

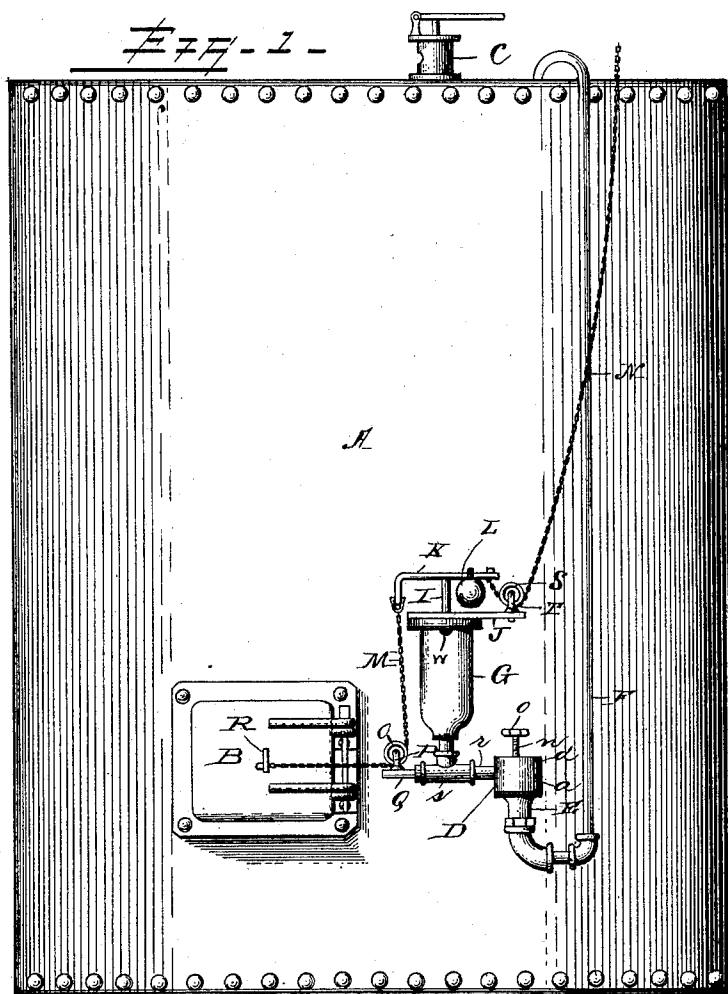
(No Model.)

2 Sheets—Sheet 1.

J. KASTNER, Jr.
SAFETY APPLIANCE FOR STEAM BOILERS.

No. 474,135.

Patented May 3, 1892.



Witnesses

Albert B. Blackwood
Charles E. Smith

Inventor

John Kastner Jr.
by Soule & Co.
Attorneys

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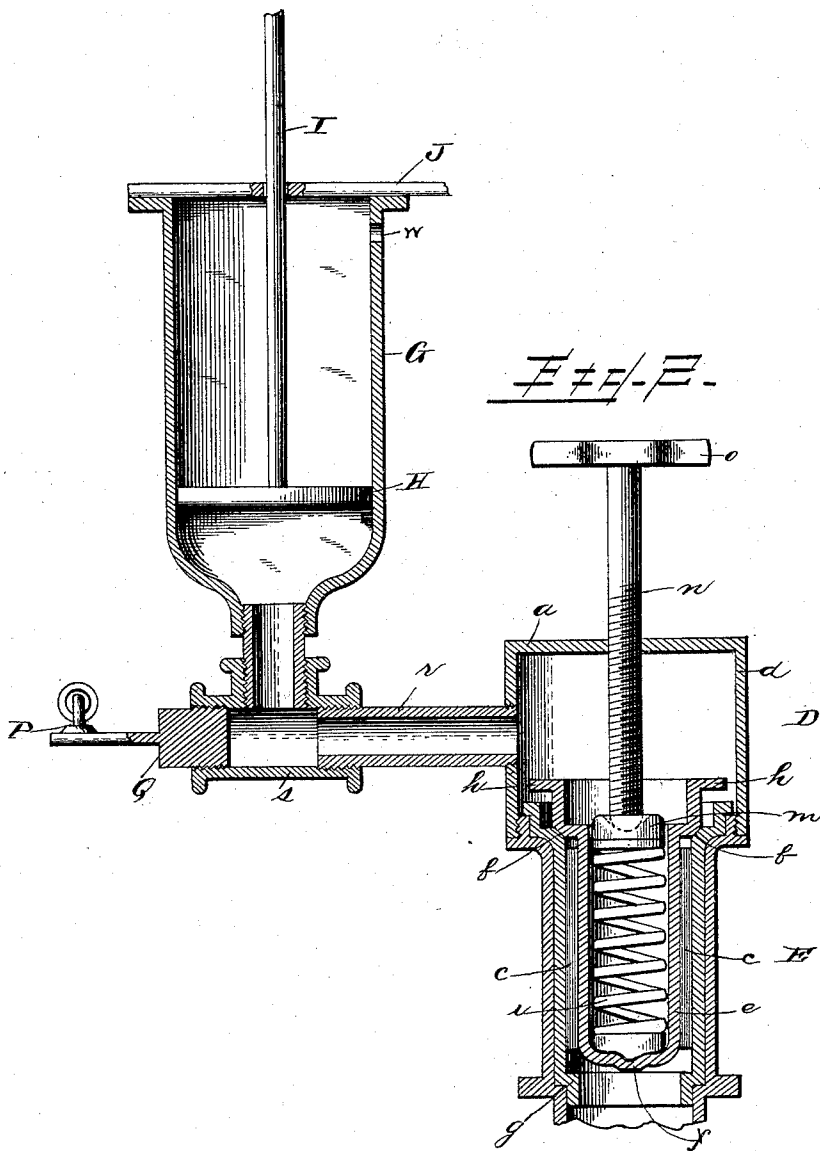
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Carleton Edmell,

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his Attorneys

UNITED STATES PATENT OFFICE.

JOHN KASTNER, JR., OF EVANSVILLE, INDIANA.

SAFETY APPLIANCE FOR STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 474,135, dated May 3, 1892.

Application filed June 19, 1890. Serial No. 355,994. (No model.)

To all whom it may concern:

Be it known that I, JOHN KASTNER, Jr., of Evansville, in the county of Vanderburg and State of Indiana, have invented certain new and Improved Safety Appliances for Steam-Boilers, of which the following is a specification.

The present invention comprises an auxiliary safety-valve to a steam-boiler, (in addition to the usual safety-valve,) which on the steam-pressure approaching a danger-limit opens and discharges steam which actuates mechanical devices, which in turn open a damper or door to check the fire, and at the same time operate a signal calling the attention of an attendant to the excessive or dangerous pressure.

The improved safety appliances are illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of an ordinary vertical steam-boiler, showing the improvements applied thereto; and Fig. 2 is a vertical section of the improved auxiliary safety-valve and of the power-cylinder into which steam is admitted when the auxiliary valve opens.

The present improvements may be applied to any type of steam-generator, but are shown as applied to an ordinary vertical steam-boiler A, having a fire-box beneath it, which is supplied with fuel through a door B and having the usual safety-valve C, of any known construction.

D is the auxiliary safety-valve and its casing as a whole, which may be located in any convenient position, preferably, however, as shown, in the vicinity of the door B. The casing E of the safety-valve D is supplied with steam by a steam-pipe F, which is supplied with steam from the upper part of the boiler, preferably from a point where the steam-pressure is greatest. The steam-supply pipe enters the casing E at the lowest part thereof. The casing E is made up of a cylinder *a*, having an annular valve-seat *b* near its upper end and internal radial wings *c*, which guide the valve, and of a cap *d*, which fits over the upper open portion of the cylinder *a*. The auxiliary safety-valve is formed of an inverted hollow cylindrical cup *e*, having a closed bottom *f*, which is located within the casing-cyl-

inder *a*, and is guided by the wings *c* of a lower flanged portion *g*, which seats on the annular seat *b*, and of an enlarged upper projecting flange *h*, which extends outwardly over the upper edge of the casing-cylinder *a*, but is less in diameter than the internal diameter of the cap *d*. Within the valve-cup *e* is a coiled spring *i*, carrying on its upper end a recessed tension-plate *m*, into the recess of which enters the lower pointed end of a tension-regulating screw *n*, which fits in a threaded aperture in the top of the casing-cap *d* and carries above the cap a regulating-wheel *o*. By turning the wheel *o* the tension of the spring *i* can be regulated so that the auxiliary valve may open at any predetermined spring-pressure. Preferably the auxiliary valve is regulated so as to open at a pressure slightly less than that at which the usual safety-valve C blows off. When the steam-pressure in the valve-casing E below the auxiliary valve reaches the limit for which the auxiliary valve is set, the latter is lifted from its seat. The steam then escapes between the valve and its seat, and impinging against the flange *h* it lifts the valve some distance from its seat, so that a copious amount of steam is discharged into the cap *d*. The steam which thus enters the cap *d* is conducted into the lower end of a power-cylinder G by means of a pipe *r* and T-fitting *s*. The power-cylinder G is bored to a true circle on its interior and in it fits and moves a piston H. The piston carries a vertical upwardly-extending rigid piston-rod I, which extends through a guide-bridge J on the top of the cylinder G. With the exception of this bridge the upper end of the cylinder G is open to the air.

Secured to the upper end of the piston-rod I is a cross-bar K, which carries a weight L, which restores the piston to its normal lowermost position. To opposite ends of the cross-bar are attached two chains M N. One chain M passes downward around a guide-pulley O, mounted in a bracket P on a plug Q, fitting into the open end of the T-fitting *s*, and thence extends to a lever-arm R, secured to the door B of the fire-box. The other chain N passes downward around a guide-pulley S, mounted in a bracket T on a projecting end of the bridge J, and thence extends to the operating mech-

anism of any suitable signaling device, which may be a steam-whistle, an alarm-bell, or a visual annunciator, and which is located so as to call the attention of an attendant. The steam which is admitted to the casing-cap *d* when the auxiliary safety-valve opens passes into the cylinder *G* beneath the piston *H* and elevates the piston with its rod *I* and cross-bar *K*, thus pulling on the chains *M N*, which in turn open the fire-box door, thus checking the fire, and give a signal to the attendant.

The power-cylinder is provided with a waste-hole *w* near its upper end, through which the steam escapes when the piston *H* is elevated to its uppermost position. A waste-pipe may be attached to this waste-hole.

I claim as my invention—

A valve-casing having a cylindrical portion *a* and an annular valve-seat *b*, a cap *d*, covering said casing, an inlet to said casing, and an outlet from said cap, a valve having an inverted cup portion *e* fitting and sliding within the cylindrical portion *a* of said valve-casing, a flanged seating portion *g*, adapted to said seat *b*, and an upper enlarged annular flange *h*, a coiled spring *i* within said cup portion *e*,

and a regulating-screw *n* for said spring, screwing through an aperture in said cap *d* and having exterior to said cap a manipulating-wheel *o*, in combination with the power-cylinder *G*, the piston *H*, sliding in said cylinder, the rod *I*, attached to said piston and extending above said cylinder, said power-cylinder beneath said piston receiving steam from said outlet from said cap *d*, the guide-pulleys *O* and *S*, the cross-bar *K*, attached to said rod *I* and having position always above said pulleys, and chains *M* and *N*, connected to the ends of said cross-bar, one of said chains extending downwardly from said cross-bar around one of said pulleys and thence to a signaling device and the other of said chains extending downwardly from said cross-bar around the other of said pulleys and thence to a door or damper, substantially as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN KASTNER, JR.

Witnesses:

JOHN M. WHITE,
MONROE TILMAN.