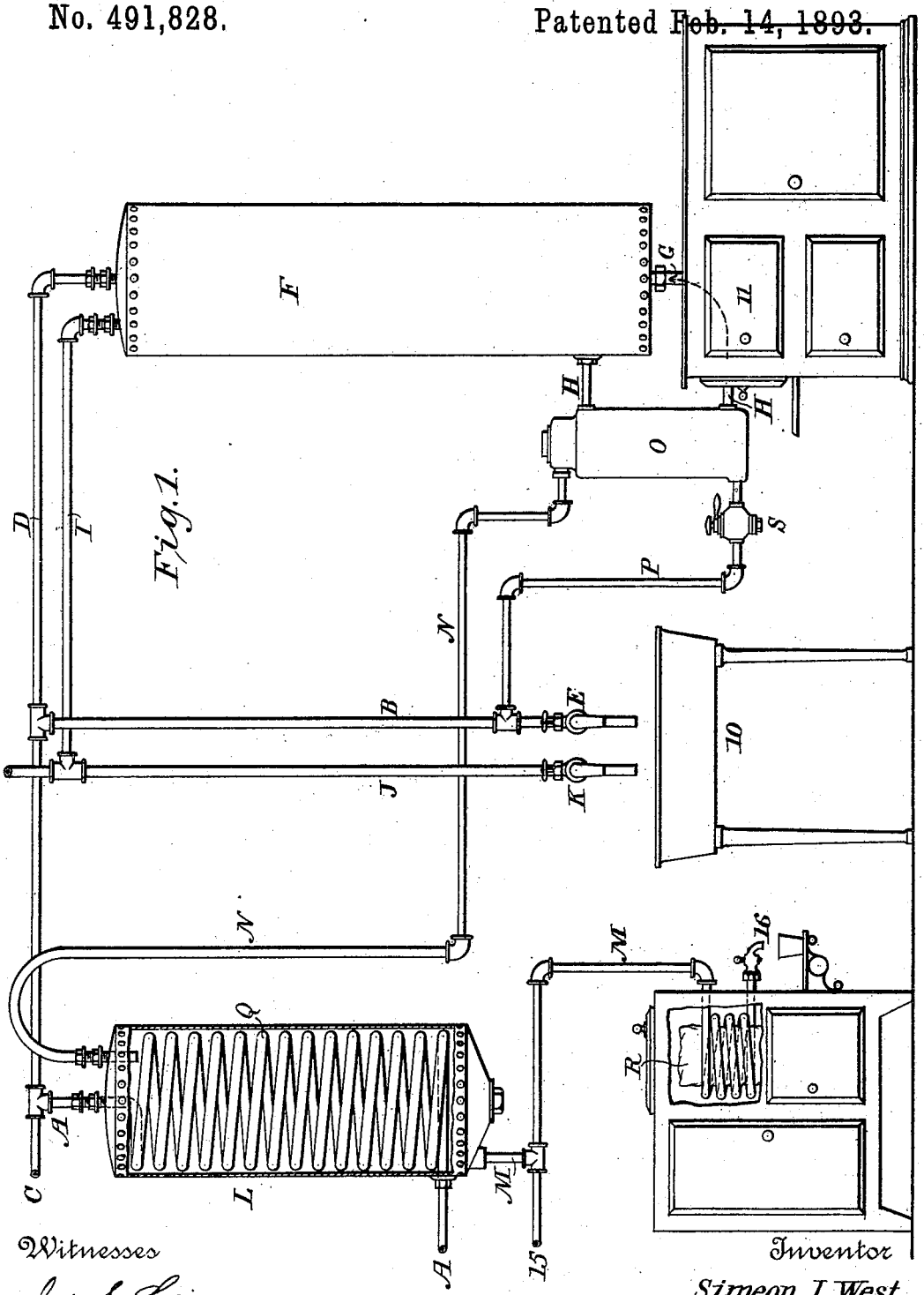

Fig. 1.

Witnesses
Jos. S. Latimer
Carleton & Snell.

Inventor
Simeon L. West
by Arthur O. Brown
his Attorney

(No Model.) 2 Sheets—Sheet 2.

S. L. WEST.

APPARATUS FOR PURIFYING, STERILIZING, AND FILTERING DRINKING WATER OR OTHER POTABLE LIQUIDS.

No. 491,828. Patented Feb. 14, 1893.

Fig. 2.

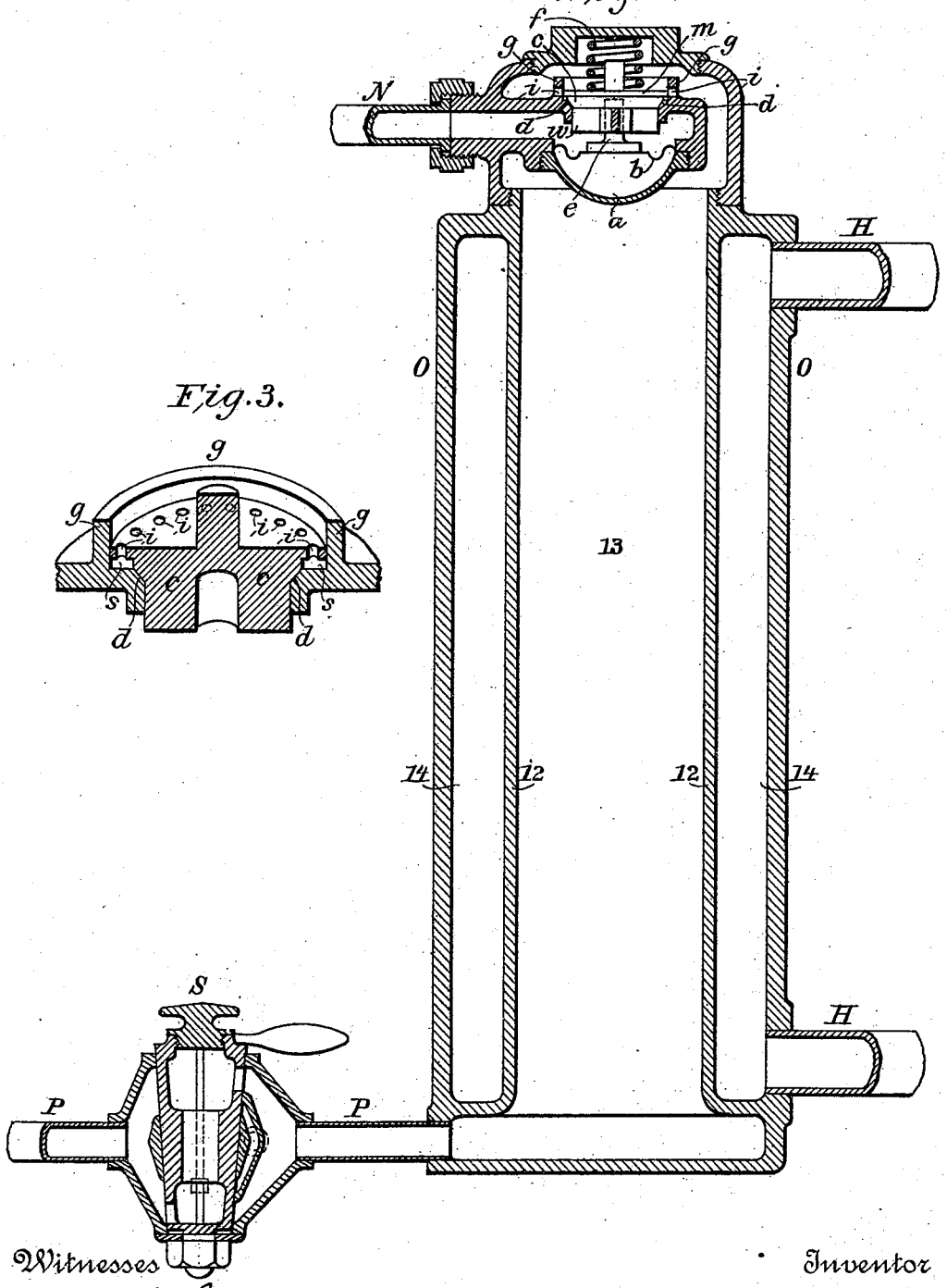

Fig. 3.

Witnesses

Jos. S. Latimer

Carleton & Snell.

Inventor

Simeon L. West

by Arthur O'Brien

his Attorney

UNITED STATES PATENT OFFICE.

SIMEON LESLIE WEST, OF WASHINGTON, DISTRICT OF COLUMBIA.

APPARATUS FOR PURIFYING, STERILIZING, AND FILTERING DRINKING-WATER OR OTHER POTABLE LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 491,828, dated February 14, 1893.

Application filed April 26, 1892. Serial No. 430,712. (No model.) Patented in England March 22, 1892, No. 5,589, and in France March 22, 1892, No. 220,345.

To all whom it may concern:

Be it known that I, SIMEON LESLIE WEST, of the city of Washington, in the District of Columbia, have invented a new and useful Apparatus for Purifying, Sterilizing, and Filtering Drinking-Water and other Potable Liquids; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention has been patented to me in Great Britain by Letters-Patent No. 5,589, dated March 22, 1892, and in France by Letters-Patent No. 220,345, dated March 22, 1892.

The object of the present invention is to provide a certain and unfailing supply of drinking water which has been previously boiled, sterilized and filtered, and which has not subsequently been exposed to the atmosphere, in houses and buildings which are supplied with water under pressure (as by ordinary street mains) and which are furnished with any ordinary means for heating the water.

The present invention consists in certain improvements upon the apparatus for the same purpose set forth in Letters-Patent of the United States No. 471,261, granted to me, March 22, 1892.

The improved apparatus embodying the invention is illustrated in the accompanying drawings, wherein

Figure, 1 is a view of ordinary water supply and heating appliances with the improvements applied thereto. Fig. 2, is a detail sectional view of a thermal or thermostatic valve employed, and of the connection between the drinking water distributing system or sterilized water service apparatus, and the water supply and heating apparatus. Fig. 3 is a perspective sectional view of a modified construction of the valve.

Referring to the drawings, A is a cold water supply pipe through which cold water is brought from the water main into the building. The supply pipe A, has suitable lateral branches, such as B, C, and D, one of which, as B, leads to the sink 10, and has the usual draw-off spigot E; another branch, as C, carries cold water throughout the building; while the third branch, D, leads to the boiler F, to supply water thereto. The water in the boiler is heated by connection in the usual manner with the water back of a range or stove 11, or by connection with any other source of heat. There are shown in the drawings the usual connections with the water back of a range, G being the pipe leading from the boiler to the range, and H the hot water return pipe leading from the range to the boiler.

I is the usual hot water pipe conveying water from the boiler to the places of use.

J is a branch hot water pipe leading to the sink, and K, a discharge faucet or spigot.

The drinking water distributing system, or sterilized water service apparatus, consists in a drinking water tank L, a water discharge pipe M, leading therefrom, a water delivery pipe N, leading thereto, a thermal or thermostatic valve in a casing O, connecting the delivery pipe N, with a water feed-pipe P. The casing O, which contains the thermal valve, is best shown in Fig. 2, where it is shown on an enlarged scale in vertical section. This casing is divided by a central annular partition 12, into an inner feed-water heating chamber 13, and an outer annular chamber or jacket 14, which chambers 13 and 14 have no communication with each other. The outer chamber 14, constitutes a portion of the hot water pipe H, leading from the water-back of the range or stove 11, to the boiler F, so that while there is a fire in the range there is a constant current of hot water through the chamber 14. The feed-water pipe P, leads from any suitable and convenient point of connection from the supply pipe A (as from the branch pipe B, as shown in Fig. 1) to the lower part of the casing O, where it communicates with the inner feed-water heating chamber 13, which is thus a continuation and part of the water feed pipe.

The hot water flowing through the jacket 14, transmits heat to the water within the feed-water heating chamber 13, thereby heating the same. The casing O, it will be noticed is located close to the range or stove 11, so that it receives the hot water therefrom at its highest temperature. Since the usual hot water apparatus connected with a range is designed to raise the water to the boiling point, the water within the heating chamber 13, will

also be raised quickly and with certainty to the poiling point when the range 11, is in use.

The thermal valve is one which will only open upon the surrounding temperature reaching a sufficiently high degree to destroy disease germs in water, say 212° Fahrenheit. The construction of the thermal valve is shown in Fig. 2, of the drawings. There is a depending cup *a*, arranged vertically within the upper part of the chamber 13, so as to be inclosed by and in contact with the water therein. The bottom of this cup *a* is permanently closed, and its top is covered by a flexible metallic diaphragm *b*. Within this cup *a*, is located a quantity of mercury or of other similar thermo-expansible liquid which expands or contracts quickly in response to changes in temperature. Above the diaphragm *b* is a valve *c*, which co-operates with a valve seat *d*, and which slips over an upwardly extending stem *e* carried by the diaphragm. Normally the valve rests on its seat and closes the passage beneath it between the chamber 13, and the delivery pipe N. When, however, the temperature of the water in the heating chamber of the water feed pipe beneath the cup *a* reaches 212° Fahrenheit, the thermo-expansible liquid within the cup expands sufficiently to lift the diaphragm and thus lift the valve from its seat. As the valve rises, it establishes communication between the feed water pipe and the delivery pipe N of the drinking water distributing system or sterilized water service apparatus leading to the drinking water tank L. As a result of this construction, it will appear that as soon as the water within the heating chamber 13, of the water feed pipe P reaches a temperature of 212° Fahrenheit, the valve *c* will be opened, thereby permitting a portion of the hot water at the temperature of 212° or over to enter the delivery pipe N. As soon, however, as the temperature of the water within the heating chamber 13, of the water feed pipe falls below 212°, the mercury will fall in the cup *a* and the valve *c* will close by gravity and by reason of the water pressure within the feed pipe P, thus closing the delivery pipe N and preventing any water passing therethrough. The prompt closing of the valve is further insured by a spring *f*. In this manner, by the employment of a thermal valve, it will be evident that no water under the desired boiling temperature can pass through the delivery pipe N, into the drinking water tank L. It will be noted that the thermo-sensitive portion of the thermal valve is surrounded by the water in the water feed pipe P, so that the action of the thermal valve is controlled solely by the temperature of the water within said water feed pipe.

In order that the valve *c* may work properly, it is not only provided with the usual guide wings but it is also formed with a rim *m* at its top which works within a cylindrical guide flange *g* formed with the valve seat *d*. In order that the rim *m* need not interfere with the passage of water, the flange is provided with ports *i*. A slight modification in this respect is shown in Fig. 3, wherein the rim *m* projects farther from the body of the valve so as to cover an annular space *s* within the flange *g*, and wherein ports *i i* are formed in the rim *m* and the ports *i* in the flange *g* are omitted.

Since the water within the drinking water tank L, will under ordinary circumstances be too hot to be immediately drank, it is necessary to cool the water during its passage from the tank to its point of use. The water within the tank is cooled by a cold water coil Q, located within it. This coil may be a portion of any one of the usual pipes through which cold water flows. Preferably, however, it is a part of the cold water pipe A, which supplies the boiler F. The advantage of having the cold water supply first connected with the coil Q within the tank as shown is that the cold water not only serves to cool the drinking water but is itself warmed thereby, thus partly saving the heat which has been imparted to the drinking water.

If it is desired that any portion of the drinking water from the tank L, should be reduced to the temperature of ice water, this may be accomplished by connecting pipe M or a branch thereof with any receptacle containing ice. As an illustration of this, the pipe M, is shown extending into an ice-box R, and coiled therein so that ice placed in the box may come in contact with the coiled pipe and cool the water passing therethrough. Suitable branch pipes, as 15, may lead from the discharge pipe M, and be carried throughout the building in which the apparatus is located, and the sterilized and purified water may be drawn off at as many places as may be desired. Suitable means are to be provided for drawing off the water, a faucet 16, at the end of pipe M, being shown for this purpose.

The drinking water distributing system, or sterilized water service apparatus, is a closed system or apparatus, it will be noted, so that the boiled water within it is not subject to atmospheric contamination.

In order that the water may be filtered, a filter S is employed. The filter may be of any suitable construction, but the filter set forth in an application for Letters Patent of the United States, executed by me on even date herewith is preferably employed. This filter is located between the point of connection of the feed water pipe P, with the water supply branch B, and the casing O. By locating the filter at this point, only the drinking water passes through the filter, which is the only water necessary to be filtered, and the water is filtered before it reaches the thermal valve, thereby preventing the proper action of the valve being injuriously affected by the mechanical impurities in the water.

The improvements in the present invention, over the apparatus set forth in my patent No. 471,261, consist, first, in the construc-

tion of the thermal valve and its connection with the drinking water service apparatus and the water heating apparatus, and, second, in the location of the filter. In the apparatus set forth in said patent, the water which passed by the thermal valve into the sterilized water service apparatus was water which had passed through the boiler and through the water-back of the stove or range. As is well known, mechanical impurities in the water collect rapidly in the bottom of boilers, like the boiler F, and where there is free communication between the boiler and the thermal valve, as in said patent, the mechanical impurities pass into the sterilized water service apparatus, clogging the same, and also collect in and around the valve itself thereby interfering with its proper operation. I sought to remedy this difficulty by placing the filter in the hot water return pipe H, but this arrangement necessitated the filtering of not only all the water entering the sterilized water surface apparatus but also all the water passing into the boiler. The result was that the filter clogged up with the impurities with great rapidity and required such frequent attention to its cleansing as to render such an arrangement impracticable. By the present construction however, the feed water to the sterilized water service apparatus is entirely distinct and separate from the usual hot water circuit, and the hot water circuit is brought only into operative contact with the feed water of the sterilized water service apparatus so as to impart the necessary heat thereto. Owing to this construction, it becomes practicable to locate the filter so that the feed water passes through the same before reaching the thermal valve, thereby preventing any mechanical impurities coming in contact with the valve, since only the same amount of water passes through the filter with this arrangement as would pass through if located on the other side of the thermal valve as in said Patent No. 471,261. As thus located the filter requires cleaning only at long intervals.

It is evident that this apparatus is applicable to the sterilizing of potable fluids other than water, such as milk for example.

I claim as my invention:—

1. A sterilized water service apparatus, a feed water supply thereto, and a thermal valve normally stopping the passage from said feed water supply to said sterilized water service apparatus, in combination with a hot water circuit in operative contact with said thermal valve, the water flowing through said hot water circuit having no communication with the water in said feed water supply, substantially as set forth.

2. A sterilized water service apparatus, a feed water supply thereto, and a thermal valve normally stopping the passage from said feed water supply to said sterilized water service apparatus, in combination with a hot water circuit in operative contact with said thermal valve, the water flowing through said hot water circuit having no communication with the water in said feed water supply, and a filter in said feed water supply for filtering the feed water to said sterilized water service apparatus before it reaches said thermal valve, substantially as set forth.

3. The casing O, having outer jacket 14, and inner chamber 13, said jacket and chamber having no communication with each other, in combination with the pipes H, H, of a hot water circuit communicating with said jacket 14, the feed water supply P, communicating with said chamber 13, the delivery pipe N, leading from said chamber 13, and the thermal valve located within said chamber 13, so as to be controlled by the temperature of the water therein, said valve controlling the outlet to said delivery pipe N, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SIMEON LESLIE WEST.

Witnesses:
ARTHUR S. BROWNE,
JOS. H. BLACKWOOD.