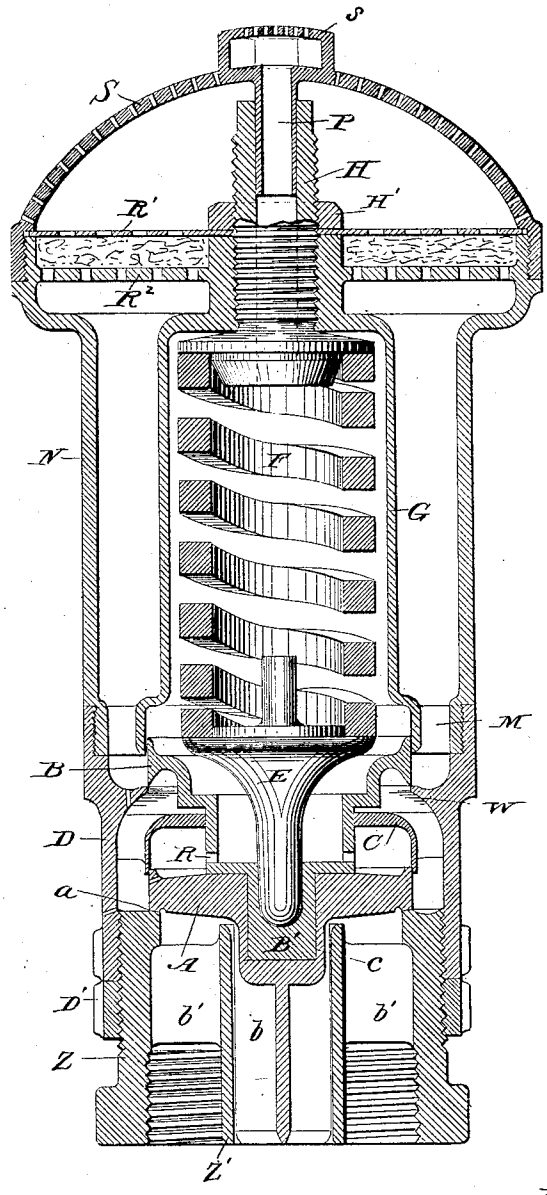
(No Model.) 2 Sheets—Sheet 1.

J. M. COALE.

MUFFLER AND SAFETY VALVE.

No. 315,732. Patented Apr. 14, 1885.

Fig. 1.



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(No Model.)

2 Sheets—Sheet 2.

J. M. COALE.

MUFFLER AND SAFETY VALVE.

No. 315,732. Patented Apr. 14, 1885.

Fig. 3.

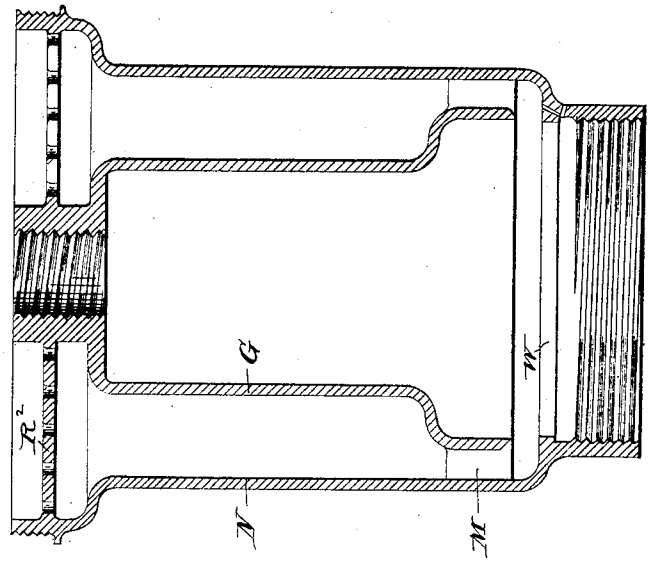
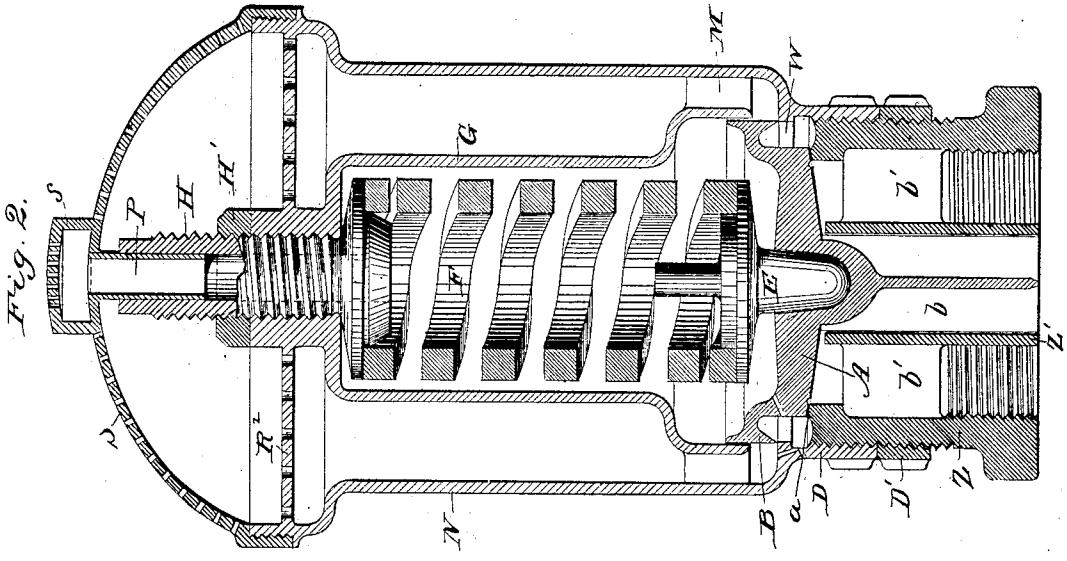


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOSEPH M. COALE, OF BALTIMORE, MARYLAND.

MUFFLER AND SAFETY-VALVE.

SPECIFICATION forming part of Letters Patent No. 315,732, dated April 14, 1885.

Application filed January 9, 1885. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH M. COALE, of the city and county of Baltimore, and State of Maryland, have invented certain new and useful Improvements in Safety-Valves and Mufflers, of which the following is a specification.

My improvements have relation to that kind of safety-valve illustrated in my Letters Patent No. 297,066, of April 15, 1884. They relate in the main to the muffler portion of the valve, the object being to simplify the construction of the same and to render it more efficient.

The nature of my improvements can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical central section of the valve and muffler. Fig. 2 is a vertical central section of a modified construction of the same. Fig. 3 is a vertical central section of the spring-case, muffler, and adjusting case or sleeve detached, these parts being formed of a single casting, as represented in Fig. 2.

Like letters of reference in all the figures indicate similar parts.

In Fig. 1 the valve shell or body is lettered Z. *a* is the valve-seat. A is the main valve. *c* is the central socket in the head of said valve, receiving the hub or stem B′ of the auxiliary valve B. F is the valve-spring, bearing at its lower end against the head of flange of the spindle E, which latter is stepped in auxiliary valve B. H is the adjusting screw-bolt, against which the upper end of the spring bears. D is the adjustable case or sleeve, provided internally with the lip W, which cooperates with the auxiliary valve. R are the openings for preventing back-pressure. G is the spring-case. N is the muffler shell or case, and M are the openings through which the steam which escapes from between the lip W and auxiliary valve is discharged. The spring-case and muffler are carried by and move with the adjusting-case D, as in my aforesaid patent, and the general organization of the parts is similar to that of the like-lettered parts in my said patent. No detailed description of the valve is therefore required, except in the particulars in which it differs from my patented device.

The wings *b* of the main valve fit in a tubular guide-stem, Z′, within the valve-case Z, and united therewith by arms *b*′, this being for the purpose of removing the movable wings *b* from the immediate neighborhood of the valve-seat *a*, which proximity is likely to cause injurious wear of the seat and that part of the valve-case immediately adjacent thereto.

The body of the muffler-case N, unlike the muffler-case in my patented device, is imperforate, and is made in one casting with the spring-case, the two being united at the bottom by radial connecting-wings extending at intervals across the annular passage M, and at the top by a diaphragm, R^2, which is also made use of to assist in muffling the escaping steam, and to this end is perforated, as shown. The muffler-case is surmounted by a dome-like cap, S, which screws onto it, and is perforated for the escape of steam, the perforations being smaller and more numerous than those in the diaphragm R^2.

To provide for the escape of steam which may enter the spring-case G, I make use of an arrangement which differs from and is an improvement over that shown in my patented device. I in the present instance use the adjusting screw-bolt H as a channel for carrying off the steam. To this end I make it tubular, as shown, and I provide upon the inside of the cap S a tubular stem, P, which, when the cap is fitted to the muffler-case, telescopes with the screw-bolt H, thus forming a continuous channel leading from the interior of the spring-case to the nut S′ on the dome, which nut is provided with perforations to permit the escape of the steam. The diaphragm R^2 and perforated dome S will in themselves act efficiently in many cases to muffle the steam to the proper extent, and this arrangement is represented in Fig. 2. In some cases, however, it may be desirable to increase the muffling action, and to this end I can make use of a second and more finely-perforated diaphragm, R′, above the first, and fill the space between the two with hair or equivalent material, through which the steam can sift. The diaphragm R′

fits around the adjusting-bolt H. It is held down in place at the center by the check-nut H′ of the adjusting-bolt H, and at its outer edge it is clamped between the dome and the muffler-case.

The lock-nut for the adjusting-case D is shown at D′.

To prevent accumulation of water of condensation, which will gather in the device, and is liable to be blown out with the steam, I form at proper points in the lip W, valve A, and case D small channels, through which the water of condensation can pass from the muffler and spring-case to the exterior of the valve-case.

C is a diaphragm for preventing back-pressure on the main valve A, similar to the like-lettered part in my Letters Patent hereinbefore referred to.

By forming the muffler-case of cast metal, and making it in one with the spring-case, I remove from it all sonorousness, such as is noticeable in a sheet-metal case, and am enabled to effectively deaden and suppress the noise which otherwise would be made by the escaping steam. I also materially cheapen and simplify the construction.

The device represented in Fig. 2 is similar to that already described with reference to Fig. 1, save that the auxiliary valve is made in one with the main valve. The diaphragm C, consequently, is dispensed with, and the muffler-case, the spring-case, and the adjusting-case D are all made in one, of a single solid casting, as indicated in Fig. 3.

In Fig. 1 it will be noted that the combined muffler and spring-case is united with adjusting-case D by a screw-joint, as in my aforesaid Letters Patent.

Having described the nature of my improvements, and the best way known to me of carrying the same into practical effect, what I claim as new and of my own invention is—

1. The spring-case and muffler-case formed in a single casting with the wings and the perforated diaphragm R^2, substantially as and for the purposes hereinbefore set forth.

2. The spring-case, the imperforate muffler-case surrounding the same, arranged so that there shall be between the two a passage for the escaping steam from the valve, and the perforated diaphragm R^2, in combination with the perforated dome or cap S, surmounting the muffler-case, substantially as and for the purposes hereinbefore set forth.

3. The combination of the spring-case, the imperforate muffler-case, the perforated dome or cap S, the diaphragm R^2, the auxiliary diaphragm R′, and the filling material contained between said diaphragms, substantially as and for the purposes hereinbefore set forth.

4. The combination of the spring-case, the muffler-case, the tubular adjusting-bolt H, the perforated dome or cap, and the tubular stem P, carried by said cap, substantially as and for the purposes hereinbefore set forth.

5. The muffler-case, the spring-case, and the adjusting-case formed in one, as described, in combination with the main and auxiliary valves, the valve case or shell, and the perforated dome or cap, these parts being constructed and arranged together for joint operation, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 31st day of December, A. D. 1884.

JOSEPH M. COALE.

Witnesses:
CHARLES F. KING,
JOHN S. REESE, Jr.