No. 759,964. PATENTED MAY 17, 1904.

J. BONAR.

STEAM EXHAUST HEAD OR MUFFLER.

APPLICATION FILED SEPT. 19, 1903.

NO MODEL.

Fig. 1.

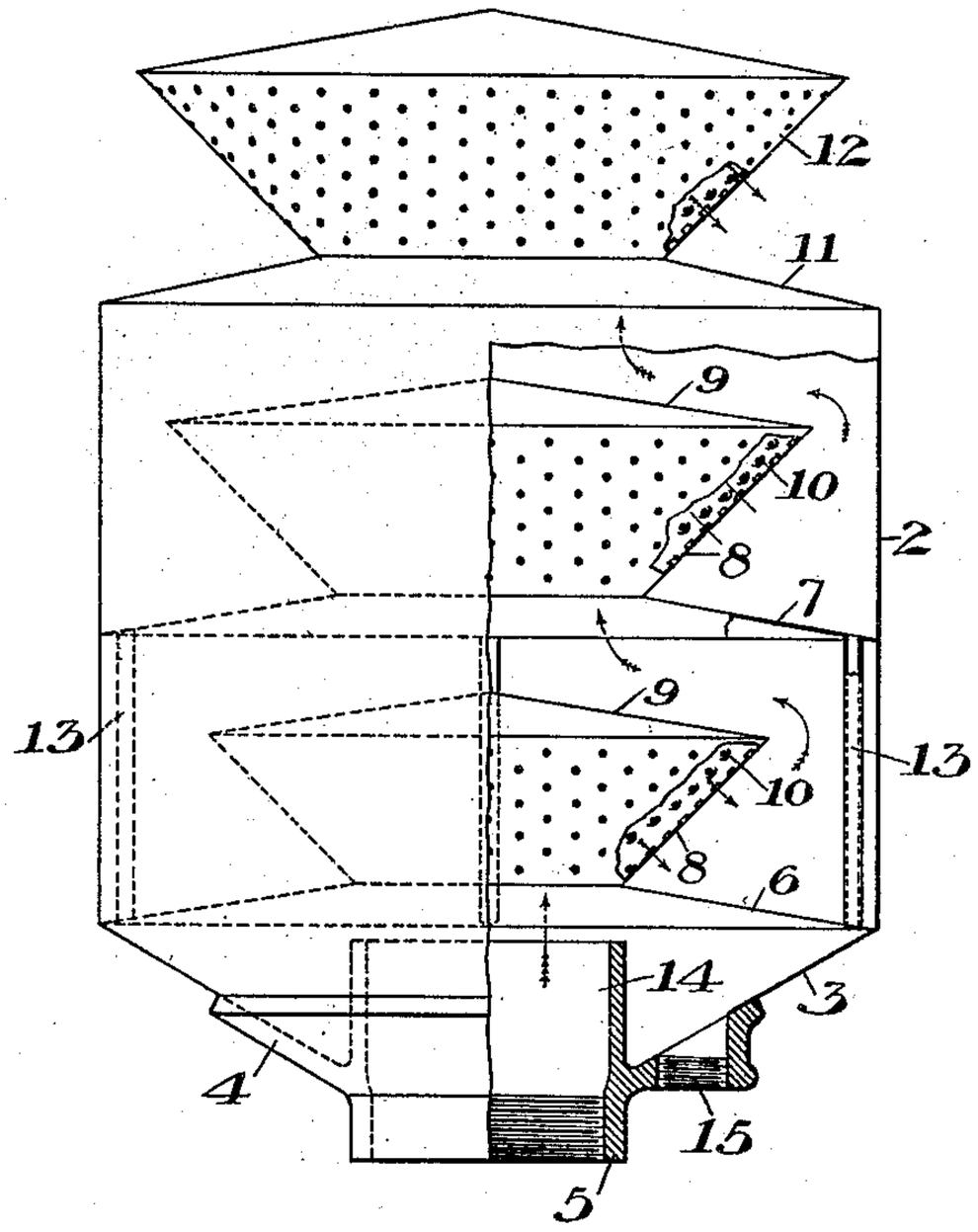
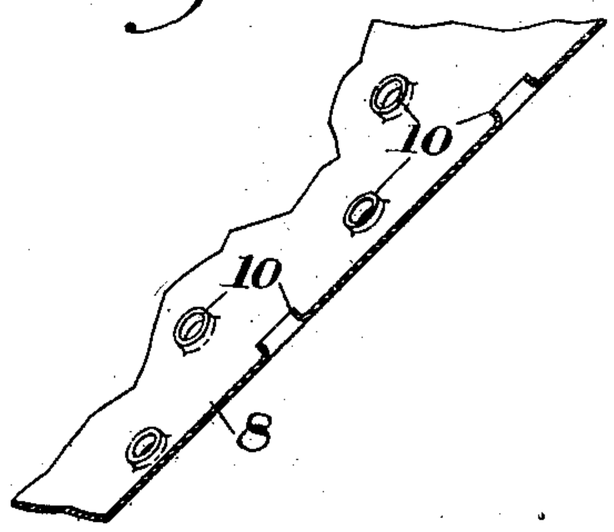


Fig. 2.



WITNESSES

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No. 759,964. Patented May 17, 1904.

UNITED STATES PATENT OFFICE.

JAMES BONAR, OF PITTSBURG, PENNSYLVANIA.

STEAM EXHAUST-HEAD OR MUFFLER.

SPECIFICATION forming part of Letters Patent No. 759,964, dated May 17, 1904.

Application filed September 19, 1903. Serial No. 173,748. (No model.)

To all whom it may concern:

Be it known that I, JAMES BONAR, of Pittsburg, Allegheny county, Pennsylvania, have invented a new and useful Steam Exhaust-Head or Muffler, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation, partly in section, showing one form of my improved exhaust-head; and Fig. 2 is a broken detail view showing the arrangement of the holes in the heads.

My invention relates to exhaust-heads and mufflers for steam, and is designed to provide for a thorough separation of the water, oil, or other liquid from the steam passing through the apparatus.

In the drawings, 2 represents a casing preferably cylindrical in form and having a conical bottom 3 secured to the annular flange 4 of the nozzle-casting 5, secured to the exhaust-pipe. The casing is provided with one or more internal partitions, of which I have shown two, (numbered 6 and 7.) These partitions are annular in form and are preferably in the form of frustums of cones. In the center of each partition is a large hole, which opens into a head consisting of a perforated shell 8, of inverted conical form, with a cover 9, which is preferably in the form of a conical cap. The holes through the inclined sides of the heads are provided with inwardly-projecting surrounding lips 10, as shown in Fig. 2. These lips are preferably formed by punching the metal inwardly, the metal displaced from the hole forming the surrounding lip, and the holes are preferably punched at right angles to the plane of the side.

The top of the casing 2 is provided with a cover 11, which is preferably inclined and has a central hole, to which a third head 12 is secured, this head being similar to those within the casing. Drain-pipes 13 connect the partitions 6 and 7 to allow the water collecting on partition 7 to run down through the partition 6 and rest upon the inclined bottom 3 around the upwardly-projecting steam-nozzle 14. This water thence is drawn through a pipe connected to the hole 15 in the flange 4. The area of the perforatoin in the heads is successively increased upwardly, and the area of the holes in the lowermost head is preferably about one and one-half times the area of the inlet-nozzle 14. The area of the holes in the second chamber is about one and one-half times those of the lower chamber and the area of the holes in the upper chamber about one and one-half times those in the intermediate chamber. This provides for expansion of the steam and insures deposition of the entrained moisture.

It will be noted that the sides of the heads are inclined at an angle to the vertical, so that the steam passing through these sides will blow downwardly, allowing the water to deposit upon the sides of the head and bottoms of the chambers while the steam passes upwardly into the next head. The moisture collecting on the inside of the heads runs down the inclined face and is prevented by the lips from passing through the holes, and this moisture trickling down the sides of the heads drops upon the top of the next lower head and thence upon the bottom of the chamber and finally collects in the chamber around the steam-nozzle.

The advantages of my invention result from the inclined sides of the heads in combination with the lips around the perforations, also from the increased area of the holes in the successive heads and from the simple and compact arrangement of the parts.

The number of the heads may be varied, the device may be used as a steam-separator, as an exhaust-nozzle, or as a muffler, and variations may be made in the form and arrangement of the casing, partitions, &c., without departing from my invention.

I claim—

1. An exhaust-head or muffler having a chamber with inclined perforated sides, and upwardly-projecting lips surrounding the perforations to prevent water dropping through them; substantially as described.

2. An exhaust-head or separator having an inclined partition with a central hole opening into a head, said head having inclined sides with perforations and upwardly-projecting lips surrounding the perforations to prevent

water dropping through them; substantially as described.

3. A casing having an upwardly-projecting steam-nozzle at the bottom and provided with perforated heads, the area of the perforations in the heads being successively greater in the upper heads; substantially as described.

4. A casing having an upwardly-projecting steam-nozzle at the bottom and provided with perforated heads, each head having inclined sides and lips surrounding the perforations, the area of the perforations in the heads being successively greater in the upper heads; substantially as described.

In testimony whereof I have hereunto set my hand.

JAMES BONAR.

Witnesses:
G. B. BLEMING,
H. M. CORWIN.