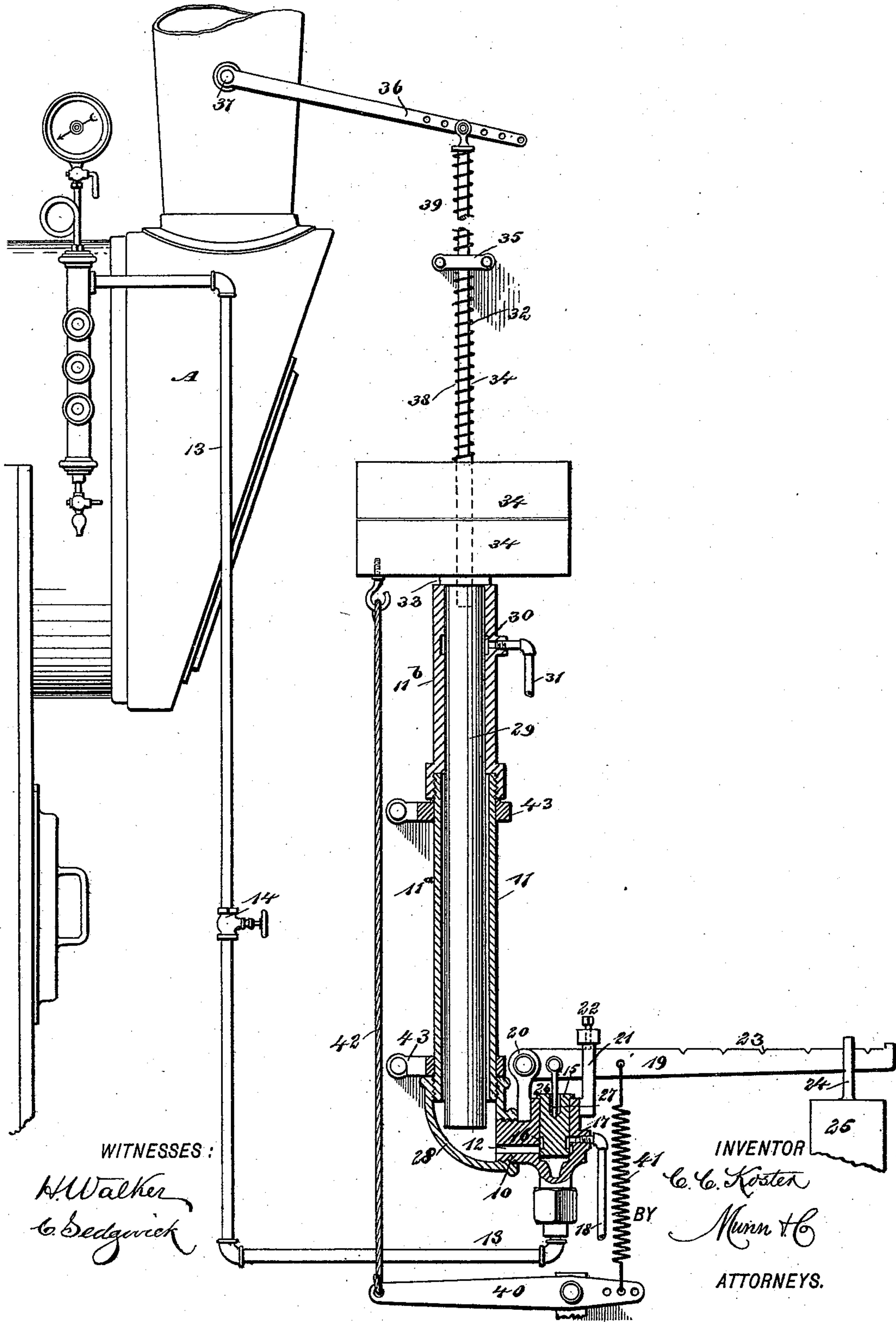


(No Model.)

C. C. KOSTER.  
DAMPER REGULATOR.

No. 486,345.

Patented Nov. 15, 1892.





# UNITED STATES PATENT OFFICE.

CHARLES C. KOSTER, OF NEW YORK, N. Y.

## DAMPER-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 486,345, dated November 15, 1892.

Application filed May 3, 1892. Serial No. 431,650. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES C. KOSTER, of New York city, in the county and State of New York, have invented a new and Improved Damper-Regulator, of which the following is a full, clear, and exact description.

My invention relates to an improvement in damper-regulators adapted for use in connection with boilers and like objects, and has for its object to provide a means whereby when a predetermined pressure of steam is formed in a boiler the damper will be automatically acted upon by the steam, and the damper located in the flue connected with the boiler will be partially or entirely closed, according to the excess of steam that may exist.

A further object of the invention is to so construct the regulator that the damper will be practically opened the moment that the steam falls below a predetermined pressure.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawing, forming a part of this specification, which represents a partial vertical section through the regulator, illustrating its attachment to a boiler, a portion of the boiler being shown in side elevation.

In carrying out the invention convenient to the boiler A or the article in connection with which the device is to be employed a valve-casing 10 is attached to any approved support. This valve-casing communicates with a cylinder 11 at one end by means of a port 12, the cylinder being placed and held in a vertical position. The valve-casing at its lower end is in direct communication with a pipe 13, the said pipe being preferably provided with a suitable valve 14 and is carried upward or in proper direction to communicate with the steam-dome or steam-space of the boiler. Within the valve-casing a valve-plug 15 is located, capable of being raised and lowered in its seat. When the valve-plug is fully seated, the port 12 in the valve-casing, leading into the cylinder 11, is closed, as is likewise communication between the boiler and the said port 12. The valve-plug is provided with an annular recess 16 near its

lower end, which is in communication with a port 17, located in that end of the valve-casing opposite the one containing the port 12, and into the port 17 a drip-pipe 18 is entered.

The valve-plug is normally held in its seat or in its lower position by means of a lever 19. This lever is fulcrumed at one end upon the valve-casing, as illustrated at 20 in the drawing, and passes over the valve-casing and valve-plug through a guide-strap 21, which strap carries a set-screw 22, bearing upon the upper edge of the lever, and the lever is provided with a series of notches or recesses 23, adapted to receive the hook or eye 24 of a weight 25. The lever is also provided near its fulcrum with a pin 26, which extends downward and has bearing upon the base-wall of a recess 27, formed in the top of the valve-plug.

The set-screw 22 limits the upward movement of the lever, and by thus limiting the movement of the lever the upward movement of the valve-plug is also limited, and the quantity of steam that shall escape from the boiler through the port 12 into the cylinder 11 and the position of the weight 25 will determine the amount of steam-pressure necessary to elevate the valve-plug and provide for an escape of steam.

The cylinder 11 is preferably made in two sections, a lower section 11<sup>a</sup> and an upper section 11<sup>b</sup>. The lower section may simply consist of a pipe, which is shown in the drawings as screwed at its lower end into an elbow 28, which elbow is screwed upon the valve-casing. The upper section 11<sup>b</sup> of the cylinder is screwed upon the pipe, and this upper section is bored properly to receive snugly a piston 29, which piston extends normally from one end of the cylinder to the other. In the upper section 11<sup>b</sup> of the cylinder an interior recess or channel 30 is produced to receive any steam that may lodge around the piston or any product of condensation, and this recess or channel communicates with a drip-pipe 31.

In the upper end of the piston 29 the lower end of a rod 32 is entered and secured. This rod carries a washer 33, which rests directly upon the top of the piston and covers the top of the cylinder, and upon the rod weights 34, in any desired number, are placed, the said



weights resting upon the washer. The rod 32 passes up through a guide-strap 35, and its upper end is pivotally and adjustably attached to a handle 36, connected with the trunnions 37 of the damper to be operated upon. The rod 32 is surrounded by two springs 38 and 39. The upper spring 39 at its upper end bears against a head formed at the top of the rod, and the lower end of the spring rests upon the upper surface of the strap 35. The lower spring 38 bears against a collar formed upon the rod above the weights, and the said spring bears likewise against the strap 35 at its under face. Thus it will be observed that when the rod 32 is forced upward, which movement closes the damper, the lower spring 38 is contracted and the upper spring 39 is expanded. By this means the rod 32 is prevented from acting too suddenly upon the damper, or closes the damper gradually, while when the piston 29 falls, and the weights with it, the upper spring serves to counterbalance the action of the lower spring, as the lower spring would at that time act to quickly force the rod downward and likewise the piston connected with it. Another equalizing device is provided, which also tends to draw the weights downward, and this device consists of a lever 40, fulcrumed between its center and one end beneath the valve-casing, the shorter end of the lever being adjustably attached to the weighted lever 19, acting directly upon the valve by a spring 41, while the longer end of the lever 40 is connected by a rope or chain 42 with the lower weight 34. Suitable straps 43 are employed to hold the cylinder 11 in its upright position.

The operation of the device is as follows: The valve 14 being opened when an excess of steam-pressure is generated in the boiler, the steam is forced down through the pipe 13 against the bottom of the valve-plug 15 and will force said plug upward until the port 12 in the valve-casing is uncovered, whereupon the steam passes through that port into the elbow 28 beneath the piston 29 and will force the piston upward, moving the weights 34, and in carrying the piston upward the rods with which the weights are connected will be taken in the same direction and the handle of the damper will be gradually forced upward and the damper will at that time be wholly or partially closed, according to the pressure of steam acting upon the piston. As the pressure of the steam in the boiler decreases the lever 19 and weight 25 will overbalance the pressure of steam against the valve-plug 15 and carry it down, which action closes the port 12 against the boiler-pressure and opens the port 16, so that the steam under the piston will escape into the outside atmosphere, which will allow the piston to descend and open the damper slowly; but when the piston is on its downward stroke the tension of the lever 19 will decrease, owing to the tendency

of the spring 41, which will become slack, allowing the damper to open but a slight distance at short intervals. The springs on the rod 32 are intended to render the working of the machine or device noiseless and to prevent any injury occurring to the device during its operation.

It will be observed that this device is exceedingly simple and durable and that it may be connected with any boiler, and, further, that it is perfectly reliable and automatic in its action. After the valve-plug has seated itself any water that may be around the plug will escape through the channel 16 into the drip-pipe 18.

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

1. A damper-regulator consisting of a valve-casing adapted for communication with the steam-space of the boiler, the said casing being provided with a sliding valve-plug and a port controlled by the plug, a weighted lever bearing upon the valve-plug, a cylinder communicating with the port in the valve-casing, a piston held to slide in the cylinder, a rod projected upward from the piston, provided with spring-cushions and adapted for attachment to the handle or manipulating-arm of the damper, a guide or bearing for the rod between the two springs, and weights carried by the rod, as and for the purpose set forth.

2. A damper-regulator for boilers, consisting of a valve-casing adapted for connection with the steam-space of the boiler and provided with an outlet-port and a valve-plug regulating the opening of the said port, a weighted lever having bearing upon the valve-plug, which controls the inlet and the escape of steam, normally maintaining it in its seat and closing the port in the valve, a cylinder in direct communication with the valve-casing port, a piston having movement in the cylinder, a spring-cushioned rod attached to the piston and adapted for adjustable connection with the damper arm or handle, weights carried by the rod, a lever 40, pivoted between its ends below the valve-casing, a spring connecting one end of said lever with the said weighted lever, and a connection between the opposite end of lever 40 and the weights, substantially as and for the purpose set forth.

3. A damper-regulator for steam-boilers, consisting of a valve-casing adapted for connection with the steam-space of a boiler and provided with a port, a valve-plug controlling the port, a drip-opening, a lever fulcrumed at one end over the casing, provided with a pin extending down and bearing upon the valve-plug, a strap through which the lever passes, and provided with an adjusting-screw and a weight adjustable upon the lever, a cylinder in communication with the main port of the valve-casing, a piston having sliding movement in the cylinder, a rod projected upward



from the piston and adapted for attachment to the arm or handle of a damper, springs carried by the rod, one being compressed when the other is expanded, weights connected  
5 with the rod, and a counterbalance-lever having a spring connection at one end with the weighted lever and a connection at its opposite end with the weights over the piston, as and for the purpose set forth.

CHARLES C. KOSTER.

Witnesses:

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