

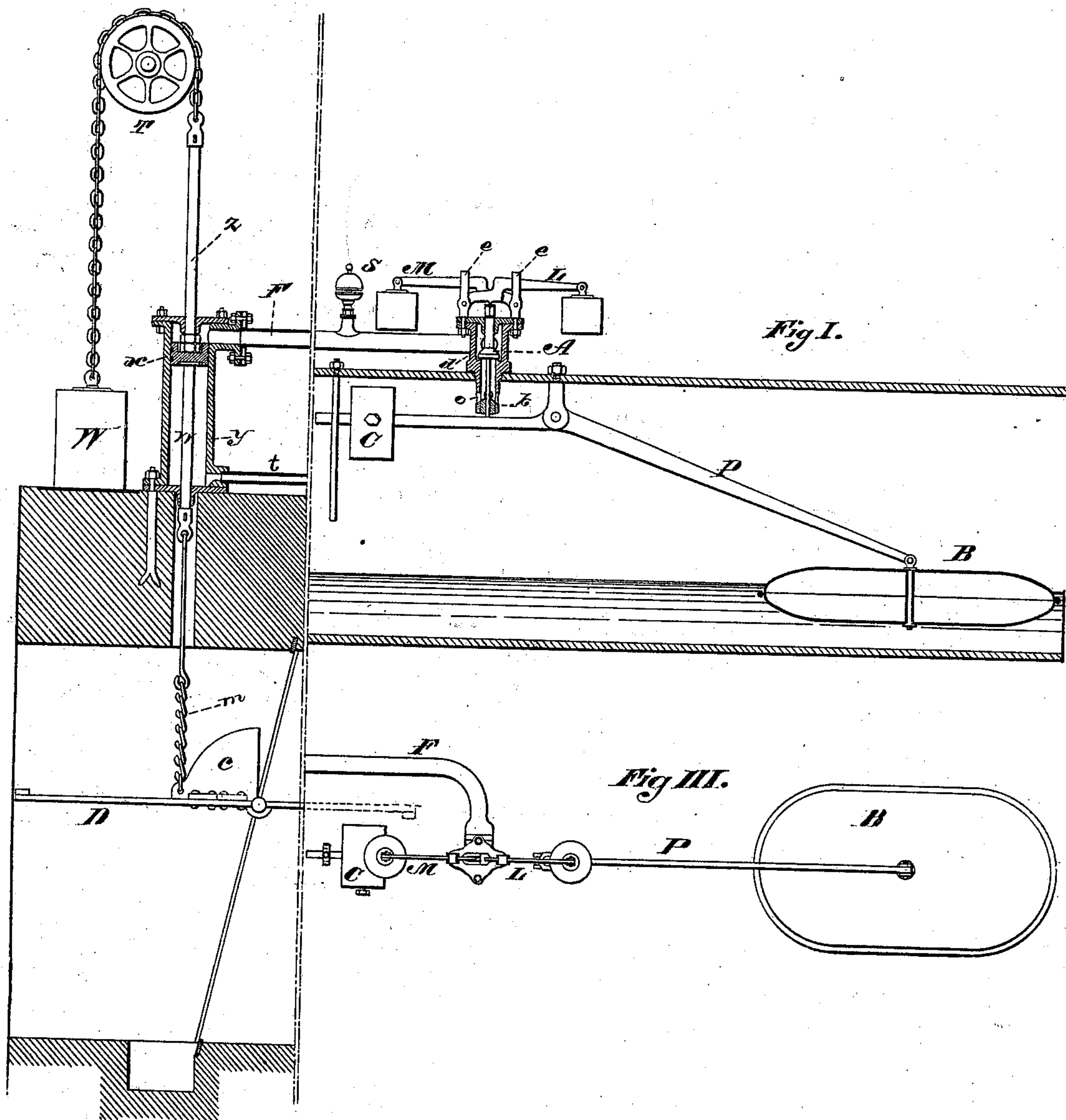
C. DECHAMP.

SAFETY-ATTACHMENT FOR BOILERS.

No. 173,395.

Patented Feb. 15, 1876.

Fig II.



Witnesses:

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CASIMER DÉCHAMP, OF LYONS, FRANCE.

IMPROVEMENT IN SAFETY ATTACHMENTS FOR BOILERS.

Specification forming part of Letters Patent No. **173,395**, dated February 15, 1876; application filed January 19, 1876.

To all whom it may concern:

Be it known that I, CASIMER DÉCHAMP, of Lyons, France, have invented an Improved Automatic Safety Attachment for Boilers, of which the following is a specification:

The nature of my invention is fully illustrated in the accompanying drawings, of which Figures I and II are partial sections, and Fig. III a partial plan view; and my device has for its object the prevention of a dangerous pressure of steam within the boiler, as well as the indication of the existence of any cause that would operate to produce such effect.

My invention consists generally of a valve, A, of peculiar construction, attached to and communicating with the boiler at its top; a float, B, attached to a lever hinged at the upper part of the inside of the boiler, and provided with a counterpoise, C; and a damper, D, with its accessories, which may be placed at any point of the draft-gallery between the boiler and the chimney. The valve A and float B are connected with the damper D by a steam-pipe, F, having at any convenient point thereon a small alarm-whistle, S, rigidly open, and easily sounded, so as to permit the escape of steam. The orifice communicating from the pipe F to the whistle is made small enough to permit the pressure of steam within the pipe to rise rapidly to operate the damper after sounding the alarm, while still large enough to at once relieve the piston *x* of all steam-pressure above it to enable the damper to be at once opened after the escape of steam from the boiler shall have ceased.

The safety-valve I form, as shown in Fig. I, of a case, *d*, let through and firmly secured to the boiler, and having seated within it the double steam-valve A, the lower stem of which passes through and is guided by a plug in the lower end of the case *d*, while the other rises through and is guided by the lid of the case. Steam has access to the valve from the boiler through various ports *o* in that part of the case within the boiler, and when the valve is raised from its seat the steam is free to pass into tube F. The upper stem of valve A that passes through the lid of the case *d* I provide with an anti-friction horizontal surface, for which I prefer polished steel, and upon which,

on a line passing through the axis of this bearing-surface, press the three tempered steel teats from the two levers L M, the one L being forked, and the one M bearing between the separate arms of the one L, so that any inequality in the weight of the levers would not operate to bind the valve-stems in their guides.

The play of the levers L M is limited by the two guides *e e*, so as to prevent the lower stem of the valve from leaving the plug in the bottom of the case *d* that guides it.

These guides *e e* serve as posts to which to hinge the levers L M, and also as screw-bolts to secure the lid to the case or steam-chest *d*, which lid fits steam-tight without the interposition of packing, by being block-jammed or ground to the upper flange of the lid. The float B, made as light as is consistent with strength, and for the construction of which I employ sheet metal thick enough to resist any pressure of the steam or water likely to cause it to collapse or leak, is hung upon the end of its lever P, hinged, as before mentioned, to the interior upper surface of the boiler, so that the shorter arm of the lever will bear against the projecting stem of the valve A, while the end of the shorter arm is provided with a counterpoise, C, if desired, and is properly guided within the boiler to cause the lever P to play in a vertical plane.

The damper and its accessories I form as follows: The damper proper D is a sheet-iron plate hung upon a horizontal axis in a suitable frame, so that when open the draft to the chimney is unimpeded, but which, when closed, completely cuts off the draft. This damper is hung in its frame to one side of its center, so that the weight of the damper will close it when released, and hold it closed. In the middle of the damper is the quadrant *c*, on which runs the chain *m* from the piston-rod *w*, to enable the weight of the damper to be exerted always in a line coincident with the line of movement of the piston in its cylinder. This cylinder *y* contains the piston *x*, which is provided with the rod *w*, connected by its chain *m* to the damper D, and the rod *z* connected to a chain passing over the pulley T, and having to its end the weight W,

the rods moving through the top and bottom heads of the cylinder; and it will be seen that any movement of the piston in its cylinder will have the effect of moving both the damper D and weight W. Steam is conveyed at the proper time to the cylinder *y* above the piston-head *x* by the pipe F, and a pipe, *t*, from the bottom of the cylinder carries off any drip or steam below the piston-head.

The operation of this device is as follows: Should the pressure of steam within the boiler reach a certain point it lifts the valve A from its seat against the weighted levers, and permits the steam to pass into pipe F, a portion of which steam sounds the whistle, while the rest coming above the piston-head *x* neutralizes the weight W, and permits the damper D to swing to close the draft. The escape of steam through the whistle and the closing of the damper each act as separate causes to at once reduce the pressure within the boiler, while the sounding of the whistle at once gives the alarm and continues to do so until the proper equilibrium is restored. The reduction of the pressure within the boiler to the proper point allows the weighted levers to return the valve A to its seat to shut off the flow of steam to pipe F, and the piston-head *x* thus relieved is returned to the top of its cylinder by the weight W, and the damper D opened. Should the water in the boiler become low, the short arm of lever P at once raises the valve A to sound the whistle and stop the draft until the sufficiency of water being made up the damper is automatically raised to permit the generation of steam.

Thus it will be seen that the dangerous pressure of steam, or the low state of the water that might soon lead to such pressure, is at once obviated or guarded against, while any disorder that might lead to an explosion is in-

dicated by the whistle, or any disorder of the working parts of this device, such as the sinking of the float, or the parting of either chains, or the breaking of either rod *z* or *w* connected thereto, is made known at once to the fireman either by the whistle or the stoppage of the draft, as in either or both events the cause will be indicated by the water or steam gage, while no danger can exist while they are being obviated.

In place of weight W or of the weighted lever bearing upon the top of the valve-stem, springs may be used to oppose the necessary resistance.

In this device no packing or stuffing box is needed, as the steam when once past the valve A is at liberty to escape, there being always sufficient to sound the whistle and move the piston to lower the damper, and it is not necessary that the damper should close entirely, nor does it always do so, as the partial closing of it diminishes the draft sufficiently to lower the steam-pressure in the boiler.

Now, having described my invention, what I claim is—

1. In combination with valve A and piston *x*, the pipe F, having orifice S therein at a point between the valve A and the cylinder *y*, having the piston *x*, in the manner and for the purpose set forth.

2. In combination with valve A, pipe F, piston *x*, and damper D, the float B with its lever P, the parts being all constructed and arranged substantially in the manner and for the purpose shown and described.

Lyons, France, May 23, 1874.

C. DÉCHAMP.

Witnesses:

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REBOUL.