

(No Model.)

G. REED.

BLOW-OFF VALVE FOR LOCOMOTIVE BOILERS.

No. 540,003.

Patented May 28, 1895.

Fig. 1

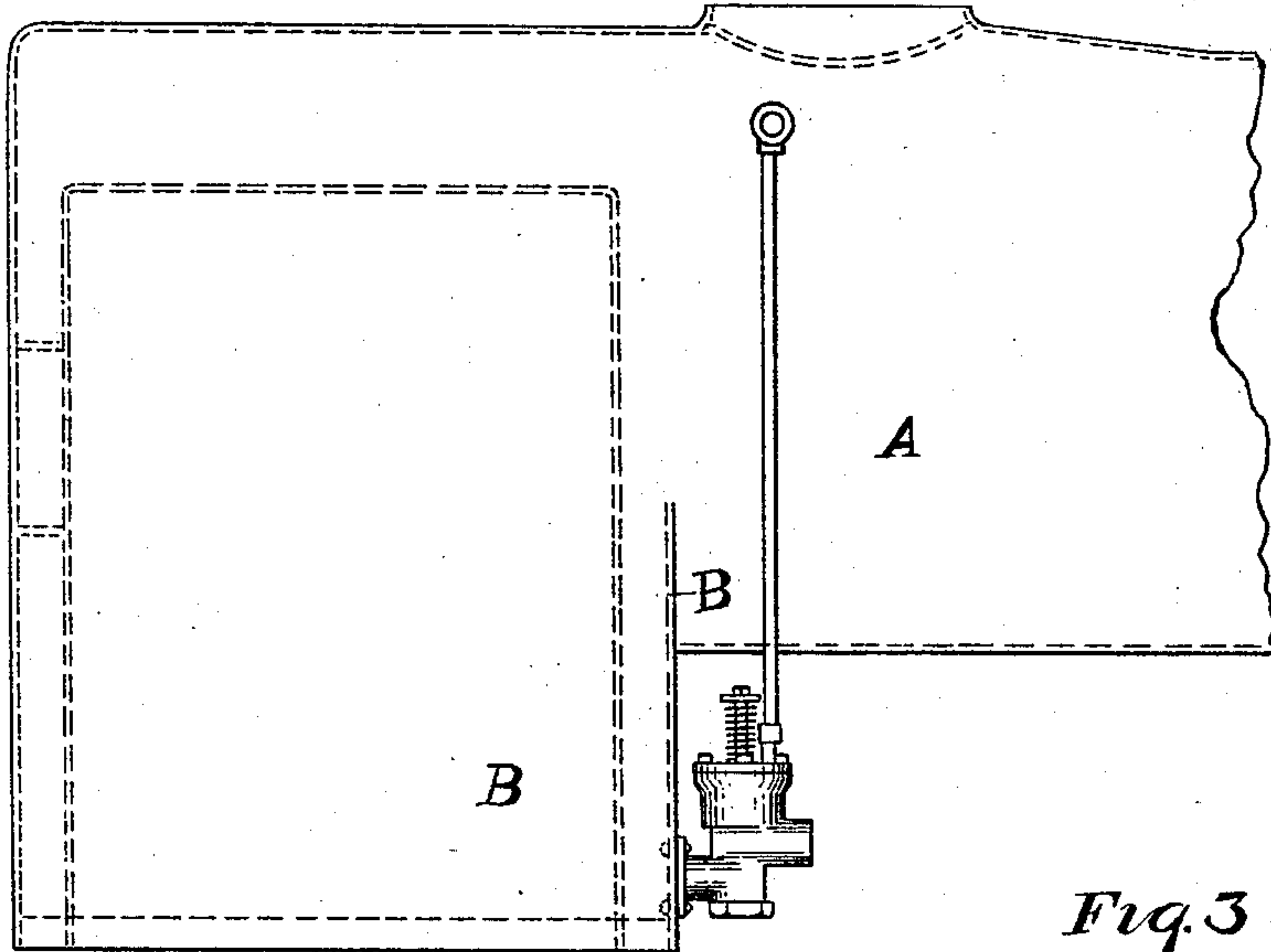


Fig. 2

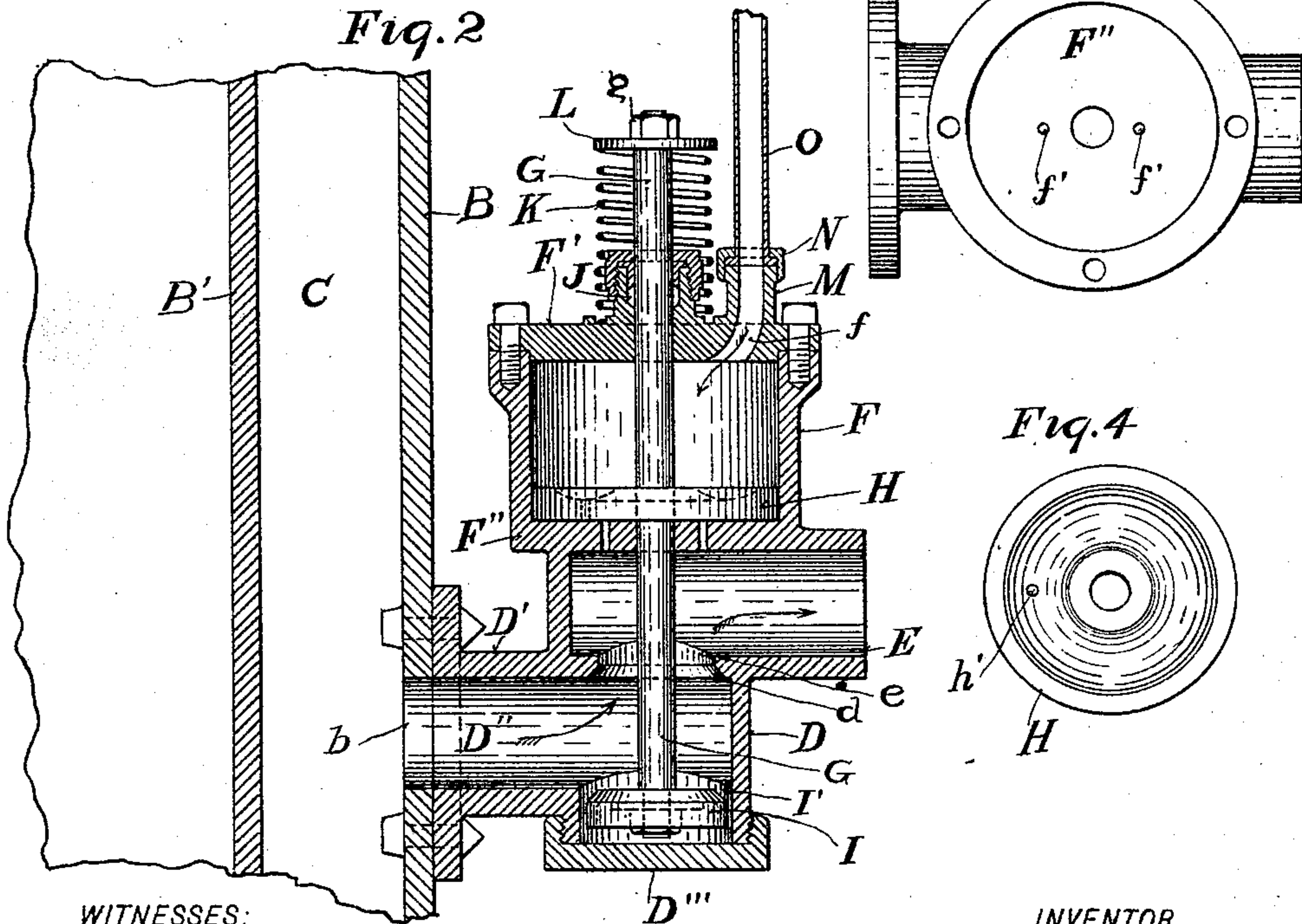
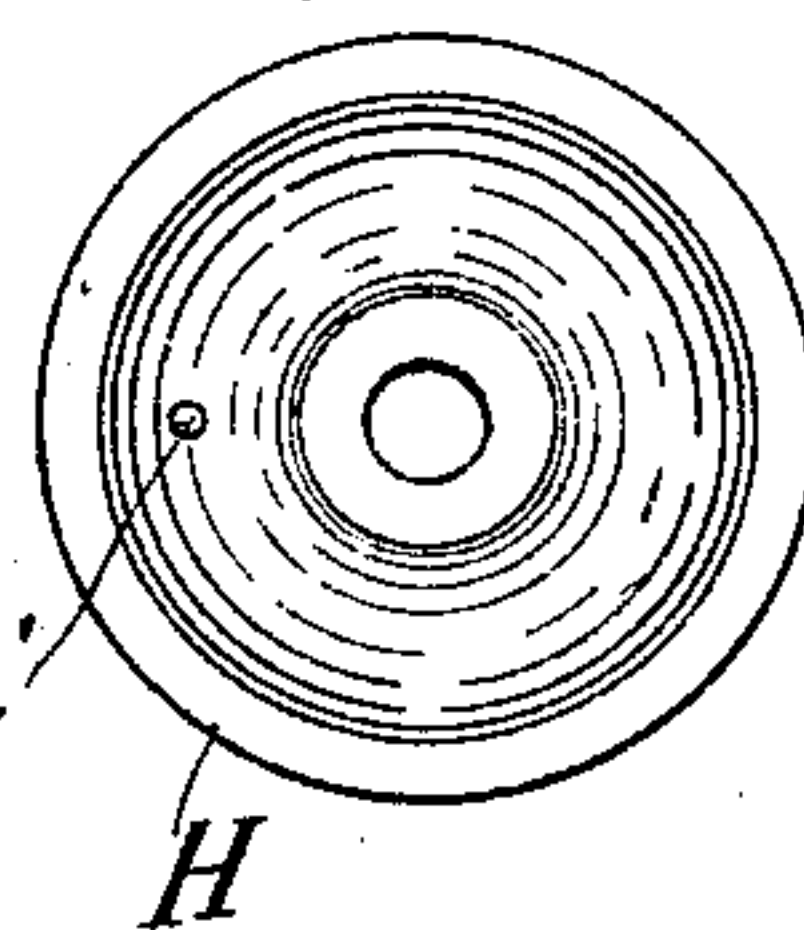


Fig. 3

Fig. 4



WITNESSES:

A. T. Oakley  
E. E. Osborne

INVENTOR

George Reed  
BY J. A. Osborne & Co.,  
ATTORNEYS.



# UNITED STATES PATENT OFFICE.

GEORGE REED, OF FOREST CITY, MISSOURI, ASSIGNOR OF ONE-HALF TO  
J. S. CASEMENT, OF PAINESVILLE, OHIO.

## BLOW-OFF VALVE FOR LOCOMOTIVE-BOILERS.

SPECIFICATION forming part of Letters Patent No. 540,003, dated May 28, 1895.

Application filed February 23, 1895, Serial No. 539,449. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE REED, a citizen of the United States, residing at Forest City, in the county of Holt, State of Missouri, have  
5 invented certain new and useful Improvements in Blow-Off Valves for Locomotive-Boilers, of which the following, with the accompanying drawings, is a specification.

While my invention applies more especially  
10 to blow-offs for locomotive boilers, it is applicable to all kinds of steam boilers.

The object of my invention is a construction of blow-off that is simple and not liable to get out of repair, and that can be opened  
15 by steam pressure from the boiler to which it is attached.

My invention consists in the construction and in the combination of parts herein described and defined in the claims.

20 In the drawings, Figure 1 shows my invention applied to a locomotive-boiler. Fig. 2 is an enlarged vertical section of my invention and illustrates its connection with the water-space around the fire-box. Fig. 3 is an enlarged plan with the top head and the piston removed, and Fig. 4 is an enlarged plan of the piston.

In the different figures of the drawings like reference characters refer to like parts.

30 A is the boiler.

B and B' are the outer and the inner walls of the chamber or water-space, C, around the fire-box.

35 The boiler, A, and the fire-box, B, with the water space or chamber, C, opening from the boiler, are of the usual construction.

My blow-off may be attached to the boiler at any convenient place along its under side, or to the water-space or chamber around the  
40 fire-box, or to what is known as the mud-drum. In the drawings I have shown it attached to the front end of the fire-box.

b is the opening from the water chamber C to the blow-off valve.

45 D is a valve-case, having therein the chamber I', and the lateral opening D'' through the projection D'. The projection D' affords means for attaching the device to the fire-box B, or to the boiler. The opening b and the  
50 lateral opening D'' register with each other.

Above the valve-case D is a horizontal dis-

charge opening, E, to the atmosphere. The valve-chamber, I', communicates with the discharge opening, E, through the connecting opening or way e. 55

The lateral opening D'', the valve-chamber I', the way e, and the discharge opening E, constitute the "blow-off opening" through the device.

Above the discharge-opening, E, is a vertical steam-cylinder, F, whose upper end is closed by the removable top-head F', and whose lower end is closed by the fixed head F''. Through the fixed head, F'', are drip openings, f', f'', for the purpose hereinafter  
60 65 stated.

The rod G passes vertically through the steam cylinder F and the discharge opening E, and into the valve chamber I'.

Upon the rod G, within the steam cylinder F, is fixed the piston H; and to the lower end of said rod G, within the valve chamber I', is fixed the valve I. The area of the piston H should be greater than the area of the valve I. The rod G serves as a piston rod for the  
70 75 piston H and as a valve-stem for the valve I. In the piston H is a drop opening, h, for the purpose hereinafter stated.

The rod G passes through a suitable stuffing box, J, to make the top-head, F', of the  
80 steam cylinder, F, steam tight.

An expansible coil-spring, K, encircles the projecting upper end of the rod G. The lower end of the spring K rests upon the cylinder top-head F', and its upper end bears  
85 against the spring-cap L. The spring-cap L is held upon the end of the rod G by the nut g.

In the upper end of the valve chamber, I', where the valve chamber opens into the discharge opening E through the way e, is an  
90 annular valve-seat, d, made to receive the valve I and form a steam- and water-tight bearing for the valve.

In the top-head, F', of the steam cylinder, F, is a steam port, f, through the nipple M. 95 The nipple M, forms a connection-piece for the union, N, between the steam cylinder and the steam pipe O. The steam pipe, O, conducts steam from at or near the upper side of the boiler A to the steam cylinder F, above  
100 the piston H, through the port f.

At the upper end of the steam pipe O, at or



near its connection with the boiler A, is a valve, P, for shutting off steam from the steam pipe O when closed, and for admitting steam to the steam pipe O when it is desired to blow out the boiler. The valve P may be of the ordinary globe pattern of valve, or of any form desired.

From the foregoing description of my device it will be seen that it is very simple. By reason of its extreme simplicity, its operation will be readily understood.

When the parts are in the position shown by Fig. 2 of the drawings, the blow-off is in position to allow steam and water from the boiler A and water chamber C to blow out through the openings *b*, *D''*, *e*, and *E*, as shown by the arrows in said figure. Before being in operative position, as shown, the piston H is at the top of the steam cylinder F, and the valve I is in place against its seat *d* so as to close communication from the lateral opening *D''* to the discharge opening *E* through the connecting way *e*. When the valve P is closed, the spring K, and the steam pressure from within the boiler against the under side of the valve I, keeps the valve closed. When it is desired to blow out the boiler, the globe valve P is opened, and steam is admitted to the steam cylinder F above the piston H, through the steam pipe O and the port *f*. As the area of the piston H is much greater than the area of the valve I, the piston H is driven to the bottom of the cylinder F by the overbalancing force from above; and as the piston H is forced down, it carries the valve I away from its seat *d* and opens the device, as illustrated. (The area of the piston H should be enough greater than the area of the valve I to enable the piston pressure to overcome the resistance of the spring K and the counter pressure on the valve I.) After the boiler shall have blown out, the spring K will lift the rod G with the piston H and valve I to their normal positions. After the boiler shall have been blown out, the drip from the condensed steam within the pipe O and within the steam cylinder F will pass out through the drip openings *h'* in the piston H and *f'*, *f'*, in the cylinder head F''. As the valve I is closed at such times, the drip passes out of the discharge opening *E* and does not enter the valve-case D.

It will readily be seen that my blow-off may

be applied to other steam boilers than locomotive boilers, and that persons skilled in the art will have no difficulty in making such application of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A blow-off for steam boilers, said blow-off consisting of a valve chamber having a lateral opening for communication with a boiler, a discharge opening, a way or passage from the valve-chamber to the discharge opening, a steam cylinder, a rod passing through the steam cylinder, the discharge opening and into the valve-chamber, a piston within the cylinder and a valve within the valve chamber on said rod, a spring to force said rod outwardly, and a steam port to the cylinder, substantially as described.

2. A blow-off for steam boilers, said blow-off consisting of a valve chamber, a lateral opening from the valve chamber for connection with a boiler, a discharge opening, a way from the valve chamber to the discharge opening, a steam cylinder having a steam port, a rod passing through the steam cylinder and through the discharge opening into the valve chamber, a piston within the steam cylinder and a valve within the valve chamber upon said rod, a spring to return the rod with its piston and valve to their normal positions, and drip openings from the cylinder, substantially as described.

3. A blow-off for steam boilers, said blow-off consisting of a valve chamber, a lateral opening from the valve chamber for connection with a boiler, a discharge opening above the valve-chamber, an opening from the valve-chamber to the discharge opening, a vertical steam cylinder above the discharge opening, one of the heads of said steam cylinder being removable, a steam port to said cylinder, a rod passing through the steam cylinder and the discharge opening into the valve chamber, a piston within the said cylinder and a valve within the valve chamber on said rod, a spring to force said rod upwardly, and a drip opening from the steam cylinder, substantially as described.

GEO. REED.

Witnesses:

G. W. HITT,  
ISAAC W. YOUNG.