

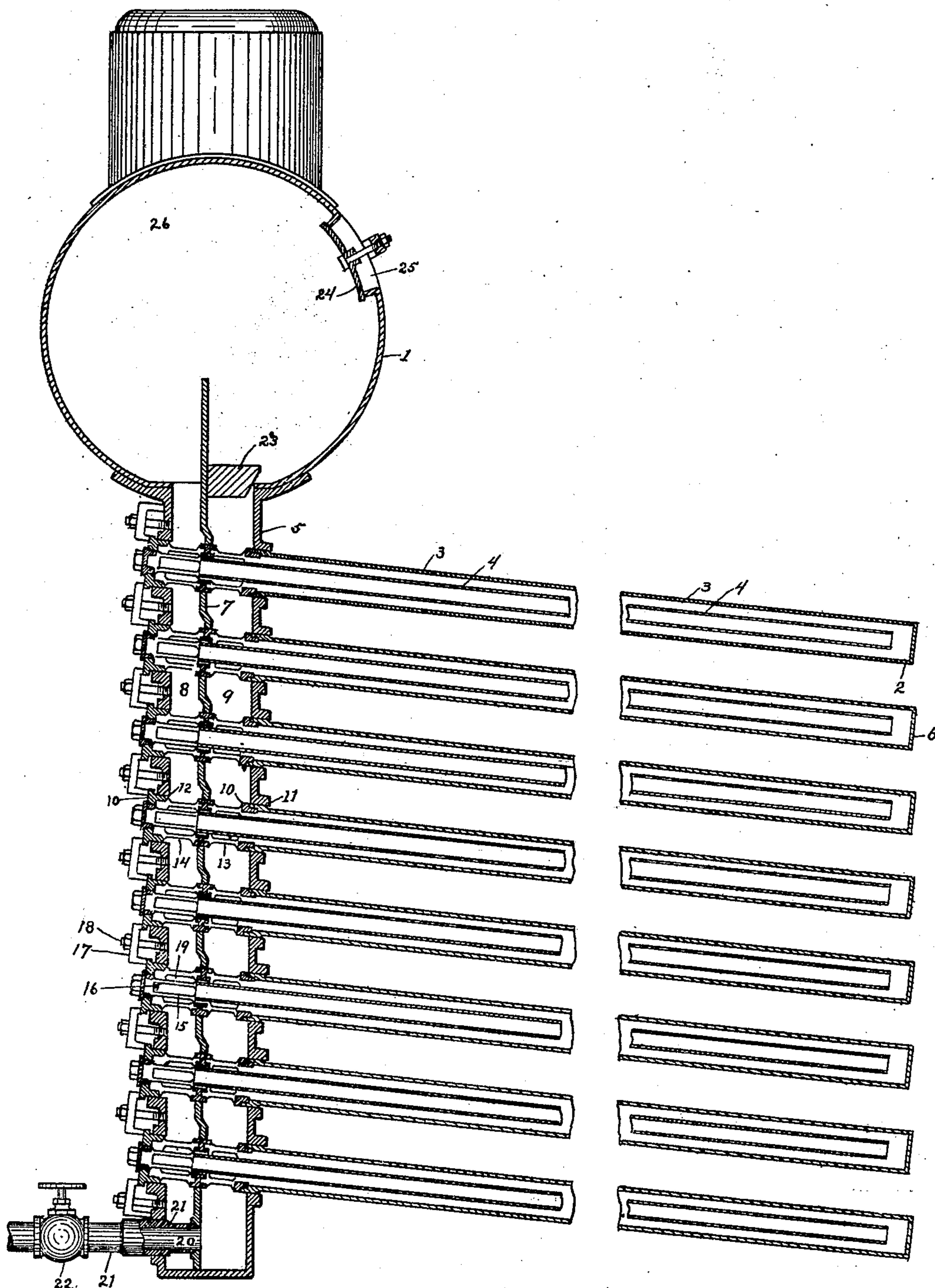
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J. R. SNEDDON.  
BOILER.

(Application filed Apr. 12, 1901.)

(No Model.)



Witnesses.  
Fred H. Sweet.  
Water Samariis

Inventor.  
James P. Sneddon  
By Kay & Totten  
Attorneys.



# UNITED STATES PATENT OFFICE.

JAMES P. SNEDDON, OF BARBERTON, OHIO, ASSIGNOR TO THE STIRLING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

## BOILER.

SPECIFICATION forming part of Letters Patent No. 689,239, dated December 17, 1901.

Application filed April 12, 1901. Serial No. 55,547. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES P. SNEDDON, a resident of Barberton, in the county of Summit and State of Ohio, have invented a new and useful Improvement in Boilers; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to improvements in Niclausse, Durr, or similar boilers; and its object is to provide means whereby said boilers may be conveniently emptied of the water contained therein.

The Niclausse and Durr boilers are provided with a series of water-tubes each of which comprises an outer tube and an inner circulating-tube, both of which are connected at their forward ends to vertical headers or water-legs which communicate at their upper ends with a steam and water drum or similar device. By reason of this double formation of the tubes the header or water-leg is provided with a diaphragm, so as to form, in effect, two compartments or passages in said header, with one of which the outer water-tubes communicate and with the other of which the inner circulating-tubes communicate, the said diaphragm serving to separate the two currents of circulation on the "uptake" and "downtake," as they are called, in said header. The water-tubes have no connection at their rear ends, so that they may be perfectly free to expand and contract, the only communication with said tubes being at their forward ends. These tubes, furthermore, are preferably inclined toward the rear, so as to secure a freer breaking of the steam-bubbles from the surfaces of said pipes. As a consequence of this construction when the boiler is put out of use it is impossible to drain the water from said tubes, the rearward inclination of said pipes preventing the water from running out at their forward ends. Heretofore the only way of emptying the water from these boilers has been by removing said tubes from the boiler. This of course is a slow and tedious process.

The object of my invention is to provide means whereby these boilers may be emptied of water without the necessity of removing the tubes therefrom; and to this end it comprises an outlet from the lower end of the up-

take compartment or passage in the header, together with means for closing the upper end of said uptake compartment or passage, whereby steam or other gaseous pressure may be admitted into the drum and then circulate through the boiler-tubes, driving the water before the same and out through the outlet communicating with the lower end of said uptake-passage.

The accompanying drawing is a sectional elevation of so much of a Niclausse boiler as will explain my improvement therein.

In said drawing, 1 represents the steam and water drum, and 2 the water-tubes, of an ordinary Niclausse or Durr boiler, said tubes each comprising the outer water-tube 3 and the inner circulating-tube 4, said tubes in the Niclausse boiler illustrated being connected at their forward ends to the header 5, but having no connection at their rear ends, as shown at 6, and inclining from their front to the rear, as shown. The header 5 is provided with the longitudinal diaphragm 7, which divides the said header into two compartments or passages, the forward or downtake compartment or passage 8 and the rear or uptake passage 9. The outer tubes 3 are connected to the frame 10, said frame forming water-tight seats in the openings 11 12 in the rear and front walls, respectively, of the header 5 and being cut away, as at 13 and 14. The inner tube 4 is connected to the frame 15, which is seated in the frame 10 and secured thereto by means of the swivel-nut 16 engaging a screw-threaded opening in the forward end of the frame 10. Both frames are held in position by means of suitable clamps 17, secured to bolts 18, projecting from the front face of the headers.

So far as described the construction of the boiler is old, and in the use of said boiler the water passes from the drum 1 down through the compartment or passage 8 and through the cut-away portions 14 in the frames 10 and through suitable openings 19 in the frames 15 and thence into the circulating-tubes 4, passing through said tubes to the rear end of the boiler and thence out and back to the front of the boiler through the spaces between the tubes 4 and the tubes 3 and out through the cut-away portions 14 of



the frames 10 and up through the compartment or passage 9 in the header back to the drum 1. The headers have usually been provided at their lower ends with openings, (not shown,) through which the sediment and water in the headers could be drained; but no provision has heretofore been made for draining the water from the tubes 2 except by removing said tubes from the boiler. In my improved boiler the lower ends of the header may be provided with the usual drain-orifices; but at any rate the rear or uptake compartment or passage 9 is provided with an outlet 20, said outlet being secured by means of a pipe-fitting 21, communicating with the uptake compartment or passage 9 and extending beyond the front wall of said header, where it is provided with a suitable valve 22. This fitting, however, must have no communication with the front compartment or passage 8. The upper end of the uptake passage or compartment 9 is adapted to be closed by any suitable means, said means in the drawing being shown as a plug 23, which seats itself in the opening in the upper end of said compartment or passage 9 and which normally remains seated, as shown, by its own weight, the pressures on the upper and lower sides thereof being balanced, so that there is no tendency for it to rise; but any simple and convenient means may be used to hold it seated, if found necessary.

In the use of my invention when it is desired to empty the boiler of water the water is first drained from the drum 1 and header 5 through the outlet 20, and then the plate 24, covering the manhole 25, is removed and the plug 23 inserted by hand in the drum and placed in the upper end of the uptake-passage 9, as shown. The cover-plate 24 is then replaced and steam or other gaseous pressure is introduced into the drum 1, said steam or similar agent passing down through the compartment or passage 8 through the inner circulating-tubes 4, driving the water contained therein before the same and forcing the same out through the rear end of said tubes and back forward through the space between the tubes 4 and the tubes 3 and into the compartment 9. Inasmuch, however, as said compartment 9 is closed at its upper end, the only path open for the water is down through said passage or compartment and through the outlet 20.

While I have shown a plug for closing the upper end of the passage or compartment 9, I wish it understood that my invention is not limited thereto, but that any means whatsoever for closing the upper end of said passage is within the scope of my invention. The water in the header 5 and drum 1 can of course be drained out through the opening 20, as the frames 10 do not fit in the diaphragm

7 so tightly as to prevent the water from the compartment 8 flowing into the compartment 9. Consequently the plug or disk to be inserted in the upper end of the passage 9 can be readily put in place by hand and may consist of any suitable plug, disk, valve, or equivalent closure for the upper end of the uptake 9, and it will remain seated, because, as above stated, the pressures on the top and bottom thereof are balanced.

When the boiler which is to be emptied is one of a battery of boilers, the pressure necessary to drive the water from the tubes thereof may be secured by admitting steam from one of the other boilers in the battery into the drum 1, and in this manner, therefore, all of the boilers of the battery can be emptied except one of said boilers. To empty this last boiler, it will be necessary to derive the pressure from some other source, and it may be conveniently derived from an air-pump driven from an electric or other suitable motor. The means, however, for providing this pressure forms no part of my invention.

While I have shown the outlet communicating with the lower end of the uptake-compartment and the valve closing the upper end of said compartment, it is obvious that the outlet and valve may be provided for the downtake compartment or passage and that in emptying the boiler the course of the steam and other pressure would be the reverse of that described. Such a modification I deem within the scope of my invention.

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

1. In a boiler having inner and outer water-tubes communicating respectively with a downtake and an uptake compartment or passage, an outlet communicating with the lower end of one of said compartments or passages, and means for closing the upper end of the same compartment or passage.
2. In a boiler having inner and outer water-tubes communicating respectively with a downtake and an uptake compartment, an outlet communicating with the lower end of the uptake-compartment, and means for closing the upper end of said compartment.
3. In a boiler having inner and outer water-tubes communicating respectively with a downtake and an uptake compartment or passage, an outlet communicating with the lower end of the uptake-compartment, and a plug for closing the upper end of said compartment or passage.

In testimony whereof I, the said JAMES P. SNEDDON, have hereunto set my hand.

JAS. P. SNEDDON.

Witnesses:

O. D. EVERHARD,  
E. E. BAKER.