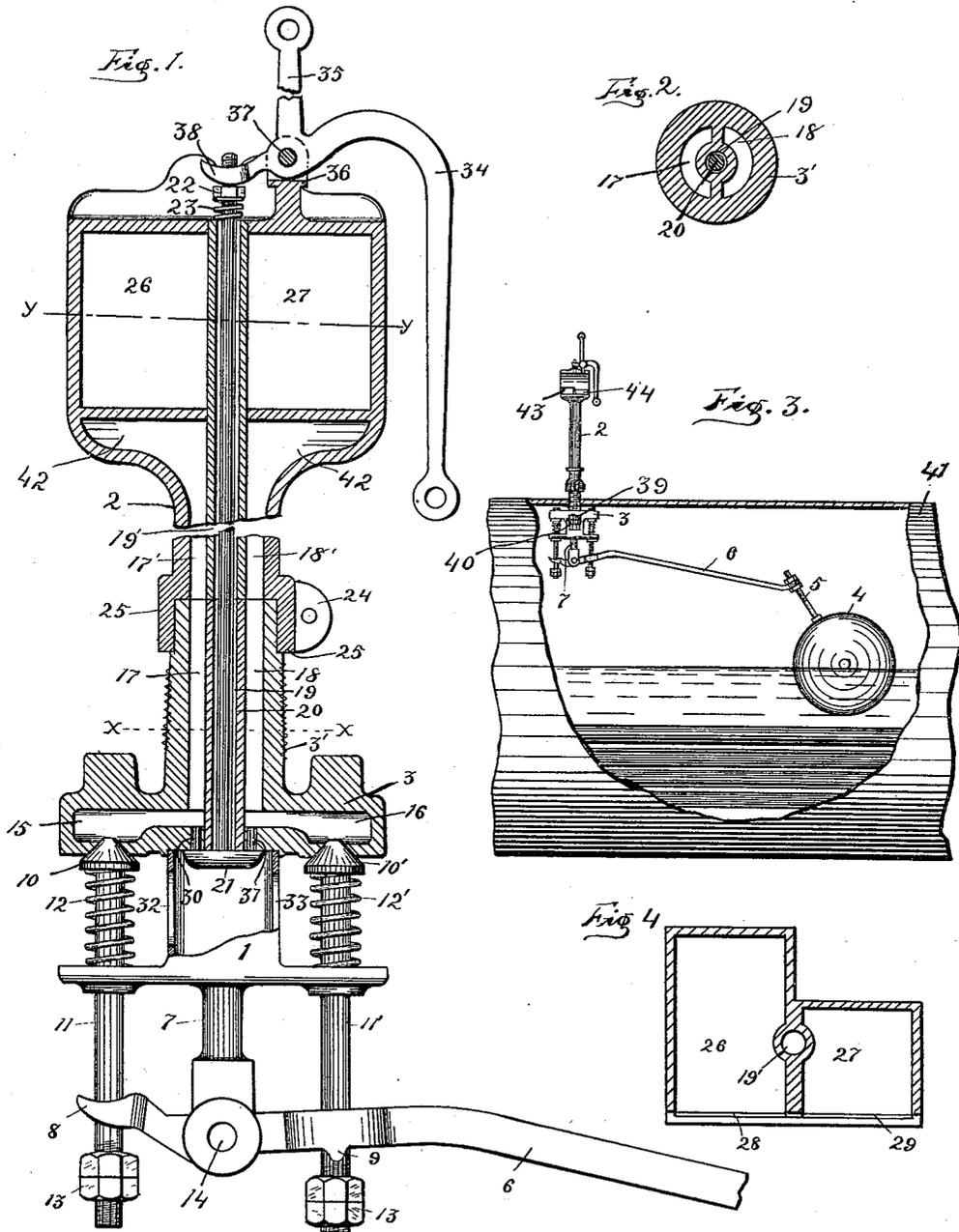


(No Model.)

P. A. KIRCHNER.
WATER ALARM FOR STEAM BOILERS.

No. 521,169.

Patented June 12, 1894.



WITNESSES:

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UNITED STATES PATENT OFFICE.

PETER A. KIRCHNER, OF FORT WAYNE, INDIANA.

WATER-ALARM FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 521,169, dated June 12, 1894.

Application filed February 2, 1894. Serial No. 498,873. (No model.)

To all whom it may concern:

Be it known that I, PETER A. KIRCHNER, a citizen of the United States, residing at Fort Wayne, in the county of Allen, in the State of Indiana, have invented certain new and useful Improvements in Water-Alarms for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in water-alarms for steam-boilers and engineers' signals. As the constantly increasing use of steam power augments the importance of the steam-boiler as a factor in the manufacturing arts, the importance and utility of reliable self-acting safety devices in connection therewith are obvious. It is well known that low water in the boiler is the most frequent cause of overheating, thereby producing, burned, defective, and exploded boilers; that the preservation of a practically uniform water supply in the boiler is one of the most important duties incumbent upon the engineer or fireman, and at the same time one of the duties most liable to be neglected by oversight or inattention; that low water in the boiler is the result of ignorance, carelessness or oversight on the part of the operator, or results from the defective operation of the indicating or safety apparatus upon which he relies. It is also well known that the common glass water-gage, and all other indicating appliances whose operative parts are located below the water line, are subject to disturbances and obstructions from sediment and mineral deposits, and accumulations which render them unreliable even in the hands of the skilled operator.

The object therefore, of my invention is to provide a cheap, simple, efficient and reliable water alarm for steam-boilers, adapted to enable the operator to maintain at all times a practically uniform water level in the boiler, thereby insuring dry steam, steady and increased power, avoiding waste of heat and fuel, lowering the running expenses, and securing the boiler on which it is attached against the disastrous effects of over-heating

by any inattention or neglect on the part of the operator.

Another object of my improvement is to provide a water-alarm for steam-boilers adapted to be secured therein above the water line, thereby rendering it at all times secure against interference or obstruction by mineral deposits, or accumulations, requiring no attention upon the part of the operator to insure prompt and reliable action, needing no oiling or packing, provided with frictionless valves, operated by one float, having a long leverage for a proportionately heavy weight, and having a wide range of adjustment for arranging the low and high water marks.

Another object of my invention is to provide a water-alarm for steam-boilers which is adapted to indicate the approach of danger from low water by an audible signal which can be readily heard and distinguished in any part of the factory or building in which it is used, or in the immediate vicinity thereof; thereby serving as an ever present and reliable monitor to warn the operator of his oversight or neglect of duty in this particular, and acting at the same time as an ever wakeful sentinel to promptly warn the manager or proprietor of incompetency or inattention on the part of the operator, in time to prevent damage to, or destruction of his property, as well as the danger to life and limb from an insufficiency of water in the boiler.

Another object of my improvement is to provide a water-alarm for steam-boilers having a whistle in connection therewith so constructed and arranged as to give three separate, distinct, and independent sounds or signals, two of which signals being for low and high water respectively, and the third adapted for use as the engineer's starting and stopping signal, designed for use as an emergency signal, in case of accident, breakage of belts, change of large belting, or other emergency requiring a sudden stopping or starting or slow running of the machinery.

My invention consists of three principal parts, viz: a two-part portion which is located within the boiler shell rigidly and removably secured thereto, provided with the spring-pressed valves and means for operating the same; a pivotally mounted float-lever having

its outer end adjustably secured to a rigid float-stem; and an externally mounted whistle portion rigidly and detachably united thereto.

The novel feature of my invention consists in the construction and arrangement where-
 5 by two separate and independent audible signals are automatically secured under the conditions hereinafter described, and by the union of the said sounds or signals a third
 10 signal can be given at the will of the operator in cases of emergency.

The objects of my invention are secured by the mechanism illustrated in the accompanying drawings in which similar figures of refer-
 15 ence indicate corresponding parts throughout the several views.

Figure 1 is a vertical central section of the externally mounted whistle, in section, and also of the removable portion within the
 20 boiler, showing the relative arrangement of the operating valves, the steam channels and the inlet, and outlet ports. Fig. 2 is a transverse section of the same on the line X—X of Fig. 1. Fig. 3 is a perspective of my im-
 25 provement in position in the boiler shell, with a proper float attached. Fig. 4 is a transverse section on the line Y—Y of Fig. 1.

The casting 3 has its upright or vertical portion screw threaded to fit a proper per-
 30 foration in the boiler shell, and has its upper extremity reduced in size or diameter, to form a seat for the whistle stem, as seen in Fig. 1. The said casting 3 is also provided with the semicircular steam channels 17 and
 35 18, separated from each other by diametrically opposite lateral or radial walls, Figs. 1, and 2, and with the transverse channels or chambers 15 and 16, communicating with the said vertical channels, and separated from
 40 each other by the annular wall of the central vertical channel 19, in which is loosely fitted the valve-stem 20 having upon its lower end the valve 21, and surmounted at its up-
 45 per end by a coil spring 23, held in position by the nut 22. The said chambers 15 and 16 are provided with outward and downward openings whose sides are adapted to form suitable valve seats for the valves 10 and 10', as seen in Fig. 1. The said casting 3 is also
 50 provided with the inlet ports 30 and 31 leading to the said chambers 15 and 16, but normally closed by the valve 21, as shown.

The casting 1 comprises a horizontal plate having vertical perforations for the valve
 55 stems 11 and 11', an open topped chamber provided with diametrically opposite openings or inlet ports 32 and 33, and a dependent lug or projection 7 having a bifurcated head in which the free end of the float lever
 60 is pivotally mounted on the pivot 14, or other proper manner. The stems 11 and 11' of the spring pressed valves 10 and 10', have their lower ends screw threaded and mounted by proper jam nuts 13, and are loosely mount-
 65 ed in suitable perforations in the plate 1, and are provided with the spiral springs 12 and 12' properly mounted thereon between

the said valves and the plate 1, and are adapted to firmly retain the said valves in their seats in the said plate or casting 3.
 70 The float-lever 6, preferably bent near each extremity in opposite directions, as shown, is pivotally mounted at one end on the pivot 14 and rigidly secured at the other end to the rigid float stem 5, carrying at one end a proper
 75 float 4, preferably spherical in form, and having the other extremity threaded and adapted for adjusting the end of the said lever thereon to suit the size of the boiler, and secured by proper nuts in a well known manner. The
 80 pivotally mounted end of the said float-lever 6 is provided with a rearwardly projecting bifurcated lug 8, Fig. 1, adapted to force the valve 10 from its seat by engaging the said nuts upon the lower end of the valve-stem 11,
 85 for the purpose hereinafter described. The said lever 6 is also longitudinally slotted for the valve stem 11' and is provided upon its lower edges with the downwardly projecting lugs 9 adapted to force the valve 10' from its
 90 seat by engaging the said nuts on the valve stem 11'. The castings 1 and 3 are firmly united when in position by means of proper clamping bolts in the lateral lugs 39 and 40, or other proper manner.

The whistle 2 consists of a cylindrical stem of proper size and length, surmounted by a suitable head having the rectangular sound-
 100 ing chambers 26 and 27 adapted by their relative size to regulate the quality of the respective sounds or signals, and is provided with the lateral openings 43 and 44 respect-
 105 ively, Fig. 3. The stem of said whistle is also provided throughout its entire length with the semicircular channels 17' and 18' adapted to register with the said channels 17 and 18 and are enlarged at their upper ex-
 110 tremities into the chambers 42, Fig. 1. The said channels 17' and 18' are provided with the steam outlet ports 28 and 29, Fig. 4, at the base of the said lateral openings 43 and 44, respectively. The said whistle 2 is also provided with a central longitudinal channel 19' adapted to register with the said channel 19 of the casting 3, and also adapted to loosely
 115 contain the upper and greater portion of the valve stem 20, as seen in Fig. 1. The said whistle 2 is provided upon its lower extremity with an annular flange 25 adapted to fit over and upon the upper end of the casting 3, and
 120 is rigidly secured thereon by means of a proper clamping screw in the lugs 24, in a well known manner, and is provided upon its upper extremity with the bifurcated lug 36 in which is mounted the downward projecting
 125 lever arm 34, on the pivot 37, having an upward projecting arm 35 and forwardly projecting bifurcated lugs 38 adapted to inclose the free end of the valve stem 20 and to engage the nut 22, for the purpose hereinafter
 130 described.

All parts of my improvement are preferably of brass or other non-corrosive material. The operation and manner of using my in-

vention thus described are briefly stated, as follows: The said casting 3 is properly mounted within the boiler shell 41 at its highest point above the surface of the water in a screw threaded perforation, Fig. 3, has the casting 1, carrying the said spring-pressed valves, rigidly secured thereto, by proper clamping-bolts in the lugs 39 and 40, as described, with the float-lever properly connected therewith and rigidly connected to the said float-stem, and has the whistle 2 firmly mounted thereon, as shown. The range of vertical movement of the said float between low water and high water in the boiler without sounding the respective signals, can be regulated by the operator by raising and lowering the said nuts upon the threaded ends of the valve stems 11 and 11', as the higher they are placed on said threaded ends the less will be the vertical range of the said float between the said signals, and by thus adjusting the said nuts the operator secures a vertical range for the said float which may be made to vary from two inches to two feet. It is apparent from the above description that if the water in the said boiler is lowered beyond a certain predetermined limit, the float lever 6 will force the valve 10' from its seat by bearing on the threaded nut on the valve stem 11', thus permitting the steam to enter the chamber 16, pass upward through the channels 18 and 18' and out through the port 29 and sound the low water alarm, which will obviously be continued until the water has been replenished. When the level of the water in the boiler has been raised above the danger point the lever 6 by means of the said float will be likewise elevated and the valve 10' will resume its normal position in its seat under the tension of the spring 12'. So, if the water in the boiler, from any cause is raised beyond a certain desired limit, the float 4 with the outward end of the float-lever will be correspondingly elevated, thus lowering the bifurcated lugs 8, and thereby forcing the valve 10 from its seat, permitting the steam to pass upward through the chamber 15 and channels 17 and 17', and out through the port 28, thus sounding the high water alarm, the quality of the two sounds or alarms being obviously determined by the respective sizes of the sounding chambers 26 and 27, as seen in Fig. 4. It is evident that lowering the water in the boiler to the proper height permits the valve 10 to resume its normal position under the tension of the spring 12.

When in case of accident, or other sudden emergency of any kind, it is desired to stop or start the machinery, a third or emergency signal, embraced in my improvement, can be given from a distant part of the building in which it is employed, by pulling a proper cord or cable attached to the lower arm 34 or attached to the upper lever arm 35, which thereby forces the valve 21 from its seat by the bearing of the lugs 38 on the nut 22, and permits the steam to enter the ports 30 and

31 communicating directly with the chambers 15 and 16 respectively, thus permitting the steam to pass up through the channels 17 and 17', and 18, and 18' and out through the ports 28 and 29 simultaneously, producing thereby a third, distinct, and independent signal by the union of the other two signals heretofore described.

Having thus described my invention and the manner in which the same is to be applied, what I claim as new and useful, and desire to secure by Letters Patent, is—

1. A whistle for steam boilers comprising a central longitudinal perforation having a proper valve stem loosely mounted therein, carrying a proper spring pressed valve and having suitable means for operating the same the spring pressed valves 10, and 10', as shown, vertical steam channels having outlet ports as shown, sounding chambers and lateral openings therefor, as described, the said whistle being adapted for making three separate and independent signals, the third signal being produced by a union of the other two sounds or signals, all substantially as described.

2. In a water-alarm for steam-boilers, the combination of the casting 3 having a vertical threaded portion adapted to be mounted within a boiler shell, provided with a central perforation for the valve stem 20 carrying upon its lower end the spring-pressed valve 21, vertical steam channels and transverse channels connected therewith, and having inlet ports and valve seats as described, the casting 1 provided with an opened top chamber having lateral inlet ports, vertical perforations for the valve stems, and a dependent lug in which the float stem is mounted, the valves 10 and 10' having threaded valve stems with the nuts 13 thereon, loosely mounted in the said casting 1 and carrying spiral springs as shown, and the valve 21 having a spring-actuated stem loosely mounted in the perforation 19, with the float lever 6 fulcrumed on the lug 7 and adapted to actuate the said valves 10 and 10', and the whistle 2 having steam channels adapted to register with the said channels 17 and 18, and having a lever adapted to actuate the valve 21, all substantially as described.

3. In a water-alarm for steam-boilers, the combination of the casting 3 having a vertical threaded portion adapted to be mounted in a boiler shell and provided with a central perforation 19 for the valve stem 20 bearing on its lower end the valve 21, vertical and transverse steam channels having inlet ports and valve seats as described, the casting 1 having a central chamber with inlet ports and adapted to contain the valve 21, a lug 7 having a bifurcated head, and vertical perforations for the valve stems, as shown, and the valves 10 and 10' having their stems provided with spiral springs and threaded nuts as described, with the float lever 6 pivotally mounted in the lug 7 and having upon one end the

bifurcated lug 8 and upon the other end a proper float, all substantially as described.

4. A whistle 2 for steam boilers consisting of an elongated stem having an annular flange and lateral lugs upon its lower end, and provided with longitudinal steam channels, as described, the said whistle having a central chamber in which is loosely mounted a spring-pressed valve stem carrying upon its lower extremity a normally closed valve 21 and surmounted by a lever arm having a bifurcated lug adapted to operate the said valve, in com-

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bination with the channeled casting 3, the chambered casting 1 and the spring-pressed valves 10 and 10' loosely mounted therein, as described, all substantially as set forth and described.

Signed by me, at Fort Wayne, Allen county, State of Indiana, this 31st day of January, 1894.

PETER A. KIRCHNER.

Witnesses:

KATE B. CHAPIN,
WALT. G. BURNS.