(No Model.)

# G. W. RICHARDSON.

## MUFFLER ATTACHMENT FOR SAFETY VALVES.

No. 342,267. Patented May 18, 1886.

Fig. 1.

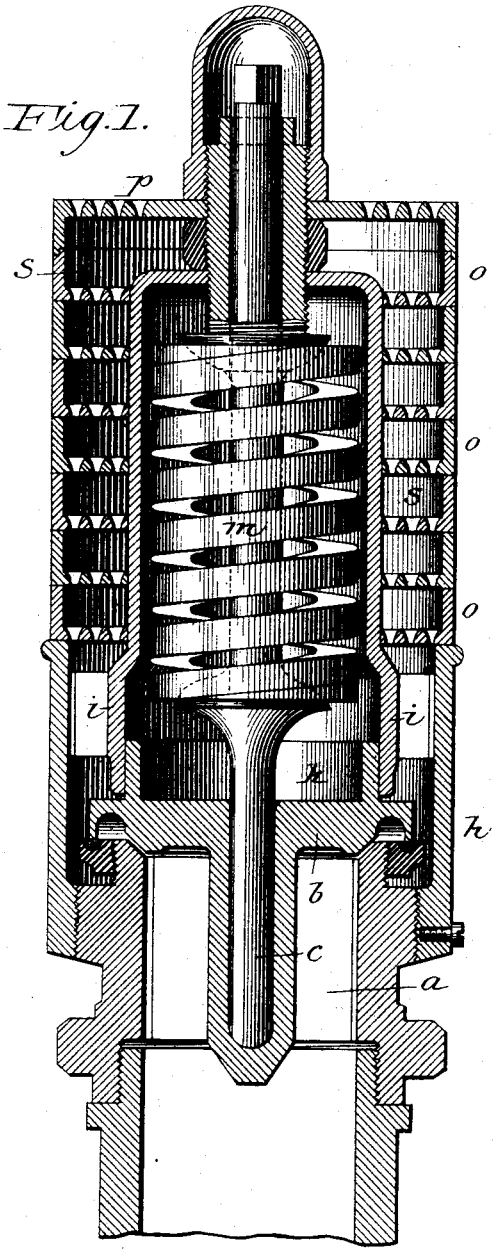



Fig. 2.

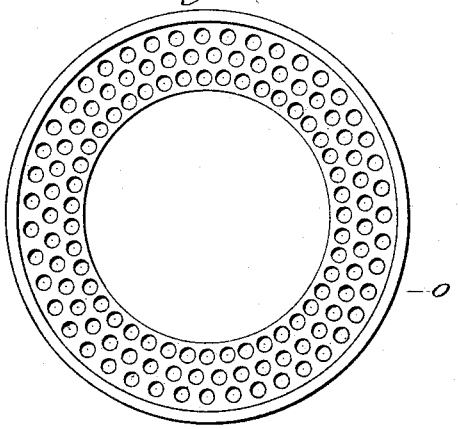
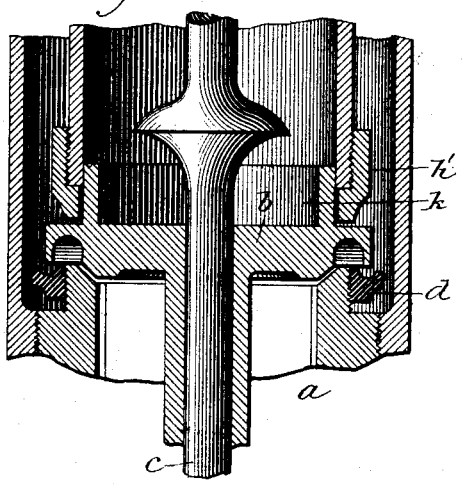



Fig. 3.




Witnesses:
Aug. Greeling
W. W. Wiston

Inventor.
Geo. W. Richardson
by Chas. W. Forbes
Atty.

# UNITED STATES PATENT OFFICE.

GEORGE W. RICHARDSON, OF MEDFORD, MASSACHUSETTS.

## MUFFLER ATTACHMENT FOR SAFETY-VALVES.

SPECIFICATION forming part of Letters Patent No. 342,267, dated May 18, 1886.

Application filed December 3, 1885. Serial No. 184,582. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. RICHARDSON, a citizen of the United States, residing at Medford, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Muffler Attachments to Safety-Valves, of which the following is a specification.

The object of this invention is to suppress the noise of escaping steam blowing from pipes, nozzles, valves, or other openings.

In the present instance the invention is adapted for use in connection with a special kind of safety-valve known to the trade and to users of steam appliances as a "pop-valve." This valve has practically superseded all known forms of safety-valves by reason of its greater efficiency in discharging surplus steam more rapidly and in closing promptly without material loss of the working pressure. This result is due to the greater and more rapid lift of the valve, and consequent increased size of its steam-escape opening, combined with a prompt and early closing action. The sudden or "pop" action of the valve produces an explosive noise, and therefore I have adapted my invention to this particular kind of valve, in order that its merits will be fully appreciated.

The invention is embodied in a valve of the kind referred to, invented and patented by me, which is controlled by a direct-acting spring arranged above the valve and within an inclosing-case, the steam-escape opening being outside of and beneath said case and the muffler attachment applied above said escape-opening and surrounding the spring-casing.

The invention consists in a series of superposed cups having a central opening fitting snugly around the spring-inclosing casing and vertical sides or circumferential flanges, upon which the successive cups rest, said flanges forming a continuous side wall and inclosed chambers, into which the steam is blown through perforations made in the bottom of each cup, a perforated plate or cover being placed at the top of the series of cups, which secures the whole in place.

My improvements can best be explained and understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical central section of a valve and casing embodying my improvements. Fig. 2 is a plan view of a section of the muffler attachment; and Fig. 3, a modification of the means for adjusting the lift of the valve, all of which will be hereinafter fully described.

*a* represents the steamway; *b*, the valve, and *c* the valve-spindle extending therefrom to the top of the casing and supporting the spring *m*, the tension of the latter being regulated by an adjusting and jam nut, in the usual way.

*d* represents a screw-ring for adjusting the size of the escape-opening from the small chamber under the extended valve-head by moving the same up or down, all of which is well understood in connection with this class of valves.

The spring-inclosing shell or case is represented at *i* and the valve-inclosing shell at *h*.

The valve *b* is provided with an annular ring or flange, *k*, projecting vertically therefrom and telescoping with the spring-inclosing case *i*, to shut out the escaping steam from the spring-chamber, and also steady the movement of the valve.

These elements already enumerated make up the principal feature of the valve shown and now in general use, and I will now proceed to refer to my improvements. The muffler attachment is made up of a series of superposed cups, *o*, that surround the spring-inclosing case *i* and rest upon the top of the valve-case *h*. The cups are piled as shown, held in contact by the cap-plate and nut *p*, and in vertical line by the spring-inclosing case. The adjoining circumferential flanges of each cup are closely fitted and form a continuous side wall to the inclosed chambers *s*, which have perforated bottoms, as shown, and through which the escaping steam is directed successively to the atmosphere in a divided state, that breaks up and suppresses the sonorous sound of the steam, this effect being well known and variously carried out.

In order to limit the lift of the valve *b*, an adjustable screw-ring, *h*, Fig. 3, may be applied to the spring-inclosing case adjacent to the valve, which can be given a range of movement equal to the extreme lift of the valve, and then moved up or down to vary the space between it and the valve when the

latter is seated, and thereby regulate and limit the lift of the valve and its capacity for discharge, so that no more steam can pass into the muffler than can escape freely without huddling; or, as shown in Fig. 1, the screw-ring *h*, Fig. 3, is dispensed with, the lower end of the spring-inclosing case forming the stop to limit the lift of the valve, the adjusting feature being in this instance transferred to the valve-casing *h*, as shown. This latter arrangement is preferred, as the adjustment is more easily effected, and, besides, all lost motion of the connected parts is constantly taken up in consequence of the spring-tension acting at all times in conjunction with the valve-casing *h*.

The adjustable case *h* or ring *h* may be held in place by means of a set-screw, as shown in Fig. 1, and the ring *h* may be operated from without by cutting an aperture in the case.

The operation of the particular type of valve shown is well known, and therefore need not be repeated herein, and muffler attachments have before been applied in a variety of ways, so that their operation is also well understood; therefore

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

A muffler attachment for safety-valves, consisting of a series of superposed cups surrounding the spring-inclosing casing, and forming a continuous side wall with intermediate inclosed and communicating chambers, through which the escaping steam is directed to the atmosphere, as set forth.

GEORGE W. RICHARDSON.

Witnesses:
CHAS. W. FORBES,
AUGUSTUS CREVELING.