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J. L. FITTS.

APPARATUS FOR TESTING FEED WATER, &c.

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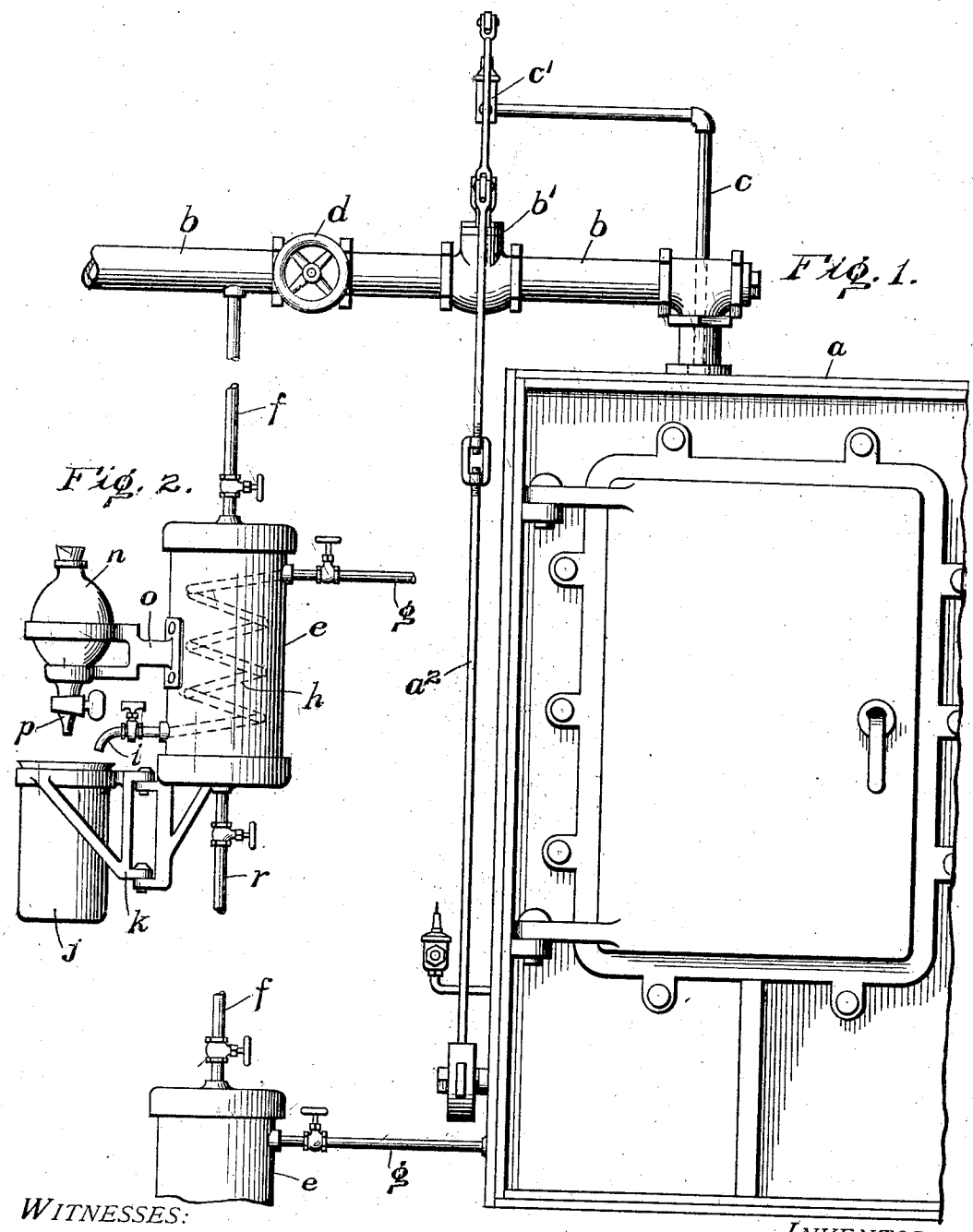



Fig. 1.

Fig. 2.

WITNESSES:

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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR TESTING FEED-WATER, &c.

No. 848,733. Specification of Letters Patent. Patented April 2, 1907.

Application filed August 2, 1906. Serial No. 328,900.

*To all whom it may concern:*

Be it known that I, JAMES LOGAN FITTS, of Merchantville, Camden county, State of New Jersey, have invented an Improvement in Apparatus for Testing Feed-Water, &c., of which the following is a specification.

It is the practice in the production of feed-water to purify waters which contain scale-forming matter—such as carbonate or sulfate of lime, magnesia, &c.—by the introduction of a suitable reagent in the heater to precipitate the impurities. The amount of the reagent required to produce a satisfactory purification depends upon the character of the water, and it is important that tests should be made from time to time to determine whether the desired purification is being accomplished. Not only is it necessary for proper purification that sufficient of the reagent should be supplied to precipitate the impurities, but it is also of importance that there should be no excess, since such excess is liable to damage the boilers and to produce foaming.

The usual method of testing chemically-treated feed-water is by dropping a solution of phenol-phthalein in alcohol into a sample of the feed-water, which indicates by the color it imparts to the water the degree of alkalinity and whether proper purification is being effected.

It is the object of my invention to provide convenient apparatus which may be applied to a feed-water heater for the purpose of making such tests whenever desired.

To obtain reliable tests, it is important that the sample of test-water should not be affected by any foreign matter, and as the water when drawn from the heater is highly heated, and therefore in a condition to dissolve and take up any impurities that may be present in the testing cup or receptacle, I have found it desirable that the test-water should be cooled before it is drawn off into the testing-cup, and for this purpose I employ a cooler, through which the test-water passes after it is drawn from the heater and before it is discharged into the cup in which the test is made.

The drawings Figure 1 is a side elevation of a portion of a feed-water heater, showing its connection with my testing devices; and Fig. 2 is a side elevation of the testing devices.

The construction of the heater is immaterial to the invention; but for purpose of illustration I have shown a chemical heater of the general character shown in Osbourn's patent, No. 729,088, dated May 26, 1903. In this apparatus, as shown, *a* is the body of the heater. *b* is the water-supply pipe by which the cool water is supplied, and *c* is the supply-pipe for the chemical agent. The chemical-supply pipe is provided with a valve *c'*, controlled by a valve *b'* in the water-supply pipe, which latter valve is in turn automatically controlled by a float in the heater through a connection $a^2$.

*d* is the usual hand-valve in the water-supply pipe.

*e* is a cooler supplied with water either from the supply-pipe *b* through a suitable valved branch *f* or from any other source.

*g* is a discharge-pipe from the heater by which a portion of feed-water to be tested is drawn off and supplied to the cooler.

I do not mean to limit my invention to any particular means for cooling the test-water in the cooler *e;* but I have shown a coil *h* in the cooler as particularly adapted for the purpose.

*i* is a spigot for drawing off the cooled test-water.

*j* is a receptacle for the cooled test-water. As shown, it is a removable cup in a hinged bracket *k*, carried by the cooler.

*n* is the vessel which contains the testing liquid, such as a solution of phenol-phthalein in alcohol. It is supported above the receptacle *j* in a bracket on the cooler and is provided at the bottom with a valved outlet *p*.

*r* is a valved drain-pipe from the cooler for discharging the cooling-water which may be returned to the heater through the pipe *b* or otherwise.

In using the apparatus when a test is to be made a quantity of water is drawn off by the pipe *g* into the cooler *e* and its temperature is reduced, preferably to about 70° Fahrenheit. The cooled test-water is then discharged by the spigot *i* into the cup *j* and a drop of the testing solution from the vessel *n* admitted. The sufficiency of the treatment of the water by the chemicals supplied to the heater is indicated by the color produced in the test-water by the testing agent. With phenol-phthalein as a testing agent for alkalies a decided reddish color indicates an excessive

alkalinity and an excessive supply of the chemical purifying or neutralizing agent. A pale-rose color indicates sufficient treatment, and a white color indicates insufficient treatment. The engineer is thus enabled to regulate the supply of the purifying reagent to the heater until the proper color test is obtained.

It is important for the obtainment of proper results that the test-water should be cooled before the testing liquid is introduced, because hot water is liable to act upon the material of the cup or receptacle and dissolve soda or other matter, which might produce a false indication.

While I have particularly described the devices as applied to making tests for alkalinity by the use of phenol-phthalein, they may be applied to other tests and with other testing chemicals.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a color-testing apparatus for feed-water, the combination with the feed-water heater, of a water-cooler connected therewith for receiving and cooling a portion of the feed-water to be tested, a receptacle for receiving the cooled water from the cooler, and a vessel for the testing liquid arranged above said receptacle for the test-water and adapted to supply the testing liquid to it.

2. In a color-testing apparatus for feed-water, the combination with the feed-water heater, of a water-cooler connected therewith for receiving and cooling a portion of feed-water to be tested and having a discharge-outlet for the cooled water, a hinged bracket carried by said cooler; and a receptacle for the test-water carried by said bracket and arranged under the discharge-outlet of the cooler, a second bracket carried by the cooler and arranged above the receptacle for the test-water, and a receptacle for the testing liquid carried by said second bracket.

In testimony of which invention I have hereunto set my hand.

JAMES LOGAN FITTS.

Witnesses:
F. JOSEPH MILLER,
R. M. KELLY.