(No Model.) 2 Sheets—Sheet 1.

M. JÖRGENSEN.

BOILER FEEDER REGULATOR.

No. 303,575. Patented Aug. 12, 1884.

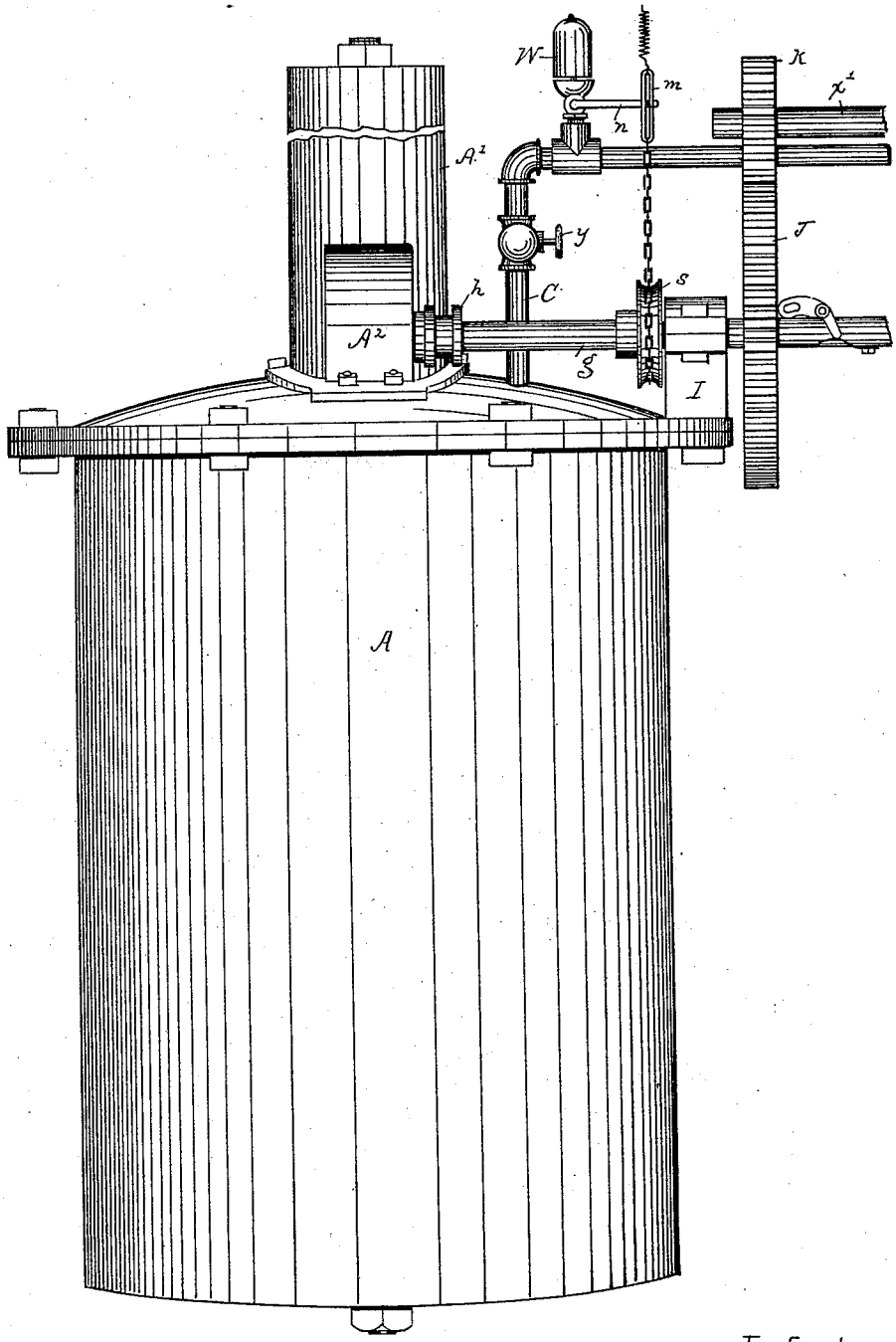

Fig. 1.

Witnesses:
Geo. A. Dickson
G. W. Emerson

Inventor:
Mathias Jörgensen
by G. G. Sloan Atty.

(No Model.) 2 Sheets—Sheet 2.

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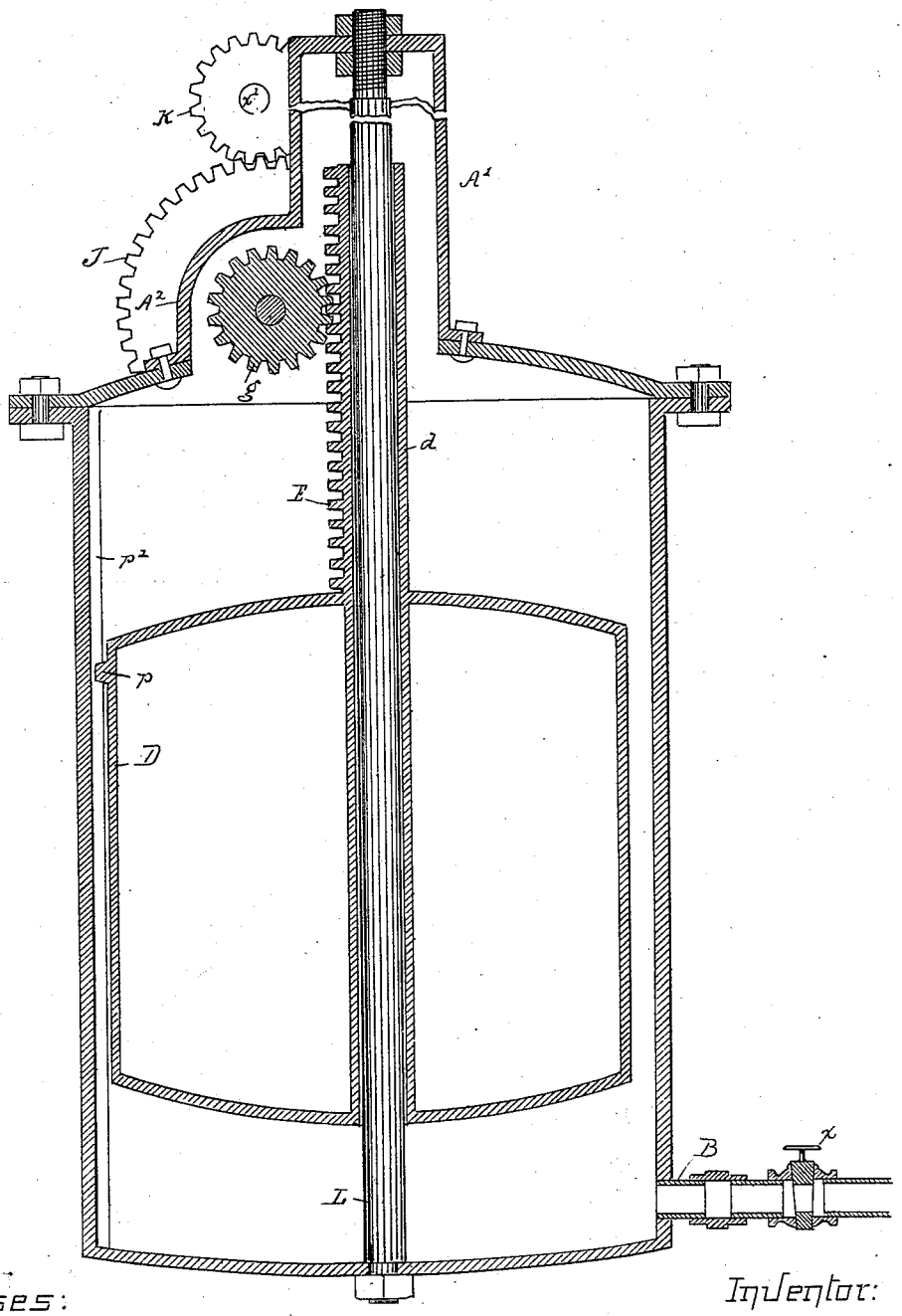

Fig. 2.

Witnesses:

Geo. A. Dickson

G. W. Emerson

Inventor:

Mathias Jörgensen

by Dodge Brown Atty.

UNITED STATES PATENT OFFICE.

MATHIAS JÖRGENSEN, OF SONOMA, CALIFORNIA.

BOILER-FEEDER REGULATOR.

SPECIFICATION forming part of Letters Patent No. 303,575, dated August 12, 1884.

Application filed October 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, MATHIAS JÖRGENSEN, of Sonoma, county of Sonoma, State of California, have invented an Improved Automatic Boiler-Feed Regulator; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to automatic devices for regulating the supply of feed-water to steam-boilers, and it embraces certain improvements in such class of boiler attachments having for their object to produce a simple and reliable device for automatically turning on a supply of feed-water, as required by the boiler, and shutting off the supply when the desired quantity has been supplied.

The following description fully explains the nature of my said improvements and the manner in which I produce, construct, apply, and combine them for the desired purpose, the drawings being referred to by letters and figures.

Figure 1 is a general outside view in elevation of a device constructed after my invention. Fig. 2 is a vertical section through the case and float.

A cylindrical case or chamber, A, has connection from the bottom through a pipe, B, with the water-space, and through a pipe, C, at the top, with the steam-space of a boiler, both pipes provided with the necessary valves and cocks *x y*. Through these connections the same conditions of steam and water exist in the cylinder as they do in the boiler, and as the level of the boiler-water is thus always indicated, in the cylinder it is caused to operate a gravity-float, D—that is, a float or drum so ballasted that it is always maintained at a certain depth of immersion, and will fall as well as rise with sufficient force or momentum to operate upon a gear-wheel and impart rotation to a shaft connected therewith. This drum is a weighted cylinder, D, with a tubular shaft or axis, *d*, extending centrally through it from top to bottom, and carried perpendicularly above the top, also to form a support for or constitute the body of a rack, E. The head of the case A has an extension-chamber, A′, upon the top, and in line with this central tube affords room for the vertical play of the drum, and at one side of this space a recess, A^2, is fixed to receive a short shaft and a pinion, *g*. The shaft extends outside the chamber through a stuffing-box, *h*, and runs through a box, I, bolted on top of the cylinder-head. The pinion *g*, being set to engage the rack, receives rotation from the movement of the float, and in turn moves the shaft *x′*, and this shaft, on the outside, is connected with the steam-supply valve of a feed-pump, or with the service-cock of a supply-pipe, according to the desired manner in which the boiler is supplied with water. The manner in which I connect this shaft with the water-supply is as follows: By means of a spur-wheel, J, and pinion K, I connect the shaft *g* with a counter-shaft, *x′*, just above it, and to the end of the counter-shaft I join the stem of a valve in the steam-pipe of the feed-pump; or, if direct control of a service-pipe is required, the connection will be to the service-cock. In either case rotation of the counter-shaft is employed to turn the valve. The amount of motion required to open and close the valves determines the proportion and the positions of the wheel and pinion, as will be understood.

To operate a globe-valve, the shaft will require to make several revolutions, and the pinion and spur-wheel will be arranged as shown in the drawings. The float slides upon the fixed guide-rod L, passing through the tube *d* and secured in the top and bottom ends of the case, and to keep the rack in gear with the pinion a rib or lug, *p*, on the side of the float, takes into a groove, *p′*, in the side of the cylinder. Being thus connected, the float moves up and down as the water-level changes, and between the two extremes of high and low water there is produced sufficient movement of the rack to operate the pinion-shaft with the amount of movement necessary to open and close the valve having connection with the shaft.

In connection with the apparatus thus produced I provide an alarm-signal to indicate automatically any derangement or improper working of the device or its attachments, whereby the supply of feed-water to the boiler is interrupted or is not turned on by the apparatus when required. Upon the steam-pipe C, I place an alarm-whistle, W, the lever of which is connected to a chain running over a small sheave, *s*, on the shaft *g*, the connection being made by a long link or slotted bar, *m*, in the chain and a pin in the end of the lever

n, so as to permit the shaft to rotate under ordinary conditions without pulling the lever. This attachment is so applied and regulated that if the float continues to descend in the chamber after reaching the low-water line, at which point the cylinder should begin to receive water from the boiler as the feed-water is turned on, then the improper action of the feed-pump or other cause interrupting the water-supply will be immediately indicated by the alarm-whistle. As no water enters the float-chamber, the float descending below the proper water-line will rotate the shaft sufficiently to wind up the chain and draw down the alarm-lever. Where the same shaft connects with the valve or cock controlling the feed-water, the valve should have sufficient area of opening to permit this additional rotation of the shaft to take place without closing or contracting the outlet.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A feed-water regulator for steam-boilers, consisting of a case or chamber, A, having connection with the water and steam spaces of the boiler through pipes B C, the weighted float, the guides p^2, and mechanism connecting said float with a globe-valve in the steam-pipe of the feed-pump in a direct water-supply pipe, whereby the vertical movements of the float within the chamber are converted into a rotary movement at the stem of the valve or cock and caused to turn the same, constructed and applied for operation substantially as hereinbefore described.

2. In a feed-water regulator, the combination, with a case or chamber having inlets for connection with the water and steam spaces of a steam-boiler, of the float D, guides p^2, rack E, pinion *g*, within the case, and the pinion-shaft working through the side of the case and having connection with the stem of the valve or service-cock to be operated on, whereby the falling and rising movements of the float are caused to open and close the valve or cock, substantially as hereinbefore described.

3. In a feed-water regulator of the character hereinbefore described, the combination, with the float D, of the rack extending above and from the center of the float and the pinion *g*, within the case, having its shaft projected through a stuffing-box in the side of the pinion-chamber A^2.

4. In a feed-water regulator of the character hereinbefore described, the combination, with the steam-pipe C, of the alarm-whistle and mechanism, as W, connecting the lever thereof with a shaft, *g*, which receives rotation from the rising and falling movement of the float, substantially as hereinbefore described, to operate as and for the purpose set forth.

In witness whereof I hereunto set my hand.

MATHIAS JÖRGENSEN.

Witnesses:

G. W. EMERSON,

S. M. KLINE.