W. H. SWIFT.

Muffler for the Escape of Exhaust Steam.

No. 209,939. Patented Nov. 12, 1878.

Fig. 1.

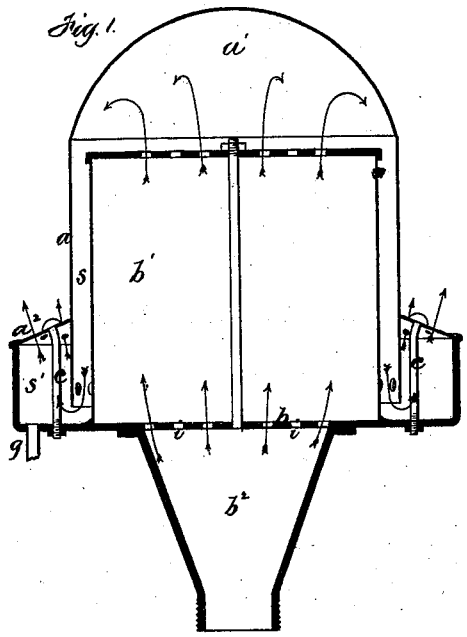


Fig. 4.

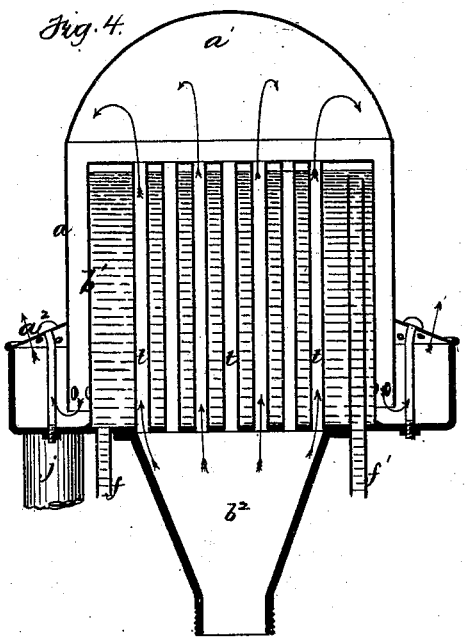


Fig. 2.

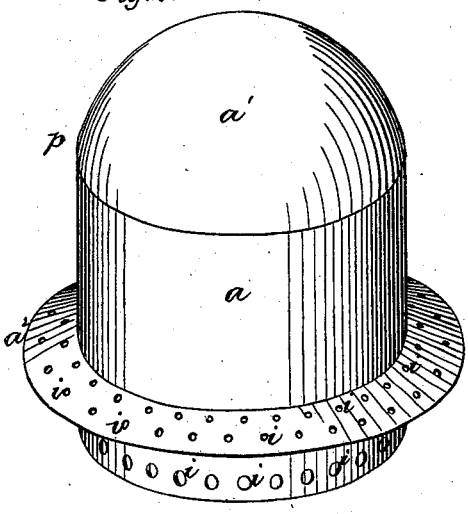
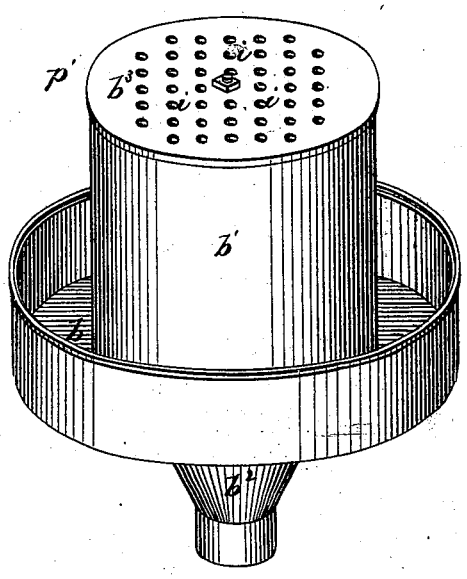


Fig. 3.



Witnesses.

E. W. Pierce.

Geo. W. Pierce

Inventor

Wm. H. Swift

by his Attys.

Wright & Brown.

UNITED STATES PATENT OFFICE.

WILLIAM H. SWIFT, OF MEDFORD, ASSIGNOR OF ONE-HALF HIS RIGHT TO CHARLES F. BROWN, OF READING, MASSACHUSETTS.

IMPROVEMENT IN MUFFLERS FOR THE ESCAPE OF EXHAUST-STEAM.

Specification forming part of Letters Patent No. **209,939**, dated November 12, 1878; application filed January 23, 1878.

To all whom it may concern:

Be it known that I, WILLIAM H. SWIFT, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Mufflers, of which the following is a specification.

This invention has for its object to provide means for muffling the ends of steam-pipes, so as to diminish the unpleasant noise attending the violent escape of steam, without impeding to any considerable extent the force of the escaping steam, the invention being intended especially for application to the steam-pipes of steam-vacuum-brake apparatus on locomotive-engines.

The invention consists, as a whole, in a muffler composed of a casing or chamber, adapted to be applied to the end of one or more steam-pipes, and arranged internally to form a sinuous passage from the steam pipe or pipes to the open air, and provided with one or more groups or series of perforations, so arranged that the escaping steam is obliged to pass through all of the said perforations in passing through the muffler, the combined area of the perforations in each series being equal to or not less than the area of the steam-pipe to which said casing or chamber is applied.

The invention consists, also in, the application of a water-receptacle to the muffler, said receptacle surrounding a series of tubes, through which the escaping steam passes, and partially condensing said steam, all of which I will now proceed to describe.

Of the accompanying drawings, Figure 1 represents a transverse vertical section of my improved muffler. Figs. 2 and 3 represent perspective views of the two general parts or divisions of the same. Fig. 4 represents a transverse vertical section, showing the water-receptacle.

Similar letters of reference indicate corresponding parts.

In carrying out my invention I prefer to construct the muffler in the form of a casing or chamber composed of two general parts, p p', as shown in Figs. 2 and 3. The part p may be called the "cap or cover," and the part p' the "base." The cap or cover is composed of a cylinder, a, which is open at its lower end, and closed at its upper end by a dome, a^1. Near the lower end of the cylinder a is an outwardly-projecting downwardly-inclined flange, a^2, which is provided with a series of perforations, i. I also prefer to make another series of perforations, i, in the lower end of the cylinder a, under the flange a^2. The material of the cylinder and its flange and dome is preferably sheet metal.

The base p' is composed of a circular pan, b, composed of a bottom and a marginal flange, and provided on its upper side with a cylinder, b^1, and on its lower side with a conical casting or coupling, b^2, adapted to be connected to one or more steam-pipes, the cylinder b^1 and coupling b^2 being bolted or otherwise securely attached to the pan b.

The bottom of the pan b is provided with a series of perforations, i, all arranged to connect with the interior of the coupling b^2; and the upper end of the cylinder b is provided with a diaphragm, b^3, having a similar series of perforations, i.

When the parts p p' are put together the outer edge of the flange a^2 rests on a seat or groove formed on the upper edge of the flange of the pan b, and the two parts are connected by bolts c c, as shown in Fig. 1, or in any desired manner. The cylinder a surrounds the cylinder b^1, and projects nearly or quite to the bottom of the pan b. Between the cylinders a and b^1 is an annular space, s, which forms a passage communicating with the space under the dome a^1 and the annular space s' within the flange of the pan b, communication between the spaces s s' being effected through the perforations i in the lower end of the cylinder a, or through the space between the lower end of the cylinder a and the bottom of pan b, in case the cylinder does not extend quite down to the pan.

It will be seen that the steam entering the coupling b^2 passes upward through the perforations i in the bottom of pan b, through the cylinder b^1, and the perforations i in the diaphragm b^2, into the dome a^1; from thence downward through the space s, into the space

s', and finally escapes upward into the open air through the perforations i in the flange a^2, all as indicated by the arrows in Fig. 1.

The steam is diffused by the various series of perforations, and in passing through the sinuous course indicated it is somewhat condensed, and its force is somewhat diminished, the result being that its final escape is attended with but little noise.

The combined area of the perforations i in each series is equal to or not less than the total area of the pipe or pipes with which the coupling b^2 is connected, so that the steam will pass through the perforations as rapidly as it passes through the steam pipe or pipes; consequently there is not enough resistance or back-pressure caused by the perforations to interfere with the operation of steam-vacuum brakes.

If desired, the cylinder b^1 may be adapted to receive water, as shown in Fig. 4, to increase the condensation of the escaping steam, in which case vertical flues t will be provided, passing through the cylinder, for the passage of the steam, and water will be supplied to the cylinder through an induction-pipe, f, and returned through an eduction-pipe, f', these pipes being connected preferably to the pump and tender of the engine, so that the water will be constantly changed in the cylinder b^1. The condensation caused by the water-supply materially diminishes the volume of escaping steam, and consequently the noise attending the same.

I provide, preferably, the pan b with a pipe, g, to conduct away the water of condensation accumulating therein.

I do not limit myself to the precise construction herein shown and described, as any casing or chamber adapted to be connected to a steam-pipe and arranged to form a sinuous passage for steam, and provided with one or more series of perforations to diffuse and scatter the steam, I regard as falling within the scope of my invention.

If desired, a large pipe, J, (shown in Fig. 4,) may be provided for the escape of both the steam and the water of condensation, in which case the perforations in the flange a^2 may be omitted.

I claim as my invention—

1. A muffler for steam-pipes composed of a casing or chamber adapted to be applied to a steam-pipe, and arranged internally to form a sinuous passage from the steam-pipe to the open air, and provided with perforations i, through which the steam passes before being discharged, substantially as and for the purpose set forth.

2. The muffler herein described and shown, consisting of the cylinder a, having dome a^1 and perforated flange a^2, and the perforated pan b, having cylinder b^1, perforated diaphragm b^3, coupling b^2, and escape-pipe g, all arranged substantially as described.

3. In a muffler for escaping steam, the cylinder b^1, adapted to contain water, and provided with flues t, for the passage of steam, and also with induction and eduction pipes, whereby the water is kept in circulation, substantially as and for the purpose described.

4. The cylinder b^1, provided with flues t, induction-pipe f, and eduction-pipe f', combined with the coupling b^2, cylinder a, and dome a^1, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM H. SWIFT.

Witnesses:
C. F. BROWN,
GEO. W. PIERCE.