(No Model.)

M. McNEIL.

POP SAFETY VALVE.

No. 411,254. Patented Sept. 17, 1889.

Fig. 1.

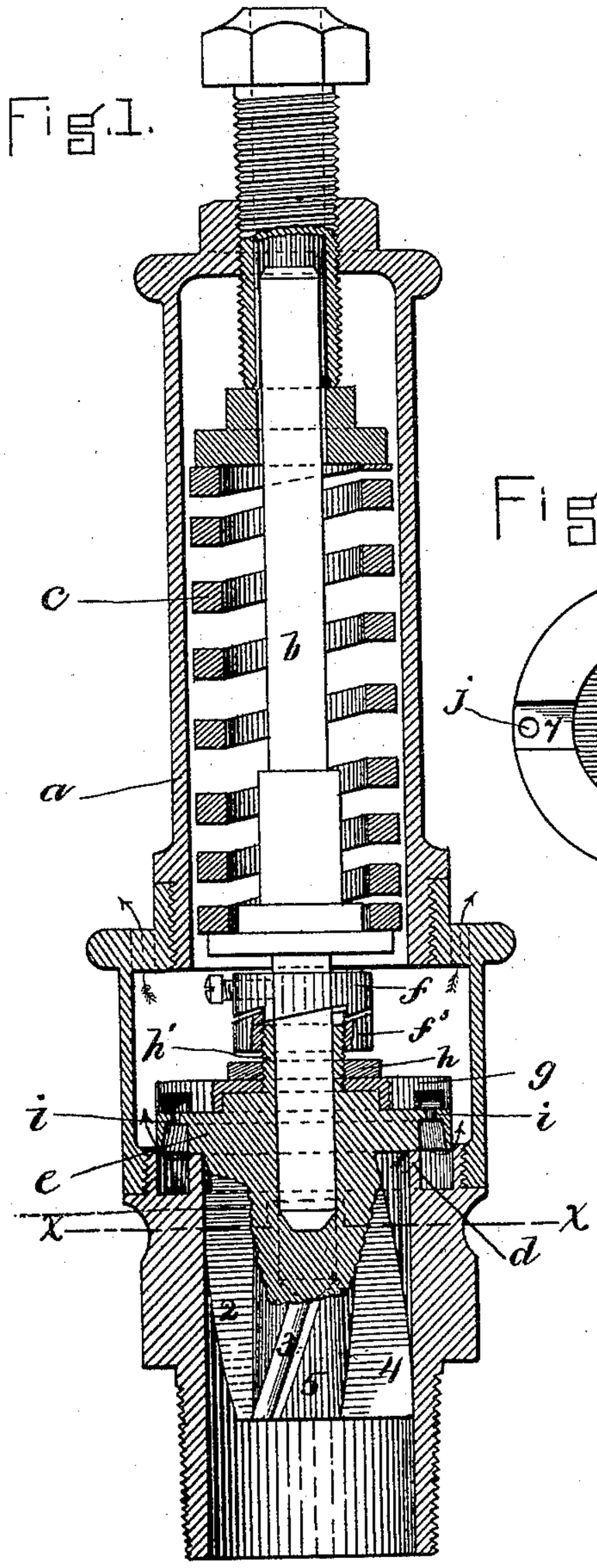


Fig. 4.

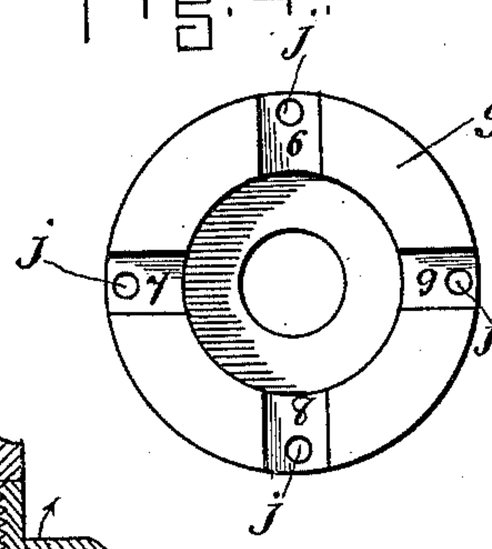


Fig. 2.

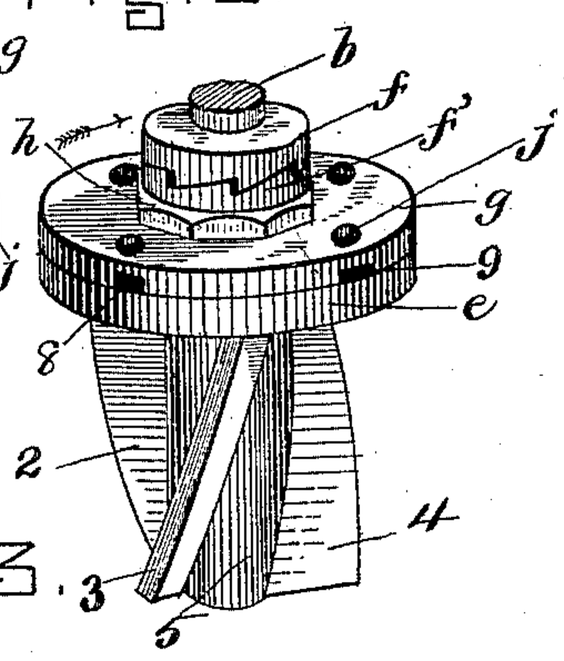
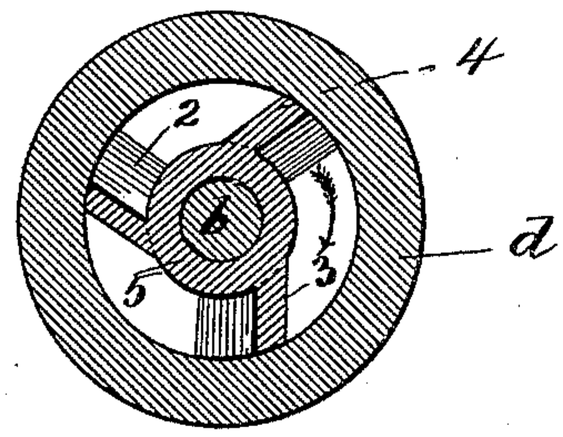


Fig. 3.



WITNESSES:

Horace Brown.

A. D. Harrison.

INVENTOR:

Murdock McNeil

by Wright Brown Quinby & Otis.

Atty's.

UNITED STATES PATENT OFFICE.

MURDOCK McNEIL, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO THOMAS HALEY, OF SAME PLACE.

POP SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 411,254, dated September 17, 1889.

Application filed February 18, 1889. Serial No. 300,264. (No model.)

To all whom it may concern:

Be it known that I, MURDOCK MCNEIL, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Pop Safety-Valves, of which the following is a specification.

This invention relates to safety-valves for steam-boilers; and it has for its object to enable the valve to have a limited rotary motion when raised from its seat by the force of the escaping steam, whereby the valve and valve-seat are prevented from wearing unevenly.

The invention also has for its object to provide improved means whereby the valve may be adjusted to close with the minimum escape of steam from the boiler, all of which I will now proceed to describe.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal section of a "pop-valve" embodying my improvements. Fig. 2 represents a perspective view of the valve and parts comprising my improvements. Fig. 3 represents a section on line *x x*, Fig. 1, looking downwardly. Fig. 4 represents a detail view, hereinafter referred to.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the casing, *b* the spindle, *c* the spring, and *d* the seat, of a pop safety-valve of common well-known form.

In carrying out my invention I provide a valve *e* of the usual form, except the wings or blades 2 3 4, which are formed spirally around the central portion 5 of the valve, (see Fig. 2,) the arrangement being such that when the valve is lifted from its seat to permit the escape of steam the latter exerts a pressure against said blades, imparting a rotary movement to said valve on the spindle in the direction of the arrows in Figs. 2 and 3. To limit the rotation thus imparted to the valve and make the same less than a complete rotation, I provide the valve with a collar *f'*, having ratchet-teeth on its upper surface, and attach to the spindle *b* a collar *f*, having corresponding teeth on its lower surface. Said teeth are formed so that when the valve is rotated in the direction indicated the inclined sides of the teeth of the collar *f'* will strike and slide in frictional contact with the inclined sides of the teeth of the collar *f*, the latter being prevented from rotating by the downward pressure of the spring *c*. The collar *f* therefore acts as a brake or retarding device to prevent the unlimited rotation of the valve and cause the valve to make only a partial rotation at each lifting, so that the valve cannot seat itself in the same position twice in succession.

The collar *f* is attached to the spindle *b* by a set-screw, which enables said collar to be adjusted up or down, and thus vary the resistance offered thereby to the rotation of the valve. By moving collar *f* upwardly upon the spindle the point of contact of its teeth with the corresponding teeth of collar *f'* may be reduced to the minimum, and vice versa.

It is a common defect with valves of the class above described that too much steam escapes from the boiler before the valve closes, thereby causing an excessive loss of steam. I have shown herein a device for adjusting the opening of the valve *e*, whereby the escape of steam may be reduced to the minimum after the boiler has been relieved of the excess of pressure. To this end I have placed upon the top of the valve *e* a plate or disk *g*, of which Fig. 4 is an inverted plan view. Said disk is secured to valve *e* by a nut *h* on the screw-threaded portion *h'* of valve *e*, and is provided with grooves 6 7 8 9 upon its under side, adapted to coincide with openings *i*, formed in the top of the valve *e*, the arrangement being such that should the valve allow too much steam to escape the disk may be so adjusted upon said valve as to cause said grooves to register with the opening *o* in the valve, thus giving an additional opening for the escaping steam and relieving the pressure of the same upon the "lip" or outer edge of the valve, thereby causing the latter to more readily close. Holes or openings *j j j j* may be formed in said disk to increase the opening of the same, as shown in Figs. 2 and 4.

I claim—

1. In a pop safety-valve, the combination, with the valve-seat *d*, valve *e*, and spring-depressed spindle *b*, of the spiral wings 2 3 4, attached to the valve, whereby the force of the escaping steam is caused to rotate the valve,

and the collars *f' f*, attached, respectively, to the valve and spindle and provided upon their adjacent sides with teeth or inclines, whereby the rotation of the valve is checked or limited, as set forth.

2. In a pop safety-valve, the combination, with the valve-seat *d*, of the valve *e*, having openings *i*, and the plate *g*, adjustably secured to the valve and provided in its under side with grooves, as 6 7 8 9, and openings *j*, extending from said grooves through the top of the plate, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 12th day of February, A. D. 1889.

MURDOCK McNEIL.

Witnesses:
C. F. BROWN,
A. D. HAMSON.