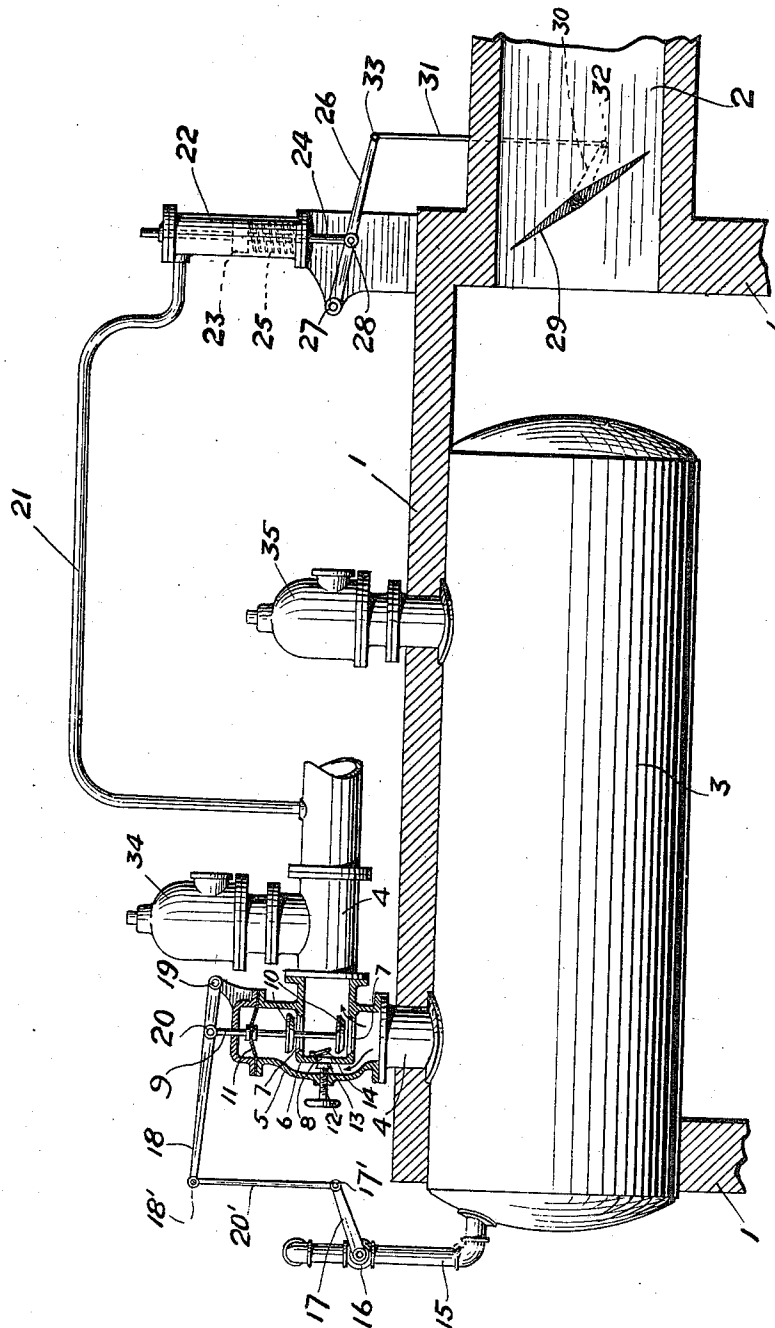


J. C. PARKER.
 MEANS FOR REGULATING PRESSURE IN STEAM BOILERS.
 APPLICATION FILED MAR. 20, 1909.

974,911.

Patented Nov. 8, 1910.



WITNESSES:

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JOHN C. PARKER, OF PHILADELPHIA, PENNSYLVANIA.

MEANS FOR REGULATING PRESSURE IN STEAM-BOILERS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN C. PARKER, a citizen of the United States, residing in the city of Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented Means for Regulating the Pressure in Steam-Boilers.

My invention comprises steam pressure regulating means designed particularly for preventing the too sudden lowering of the pressure in steam boilers, which is frequently caused by an over draft on the steam supply and results in lifting the water out of the tubes or off the sheets, whereby damage, such as bending, bursting or cracking of parts and explosions, due to over heating, may occur, with resulting injuries to persons and loss of life.

In my invention, the main for taking off the steam is provided with valve mechanism which automatically opens when the steam in the boiler reaches a desired pressure and automatically closes when the pressure falls below a desired limit. Preferably there is provided a by-pass, with a valve which can be set to permit a desired limited amount of steam to flow constantly from the boiler through the main under normal conditions for the purpose of steadying the action and an automatic check valve is provided to close the by-pass and prevent the flow of steam from the main to the boiler under abnormal conditions, as in case of a burst tube or an explosion. The manually operated valve may be wholly closed if desired. In order that the steam main shall not be subject to pressure higher than that required for operating the regulating valve mechanism and to prevent a pressure drop which might otherwise be beyond the control of such valve mechanism, the steam main is provided with a safety valve which is set to blow at or below the boiler pressure required for opening the regulating mechanism. And in order to prevent danger from the failure of the regulating valve to operate for any cause, the boiler is provided with a safety valve set to blow above the pressure required for opening the regulating valve and therefore closed excepting in the emergency indicated. The steam pressure may be further steadied and prevented from falling abruptly through the too sudden introduction of feed water by regulating the introduction of the feed water proportionately to the steam pressure, which is accomplished

by connecting valve mechanism for regulating the introduction of the feed water with the valve mechanism for regulating the flow of steam so that the water and steam regulating valves open and close together, the gradual introduction of water gradually checking the rise in pressure. The action of the boiler may be further steadied by connecting the damper with the steam regulating valve so that as the valve gradually opens with the rise in steam pressure, the damper gradually closes to check the production of steam.

The foregoing characteristic features of my invention are exemplified in the accompanying drawing and the following description thereof.

The drawing is a sectional elevation of mechanism embodying my invention.

The mechanism, as shown in the drawing, comprises the top of the furnace 1 having the flue 2 and set in the furnace a boiler comprising the steam chamber or drum 3 having the steam "take off" line or main 4 containing the valve casing 5. The casing 5 contains the partition 6 having therein the aligned ports 7 and between the ports 7 the port 8. A stem 9 has fixed thereon the balanced puppet valves 10, which are adapted to control the ports 7, the stem being fixed to a diaphragm 11 which is held in the top of the casing. A stem 12, having a screw connection with the casing, carries the valve 13 which can be set to regulate the flow through the port 8, and a check valve 14 having a hinged connection with the partition.

A conduit 15, for delivering feed water to the boiler, contains the valve 16 which is operated by an arm 17. A lever 18, which has the fulcrum 19 on the valve casing 5 and the pivotal connection 20 with the rod 9, is oscillated by the reciprocating action of the valves 10 due to variations in steam pressure on the diaphragm. A link 20' has the pivotal connection 17' with the lever 17 and the pivotal connection 18' with the lever 18. Consequently as the steam pressure rises and the valves 10 are elevated the mechanism connecting the latter with the valve 16 causes it to open to admit feed water.

The main 4 is connected by a duct 21 with an end of a cylinder 22 which contains a piston 23 having the stem or rod 24, the cylinder containing the coiled spring 25 which acts on the piston oppositely to the steam in-

roduced through the duct 21. A lever 26, having the fulcrum 27, is oscillated by the reciprocation of the rod 24 which has the pivotal connection 28 therewith. The flue 2 contains the damper 29 adapted to be oscillated by the arm 30 fixed thereto, the arm being oscillated by a link 31 having the pivotal connection 32 therewith and the pivotal connection 33 with the lever 26. Hence the position of the piston 23, depending upon the pressure in the steam main, determines the position of the damper 29, the draft being gradually reduced by the gradual closure of the damper as the steam pressure rises.

The safety valve 34 is placed in the steam main 4 and set to blow at a pressure not higher than the desired maximum boiler pressure, or that required to lift the valves 10. The safety valve 35 is connected with the steam drum 3 and set to blow at a safe pressure higher than that required for opening the valves 10.

In the claims the term "steam line" is to be understood as indicating a conduit for carrying the steam to an engine or other mechanism in which its energy is utilized or dispersed for a useful purpose, as distinguished from the waste that results where a safety valve blows.

Having described my invention, I claim:

1. A steam boiler having a steam line and for regulating the flow of steam from said boiler through said line an automatic valve mechanism adapted to open and close with variations in the boiler pressure.

2. A steam boiler having a steam chamber, a steam line connected therewith, and mechanism operated by the boiler pressure for regulating the flow through said line.

3. A steam boiler having a steam chamber, a steam line leading therefrom, automatically operating valve mechanism connected with said line for regulating the pressure in said chamber, and a by-pass through which steam flows from said chamber through said line when said valve is closed.

4. A boiler having a steam "take off" in combination with mechanism comprising an automatically closing valve adapted to open when the working pressure of the boiler is reached and a by-pass through which steam flows from said boiler when said valve is closed.

5. A boiler having mechanism comprising an automatically closing valve adapted to open when the working pressure of the boiler is reached, a by-pass through which steam flows from said boiler when said valve is closed, and a valve for closing said by-pass.

6. A boiler having a steam chamber, a steam line connected therewith, mechanism comprising an automatically closing valve adapted to open when the working pressure of the boiler is reached, a by-pass through which steam flows from said boiler when said valve is closed, a valve for regulating the flow through said pass, and a check valve for automatically closing said by-pass.

7. A boiler having a steam chamber, a steam line leading from said chamber, a self closing valve connected with said steam line and adapted to open when the working pressure is reached in the boiler, and a safety valve in said steam line beyond said valve first named.

8. A boiler having a steam chamber, a steam line leading from said chamber, a self closing valve in said steam line and adapted to open when the working pressure is reached in the boiler, and connected with said steam chamber a safety valve adapted to open at a pressure higher than said working pressure.

9. A boiler having a conduit for carrying feed water thereto, a steam line leading therefrom, a valve for controlling said feed water conduit, mechanism comprising a valve opened by pressure in said boiler which regulates the flow through said steam line, and means whereby the opening of said last named valve opens said first named valve.

10. A boiler, in combination with a furnace having a damper, a steam line leading from said boiler, in said line a valve automatically opened when the working pressure in said boiler is reached, and means whereby the opening of said valve closes said damper.

In witness whereof I have hereunto set my name this 19th day of March, 1909, in the presence of the subscribing witnesses.

JOHN C. PARKER.

Witnesses:

JOS. G. DENNY, Jr.,
ROBERT JAMES EARLEY.