No. 616,539. Patented Dec. 27, 1898.

L. KACZANDER.

BOILER TESTER.

(Application filed Oct. 29, 1898.)

(Model.) 2 Sheets—Sheet 1.

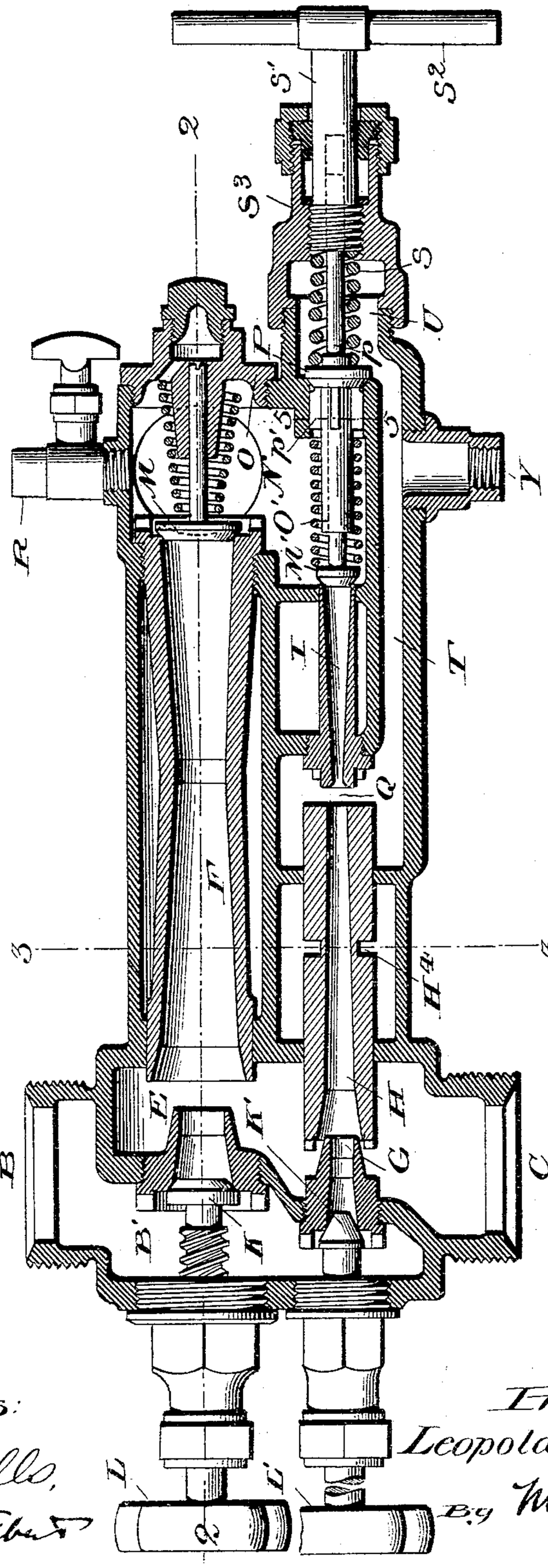

Fig. 1.

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Fig. 2.

Fig. 4.

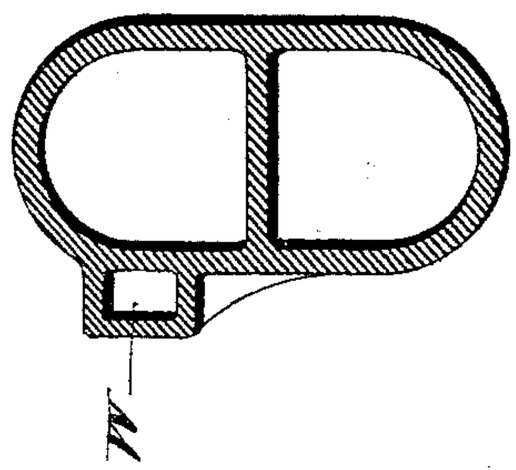


Fig. 3.

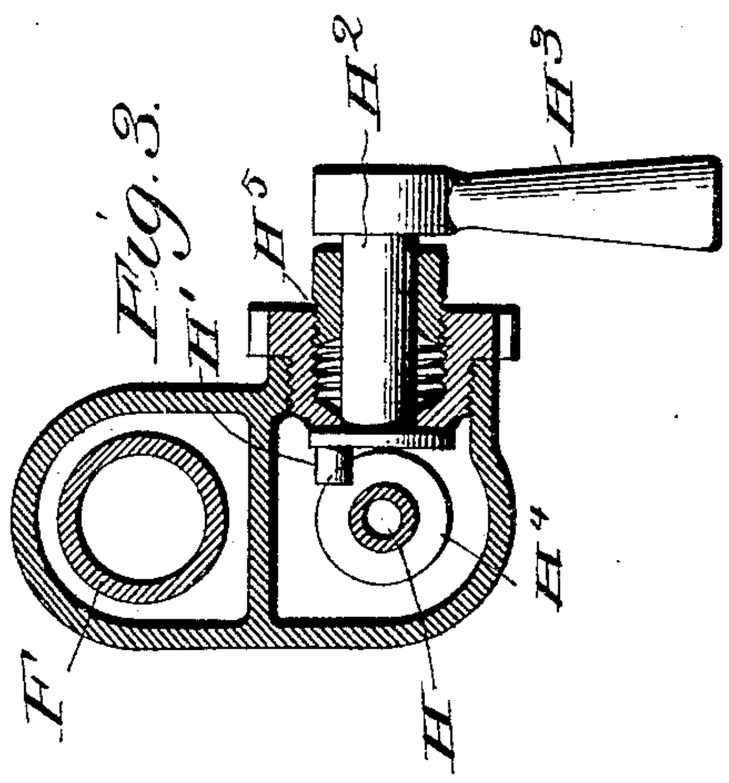
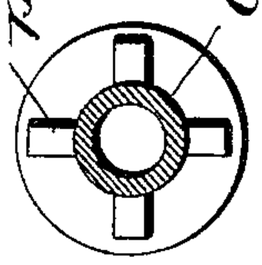


Fig. 5.



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UNITED STATES PATENT OFFICE.

LEOPOLD KACZANDER, OF NEW YORK, N. Y., ASSIGNOR TO THE NATHAN MANUFACTURING COMPANY, OF SAME PLACE.

BOILER-TESTER.

SPECIFICATION forming part of Letters Patent No. 616,539, dated December 27, 1898.

Application filed October 29, 1898. Serial No. 694,935. (Model.)

To all whom it may concern:

Be it known that I, LEOPOLD KACZANDER, a citizen of the United States, and a resident of the city of New York, county and State of New York, have invented certain new and useful Improvements in Boiler-Testers, of which the following is a specification.

Boiler-testers usually contain two distinct and separate sets of interior tubes or nozzles. One of these is used for the purpose of filling the boiler or washing it out with warm water, forming what is technically known as an "ejector," an instrument capable of delivering a desired quantity of water into a boiler when empty, but not capable of exerting any overpressure. The second set of nozzles forms an "injector," an instrument which when properly proportioned is capable of exerting a considerable overpressure beyond the initial pressure of the operating steam and is used for applying the testing pressure.

The object of my invention is to simplify the construction of such apparatus and to increase its efficiency.

Such apparatuses as heretofore constructed have contained, so far as I am informed, two outlets for the overflow or surplus water, one at or near the smallest diameter of the delivery-tube of the injector part, as is usual in injectors, while the other leads away the surplus water from the delivery-chamber. Both these overflows have been distinct and separate from each other and connected with chambers also separate from and independent of each other. One of the characteristic features of my invention is that I use one overflow-outlet only, whereby the construction of the apparatus and the work of taking care of the overflow water are simplified.

In boiler-testers the water cannot be lifted by the instrument itself, but must flow to it under a head of pressure which must be considerable in order to produce sufficient pressure at the hose-nozzle when washing out the boiler, so as to remove all dirt, and particularly scale hardened on the boiler-plates. It has been found, however, that with increasing pressure of the inflowing water the temperature of the water delivered through the hose or boiler-pipe is lowered, which is quite natural, since the diameter of the steam-nozzle is fixed and invariable, so that with an increasing volume of the inflowing water caused by increasing pressure the heating properties of the fixed volume of steam must decrease. This causes unsatisfactory results, since it is desirable to wash and fill the boiler with as hot water as possible in order to avoid undue cooling of the plates, because the contraction caused thereby and the subsequent expansion of the plates when the boiler is fired up again may cause leaky joints in the flues or boiler-tubes. To remedy this defect, I provide for direct heating of the delivered water by live steam independently of the nozzles through which the water passes and before it reaches the delivery hose or pipe, this constituting another characteristic feature of my invention.

In the accompanying drawings, Figure 1 is a vertical longitudinal section on line 1 1, Fig. 2, of an apparatus embodying my invention in its preferred form. Fig. 2 is a horizontal longitudinal section on line 2 2, Fig. 1. Fig. 3 is a cross-section on line 3 3, Fig. 1. Fig. 4 is a cross-section of the body of the apparatus on line 4 4, Fig. 2. Fig. 5 is a cross-section of the pressure-regulating valve on line 5 5, Fig. 1.

A is the body of the apparatus, provided at B, C, and D with the usual couplings or connections for the admission of steam and water and for delivering the fluid into the boiler.

E is the steam-nozzle, and F the combined condensing and delivery nozzle, of the ejector part of the apparatus.

G is the steam-nozzle, H the movable condensing-nozzle, and I the delivery-nozzle, of the injector part. Admission of steam to the nozzles is controlled by the valves K and K′, operated by ordinary screw-threaded spindles attached to handles L and L′.

At the delivery ends of nozzles F and I spring-actuated check-valves M and M′ seat against the nozzles, so that when either one of the nozzles is in operation no water can run through the idle set of nozzles from the delivery or pressure chamber N. The spindle of valve M is guided into the cap O and that of valve M′ is guided in the long projection O′, cast on the head of the pressure-regulating valve P.

The nozzle H is made movable for a twofold purpose. When the injector is used for applying the testing pressure, the entrance area for water into nozzle H may be varied

according to the operating steam-pressure by moving the nozzle H nearer to or farther away from the steam-nozzle G. Again, when the ejector is used for filling the boiler nozzle H may be moved against the receiving end of nozzle I, acting as a valve and closing the overflow-space Q, thereby preventing waste of water. The moving of nozzle H is effected by means of a crank-pin H′ on spindle H^2, to which spindle is attached an operating-handle H^3. The pin fits an annular groove H^4, cut into nozzle H. By oscillating handle H^3 nozzle H will be moved to and fro, as desired. Spindle H^2 is guided in an ordinary stuffing-box H^5.

R is a valve-controlled bracket for the reception of a steam-gage to indicate to the operator the testing pressure, as usual in this kind of apparatus.

Behind the pressure-valve P is placed a spring S, which may be compressed more or less by means of the screw-threaded spindle S′, operated by handle S^2. Spindle S′ is guided by and packed in the stuffing-box S^3. Valve P is guided partly by means of its spindle *p*, which enters a bore or axial socket in the spindle S′, and partly by its wings *p*′, Figs. 1 and 5, entering a cylindrical hole in the body of the instrument.

T is a channel establishing communication between the overflow-space Q and the relief-chamber U behind valve P.

V is the common overflow-outlet from Q and U.

W is a channel establishing communication between the steam-chamber B′ and the pressure or delivery chamber N. Admission of steam into this channel from the steam-chamber is controlled by a valve W′, which is operated by means of a screw-threaded spindle provided with a handle W^2.

The operation of the apparatus is as follows: To fill or wash out the boiler, nozzle H is moved against nozzle I to close the overflow-space at Q. Water is then admitted at C, and steam-valve K of the ejector part of the apparatus is opened. The water will then be driven through nozzle F (the force of the jet opening valve M) into delivery-chamber N and thence into the boiler. Should the delivery-water not be of sufficiently high temperature, on account of the low initial temperature of the water admitted at C or on account of an extraordinarily large volume of water admitted at C as the result of the high-water pressure, the valve W′ may be opened and live steam admitted directly into the delivery-chamber, whereby an additional amount of heat corresponding to the quantity and pressure of steam admitted through the passage W is added to the delivery-water. When the boiler is filled and the testing pressure is to be applied, valve K is closed, valve K′ of the injector part of the apparatus is opened, and nozzle H is moved toward the steam-nozzle G until the steam-gage at R begins to indicate a rising pressure, and then spring S is compressed, allowing valve P to open more or less under pressure from chamber N until the pressure desired to be applied is reached. The boiler being full, the surplus water, which cannot enter it, will overflow partly at Q and partly into the relief-chamber U, from both of which places it will find a final outlet through the common overflow-nipple V into the atmosphere.

Having described my invention and the best way now known to me of carrying the same into practical effect, I state in conclusion that I believe myself to be the first to have produced a boiler-tester with two distinct and separate sets of nozzles, in which there is only one final overflow-outlet for any surplus water. I also believe myself to be the first to have produced a boiler-tester with two distinct and separate sets of nozzles, which is provided with a heating arrangement for directly heating the water independently of the degree of heat attained in passing the water through the nozzles. I therefore do not restrict myself to the particular structural details hereinbefore set forth in illustration of my invention; but

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

1. In a boiler-tester having two separate and distinct sets of nozzles, and in combination with the usual injector-overflow Q, and the relief-chamber U, a single outlet for the discharge of the surplus overflow water from both of said parts Q and U, substantially as and for the purposes hereinbefore set forth.

2. In a boiler-tester with two distinct and separate sets of nozzles, the combination of the injector overflow-space, the relief-chamber, a channel or passage establishing communication between said parts, and a single overflow-outlet, substantially as and for the purposes hereinbefore set forth.

3. In a boiler-tester of the character described, a channel W connecting the steam and the delivery chambers, substantially as and for the purposes hereinbefore set forth.

4. In a boiler-tester of the character described, a channel connecting the steam and the delivery chambers of the apparatus, and a valve controlling the steam admission through said channel into the delivery-chamber, substantially as and for the purposes hereinbefore set forth.

5. In a boiler-tester of the character described, the combination with the nozzles, and the delivery-chamber, of means whereby the water may be heated after it passes from the nozzles into the delivery-chamber and before it enters the boiler, substantially as and for the purposes hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 25th day of October, 1898.

LEOPOLD KACZANDER.

Witnesses:

ADOLPH BARGEBUHR,

JAMES E. MURPHY.