

No. 660,690.

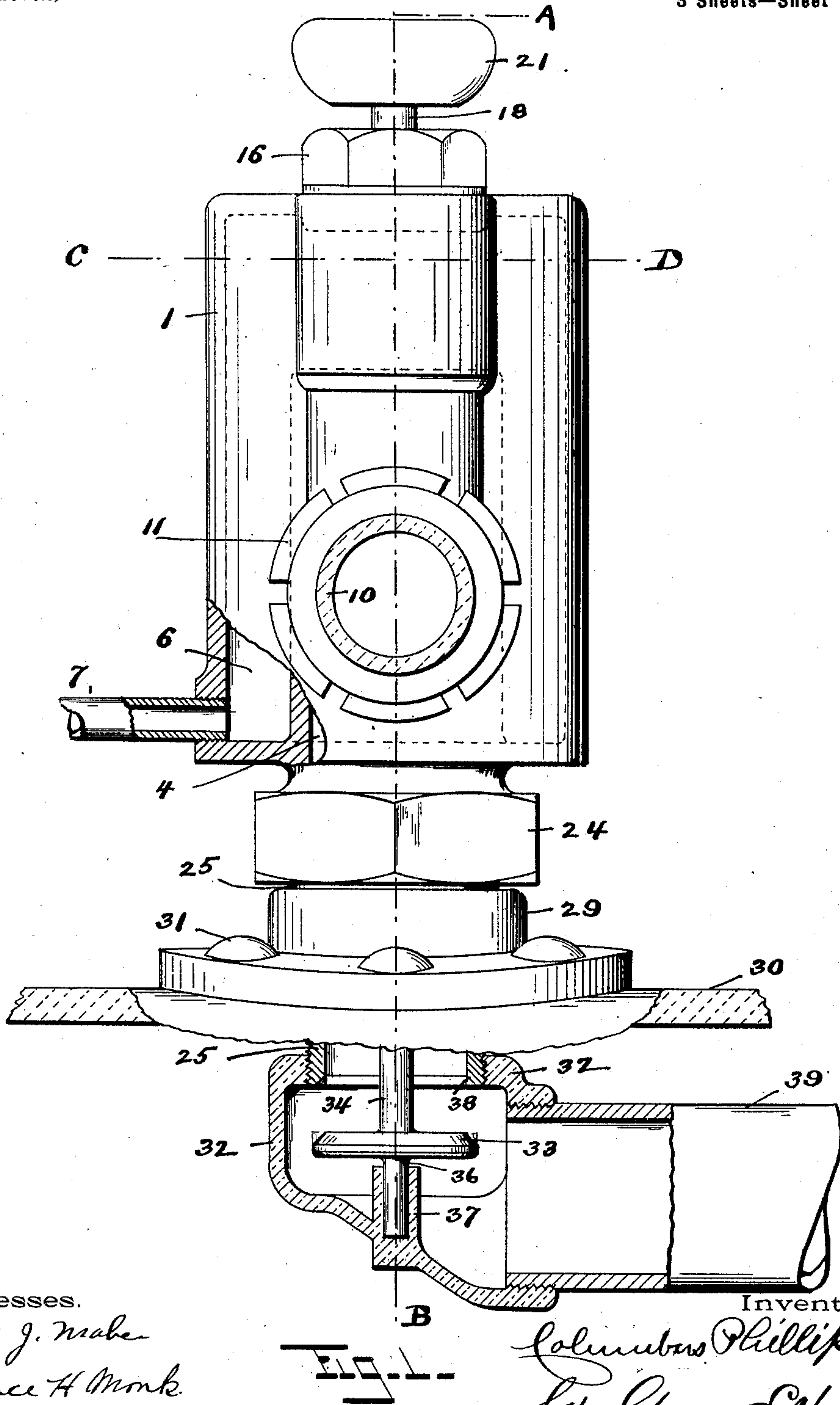
Patented Oct. 30, 1900.

C. PHILLIPS.  
BOILER ATTACHMENT.

(Application filed July 13, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.  
Edward J. Mabe  
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Inventor.  
Columbus Phillips  
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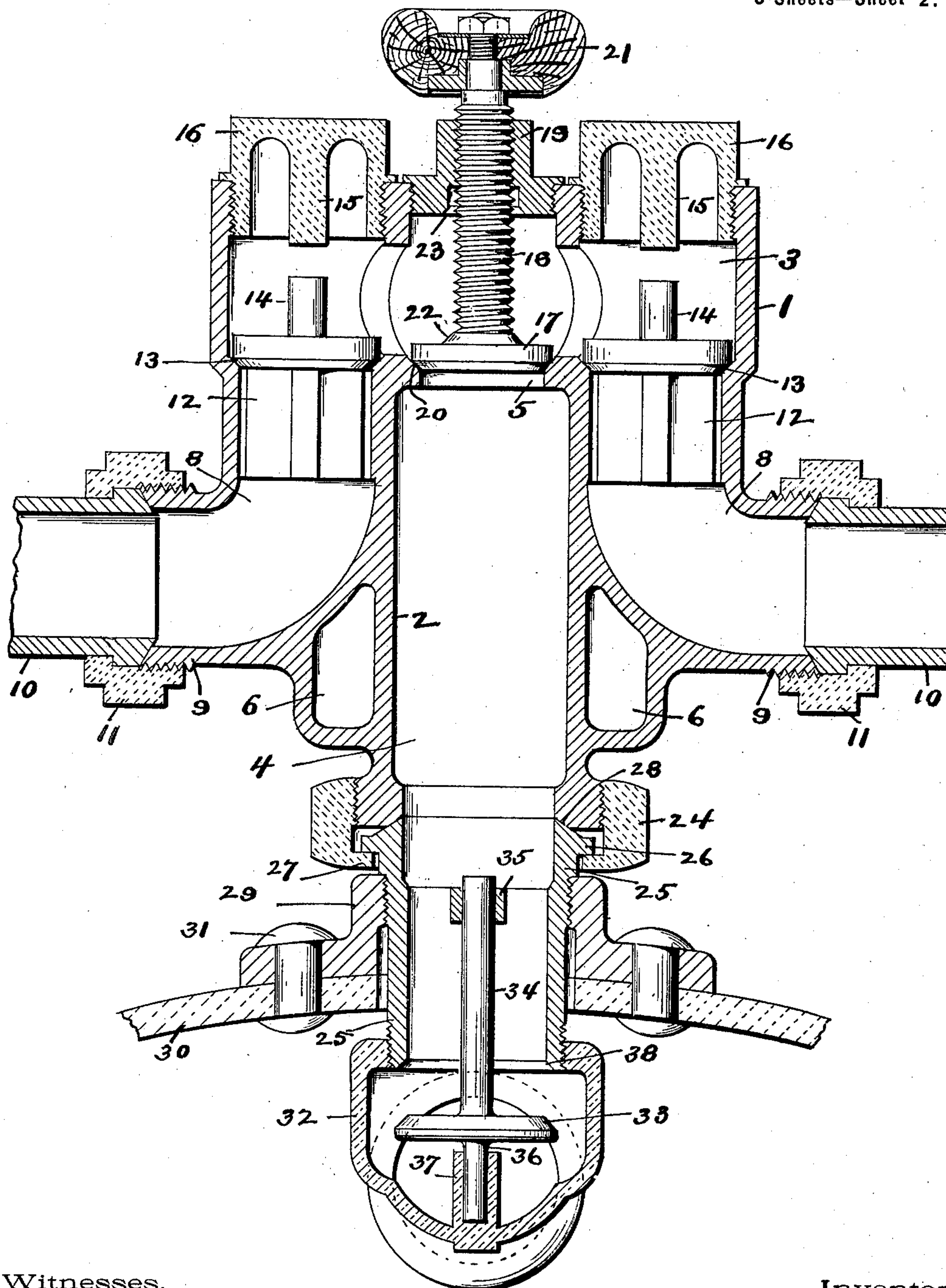
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(No Model.)

3 Sheets—Sheet 2.



Witnesses.

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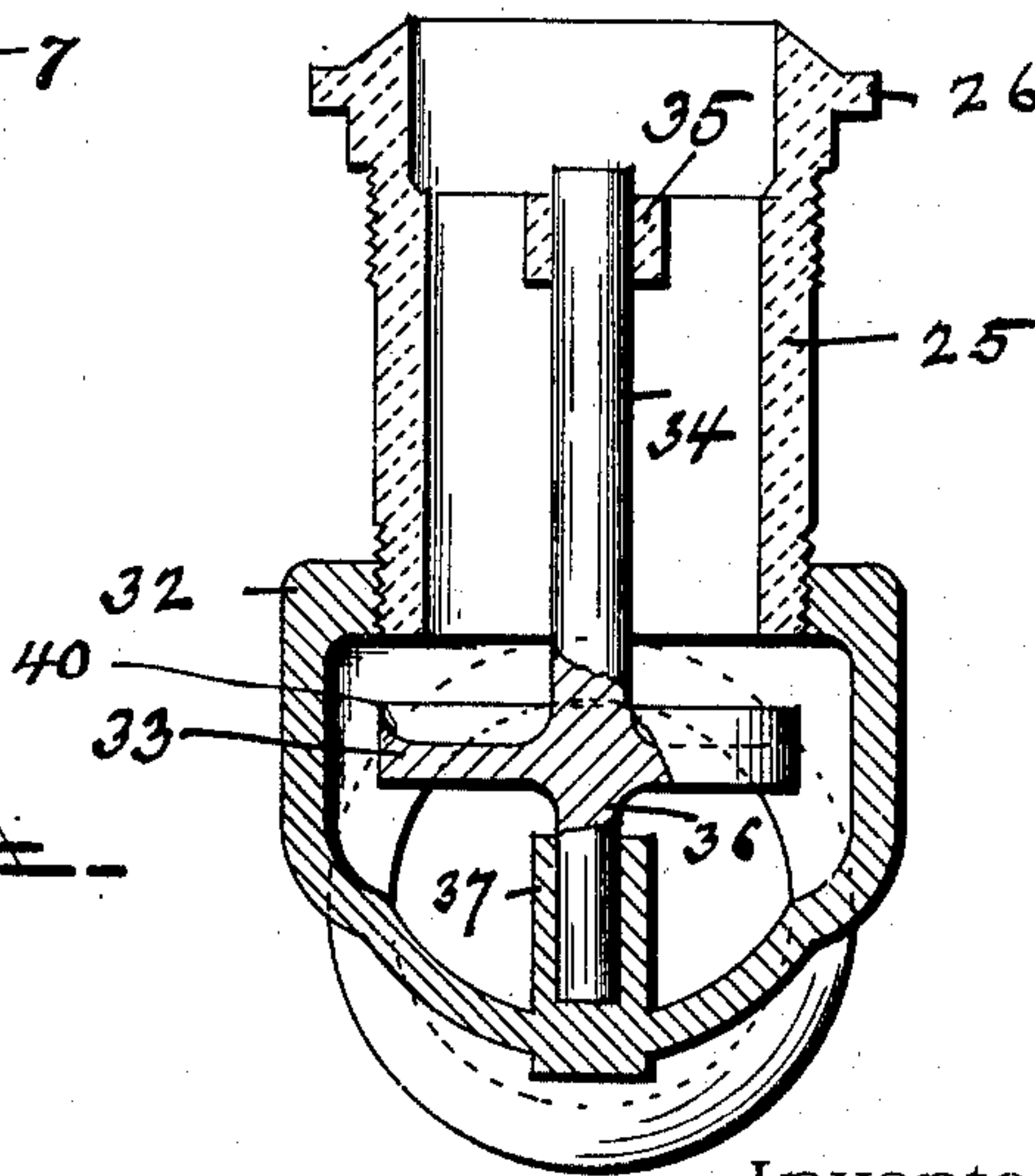
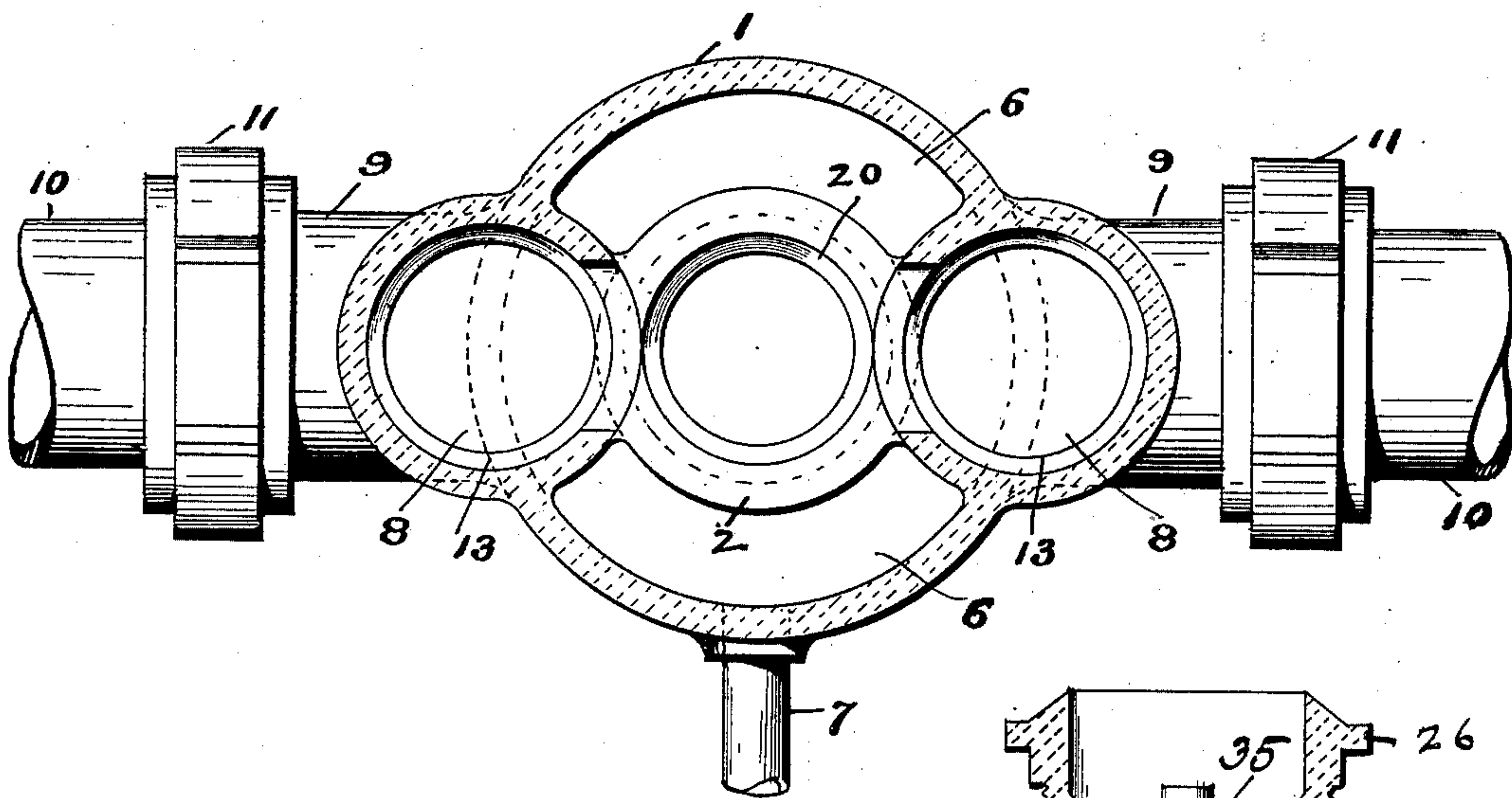
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3 Sheets—Sheet 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

COLUMBUS PHILLIPS, OF MERIDIAN, MISSISSIPPI, ASSIGNOR OF ONE-HALF TO  
JAMES E. MINOR, OF NEW HAVEN, CONNECTICUT.

## BOILER ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 660,690, dated October 30, 1900.

Application filed July 13, 1900. Serial No. 23,588. (No model.)

*To all whom it may concern:*

Be it known that I, COLUMBUS PHILLIPS, a citizen of the United States, residing at Meridian, in the county of Lauderdale and State of Mississippi, have invented certain new and useful Improvements in Attachments for Feed-Water Injectors, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an attachment for feed-water injectors for locomotive-boilers, and refers more especially to improvements upon a device of this character invented by me and patented in United States Letters Patent No. 433,028, dated July 29, 1890.

It is the object of my invention, among other things, to construct an attachment for feed-water injectors which can be attached to the boiler of a locomotive and in which the valve through which water is admitted to the boiler will be above the water-inlets when the valve is open, so that the water-pressure will not be exerted upon the valve and its stem; to provide an auxiliary cooling-chamber and connect it with the water-inlets, so that the same will be always filled with water and have a cooling tendency upon the adjacent parts; to provide a safety-valve that will be actuated by the water-pressure within the boiler and will prevent the water escaping therefrom if, perchance, the device should be broken off or injured; to make the device so that all of the parts will be self-contained and the check-valves operative within the shell or casing, and, further, to construct an attachment of this character having the fewest possible parts designed so as to be economically manufactured and readily assembled.

To these and other ends my invention consists in an attachment for feed-water injectors having certain details of construction and combination of parts, as will be hereinafter described, and more particularly pointed out in the claims.

Referring to the drawings, in which like numerals designate like parts in the several views, Figure 1 is an elevation of the attachment complete, secured to a fragmentary portion of a boiler. Fig. 2 is a vertical section thereof upon line A B of Fig. 1. Fig.

3 is a cross-section of the attachment-body upon line C D of Fig. 1, and Fig. 4 is a view of a modified form of a safety-valve.

In the embodiment of my invention all of the parts are inclosed within a body or shell 1, which is provided with an inner core 2, terminating within the said shell near the top thereof with a hollow inlet-chamber 3, formed within the upper portion of the said shell; an outlet-chamber 4 within the core 2, opening at its bottom end through the said shell and at the upper end through the port 5 into the chamber 3; a cooling-chamber 6, which is formed between the outside of the core 2 and the inside of the shell 1 and opening at its upper end into the chamber 3; and a squirt-pipe 7, which is threaded into the shell 1 and communicating with the cooling-chamber 6.

Diametrically opposite to each other and within the body 1 are the inlet-passages 8 8, which passages are preferably circular in cross-section, with their upper ends opening into the chamber 3 and their lower ends through the integral bosses 9 9 in a plane at right angles to that portion of the passage within the shell or body 1. Separably secured to the bosses 9 9 by the spanner-nuts 11 11 are the inlet-pipes 10 10, which are connected at their opposite ends to the injectors. Operative within the vertical portions of the passages 8 8 are the check-valves 12 12, which are held by gravity against the valve-seats 13 13. The particular shape or construction of these valves is not material to my invention, as any of the styles or forms common to the art can be used; but the form herein shown is the one I prefer.

To limit the upward movement of the valves 12, I have fixed thereto the stops 14, which are preferably integral therewith and which engage with the stops 15 upon the nuts 16 16, threaded into the top of the body 1 when in their uppermost position. If desired, the stops 15 can be made adjustable, so that the limit of the vertical movement of the check-valve may be varied; but as this is not an essential feature of my invention I have not shown it in detail.

The numeral 17 designates the main valve, which is provided with a stem 18, threaded through the nut 19, screwed into the top of



the body 1. The seat 20 for this valve is formed in the top of the core 2, as shown in Fig. 2, and secured to the stem 18 is a suitable handle 21, which provides means for rotating the stem and adjusting the vertical position of the said valve.

To prevent leakage when the valve 17 is open to its maximum width, I have provided a valve 22 upon the back of the valve 17, which engages with the seat 23 in the nut 19 when said valve has been opened to its limit and effectually prevents the escape of any water or steam through the said nut.

Removably fixed to the lower end of the body 1 by the nut 24 is a bushing 25, having a flange 26 thereon, against which the inwardly-projecting flange 27 upon the nut 24 engages and secures the said bushing to the lower end of the said body, the angular faces 28 forming a water-tight connection. The bushing 25 is threaded within a collar 29, which is secured, preferably, to the boiler 30 by means of rivets 31, and threaded to the lower end of said bushing 25 within the said boiler is the hood or elbow 32. Movable vertically within the bushing 25 and hood 32 is a safety-valve 33, having an upper stem 34, fitted into a lug 35, integral with the bushing 25, and a lower stem 36, fitted into a boss 37, integral with and projecting into the said hood. A valve-seat 38 is provided for the safety-valve 33 within the bottom open end of the bushing 25.

A modified form of safety-valve is shown in Fig. 4, having a knife-edge 40 and no angular seat, as 38. This construction of a safety-valve insures a positive water and steam tight joint and a perfect seat, even though scale has formed upon the valve-seat— in this case the bottom of the bushing 25.

This attachment can be secured to either the forward or the rear end of the boiler, and if attached to the rear end the water is conveyed to the forward end through the pipe 39, which is threaded into the hood or elbow 32, as shown in Fig. 1. If the attachment is secured to the forward end of the boiler, the use of this pipe 39 can be dispensed with. The usual form of feed-water injector is used with my attachment and connected thereto by the pipes 10 10.

The operation of my device is as follows: The valve 17 is lifted off its seat by means of the handle 21, and the water from the injectors enters the inlet-passages 8 8 through the pipes 10 10, lifts the check-valves 12 12 off their seats, and the water enters the chamber 3, passes through the aperture 5 into the chamber 4, down through the bushing 25 into the hood 32, and from there is discharged into the boiler. A portion of the water that enters the chamber 3 passes into the cooling-chamber 6, surrounding the central core 4, and has a tendency to keep cool the adjacent parts.

Should the check-valves 12 12 become disarranged and refuse to seat properly when the injector ceases to force the water against

it or from any other cause, the safety-valve 33 will be raised automatically against its seat 38 by the excess pressure in the boiler and prevent the water or steam within the boiler escaping therefrom, and if perchance the device should be broken off or injured through a collision or from other means the safety-valve 33, which is within the boiler itself, will be held against its seat by the boiler-pressure and the steam or hot water cannot escape at this point. If it is desired to examine the check-valves at any time, it is simply necessary to close the valve 17, as shown in Fig. 2, and thus cut off all communication with the boiler-pressure, and by removing the nuts 16 access can be had to the said valves, an operation requiring but little time and labor.

The pipe 7 is designed for a squirt-pipe, and the water that is conveyed therethrough from the cooling-chamber 6 is used for wetting down the coal and sprinkling the deck. If it is desired to use the squirt for only a small amount of sprinkling, it will not be necessary to start the injectors, as sufficient water will remain within the cooling-chamber to supply the demand; but if a larger amount of water is required the injectors must be operated.

There are many minor changes and alterations that can be made within my invention, and I would therefore have it understood that I do not limit myself to the exact construction herein shown and described, but claim all that falls fairly within the spirit and scope of my invention.

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

1. In a device of the character described constructed with a body member provided with separate inlet and outlet chambers having connection with each other by means of a suitable port, and inlet-passages opening at one end through the said body member and at the other end into the said inlet-chamber; the combination therewith of a valve adapted in its movement to cover and uncover the said port; and check-valves operative within the said inlet-passages and normally closing the inner ends thereof, substantially as described.

2. In a device of the character described constructed with a body member provided with an outlet-chamber, an inlet-chamber above said outlet-chamber, the said chambers being connected by a suitable port, and inlet-passages opening into the said inlet-chamber, the combination therewith of a valve movable within the said inlet-chamber and adapted to cover and uncover the said port during its movement, and check-valves operative within the said inlet-passages and normally closing the opening thereof into the said inlet-chamber, substantially as described.

3. In a device of the character described, constructed with a body member provided with separate inlet and outlet chambers connected with each other by a suitable port; and inlet-passages opening into the said in-



let-chamber; the combination therewith of a valve adapted to cover and uncover the said port and in its open position to be moved in a plane above the openings of the said inlet-passages into the said inlet-chamber, substantially as described.

4. In a device of the character described, constructed with a body member provided with separate inlet and outlet chambers connected with each other by a suitable port; and inlet-passages opening into the said inlet-chamber; the combination therewith of a valve adapted to cover and uncover the said port and in its open position to be moved in a plane above the openings of the said inlet-passages into the said inlet-chamber, said valve carrying upon its back a valve, adapted when wide open to engage with a valve-seat upon the nut through which the valve-stem passes; substantially as described.

5. In a device of the character described, a body member having an outlet-chamber, an inlet-chamber above said outlet-chamber and connected therewith by means of a suitable port, and a cooling-chamber surrounding the said outlet-chamber and opening into the said inlet-chamber; the combination therewith of a valve movable within the said inlet-chamber and adapted to cover and uncover the said port, substantially as described.

6. In a device of the character described, the combination with the body member having an inlet-chamber 3 therein; an outlet-chamber 4 below said inlet-chamber and connected by a port 5, a cooling-chamber 6 surrounding the said outlet-chamber and opening into the said inlet-chamber, and inlet-passages 8 8 opening into the said inlet-chamber; of a valve 17 adjustable within the said inlet-chamber and adapted to cover and uncover the port 5; and check-valves 12 12 operative within the said inlet-passages, substantially as described.

7. In a device of the character described, the combination with a body member having an outlet-chamber therein and a valve adapted to open and close the port into said chamber; of a bushing separably secured to the said body member, the bore of which forms

an extension of the said outlet-chamber; and a safety-valve operative within the said bushing, and adapted in its movement to cover the lower end thereof and close the outlet from said chamber, substantially as described.

8. In a device of the character described, the combination with a body member having an outlet-chamber therein and a valve adapted to open and close the port into said chamber; of a bushing separably secured to the said body member, the bore of which forms an extension of said outlet-chamber, and a safety-valve, having a knife-edge rim, operative within the said bushing, and adapted in its movement to cover the lower end thereof and close the outlet from said chamber, substantially as described.

9. In a device of the character described, the combination with a body member having an outlet-chamber therein and a valve adapted to open and close the port into said chamber; of a bushing separably secured to the said body member, the bore of which forms an extension of the said outlet-chamber; an elbow or hood having connection with the said bushing; and a safety-valve loosely mounted in the said hood and bushing and adapted in its movement to cover the lower open end thereof and close the outlet from said outlet-chamber, substantially as described.

10. In a device of the character described, the combination with the body member, having the inlet-chamber 3 and outlet-chamber 4; of the bushing 25, the bore of which forms an extension of said outlet-chamber; means as the nut 24, for separably securing the said bushing to the said body member; a hood or elbow 32 secured to the said bushing opposite to the said body member; and a safety-valve 33 mounted and operative within the said hood and bushing, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

COLUMBUS PHILLIPS.

Witnesses:

L. B. FERGUSON,  
GUSTAVE M. HEISS, Jr.