

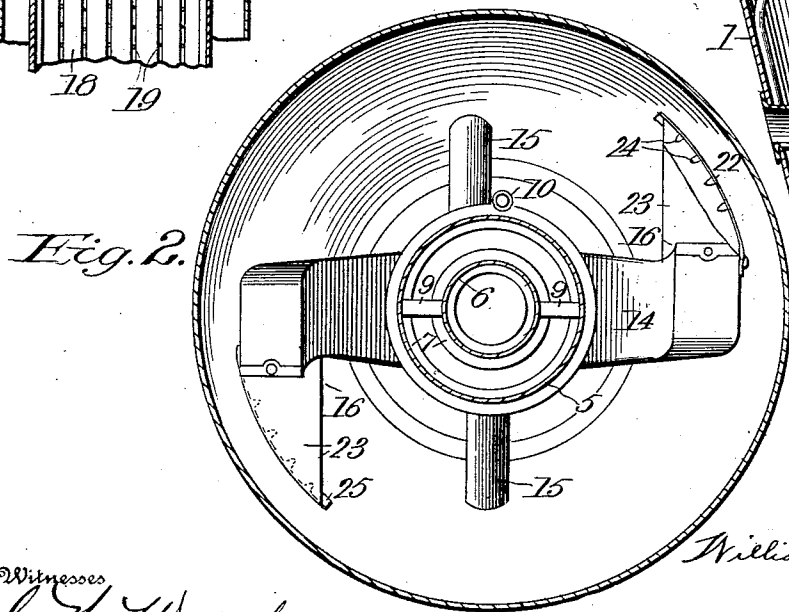
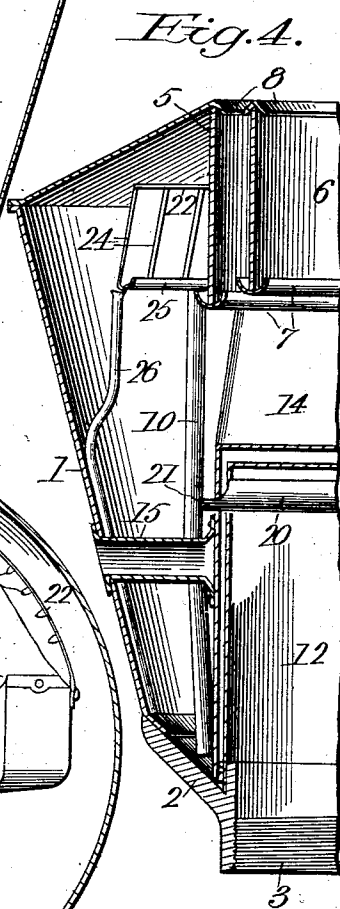
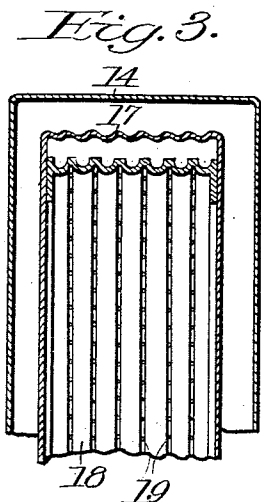
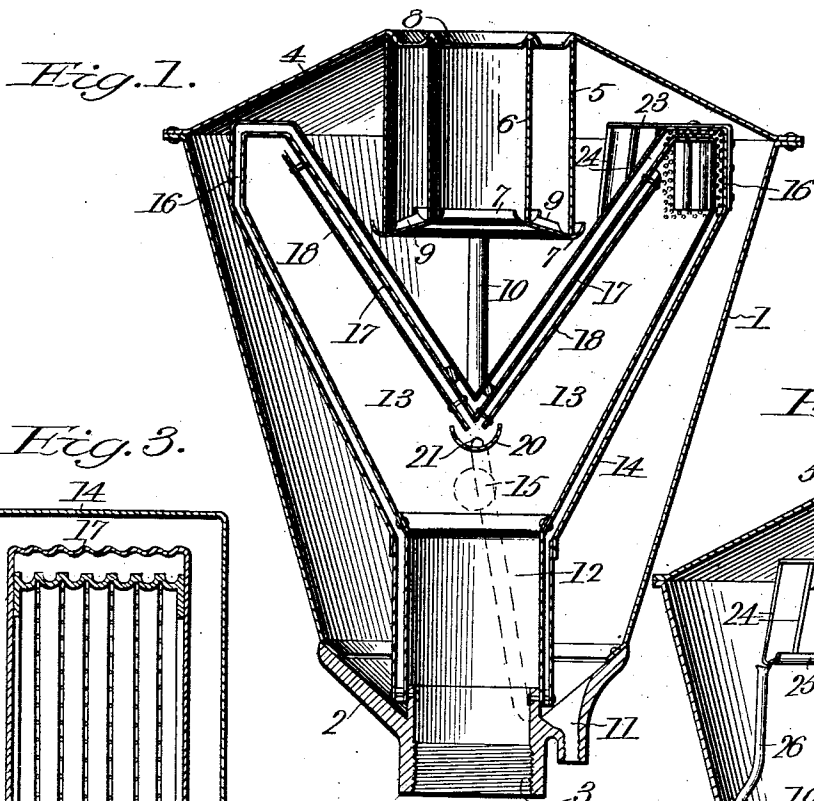
No. 745,939.

PATENTED DEC. 1, 1903.

W. F. WARDEN.
EXHAUST HEAD.

APPLICATION FILED MAY 14, 1903.

NO MODEL.



Witnesses
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By

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his

Inventor

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UNITED STATES PATENT OFFICE.

WILLIAM F. WARDEN, OF AKRON, OHIO.

EXHAUST-HEAD.

SPECIFICATION forming part of Letters Patent No. 745,939, dated December 1, 1903.

Application filed May 14, 1903. Serial No. 157,109. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. WARDEN, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Exhaust-Heads, of which the following is a specification.

This invention relates to improvements in exhaust-heads; and the object is to provide an improved exhaust-head for separating the water of condensation from the exhaust-steam and collecting said water and conveying it from the head, permitting the escape of steam in a dry condition.

With the above object in view the invention consists in the novel features of construction hereinafter fully described, particularly pointed out in the claims, and clearly illustrated by the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of an exhaust-head constructed in accordance with my invention; Fig. 2, a transverse sectional view of the same; Fig. 3, an enlarged sectional view of one of the steam-inlet pipes, showing the air-chamber surrounding the same; and Fig. 4, a longitudinal sectional view of a portion of the head, taken at right angles to Fig. 1.

Referring now more particularly to the drawings, 1 designates a truncated conical casing forming the body of the head, attached at its lower end to a casting 2, having an attaching-sleeve 3, by which the head may be secured to an exhaust-pipe. The upper end of the casing is closed by a conical-shaped wall 4, formed with a central opening, in which is secured a sleeve 5, forming an outlet for the steam. This sleeve projects downwardly into the casing, and arranged therein is a sleeve 6 of smaller diameter. Attached to the lower edges of both of the sleeves, upon their inner and outer faces, are annular troughs 7, while at their upper edges, upon the inner face of the outer sleeve and inner and outer faces of the inner sleeve, are annular downwardly-inclined flanges or lips 8, said troughs 7 of the sleeves communicating by means of transversely-extending troughs or gutters 9, so that the water of condensation may pass from the trough of the inner sleeve to the trough of the outer one, from

which it passes through a downwardly-extending pipe 10 to an outlet 11, formed in the casting.

Attached to sleeve 3 upon the interior of the casing is a steam-inlet pipe 12, which is formed with branches 13, extending upwardly on opposite sides of the casing and having reversely-disposed discharge ends arranged to discharge the steam tangentially or horizontally. Surrounding pipe 12 and its branches 13 is an air-chamber 14, which is supplied with air by transversely-extending pipes 15 communicating therewith and opening to the atmosphere through opposite sides of the casing. The outer ends of the air-chambers surrounding said branch pipes 13 are arranged at the discharge ends of the latter and are closed by perforated walls 16.

The upper walls 17 of the pipes 13 are corrugated longitudinally to form condensing-surfaces, and arranged beneath said walls are plates 18, which are corrugated longitudinally to form gutters or troughs to collect the water of condensation, said water passing downwardly to a trough 20, arranged beneath the lower ends of the plates and provided with an outlet 21, from which the water passes to the outlet 11. Said plates are formed with longitudinal rows of perforations 19, arranged between the troughs or gutters to permit the passage of steam to the walls 17.

Arranged at the outer edges of the discharge ends of the pipes 13 are condensing and deflecting plates or hoods, which consist of vertical walls 22, curved to follow the transverse contour of the casing, and horizontal upper walls 23. The walls 22 are provided with ribs 24 for condensing the steam and collecting the water of condensation, and troughs 25 are arranged at the lower edges of said walls to receive the water from the ribs, said water passing from these troughs through pipes 26 to the outlet 11 at the lower end of the casing.

The operation of my improved exhaust-head is as follows: Exhaust-steam enters pipe 12 and passes into the branch pipes 13, a part of the steam passing through the perforations of plates 18 and impinging against the corrugated upper walls 17 of said pipes, which are cooled by the air in the air-chamber, said steam being condensed and the water therefrom entering the troughs or gutters

of said plates, by which it is conducted to the trough 20, passing therefrom to the outlet 11. The steam that is not so condensed passes out through the discharge ends of the pipes 13 and impinges against the walls 22 of the hoods and the ribs 24, carried thereby, where a further condensation takes place, the water passing off through troughs 25 and pipes 26. The remaining steam is discharged tangentially, setting up centrifugal action, and finally passes out through the double-sleeved outlet, where a final condensation takes place, so that the steam is discharged from the head in a practically dry condition. The flanges or lips 8 prevent any particles of water clinging to the sides of the sleeves from being carried out by the steam.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. An exhaust-head comprising a casing having an outlet, a steam-inlet pipe extending within the casing having a corrugated wall, a plate arranged within said pipe adjacent to said wall and formed with longitudinally-extending troughs or gutters and with perforations between said gutters, and a trough arranged at the lower end of said plate.

2. An exhaust-head comprising a casing having an outlet, a steam-inlet pipe extending into said casing having a corrugated wall, a plate positioned in said pipe adjacent to said wall and formed with longitudinally-extending gutters and with perforations between said gutters, an air-chamber surrounding said pipe, a communication between said air-chamber and the exterior of the casing, and a trough at the lower end of said plate having an outlet into said casing.

3. An exhaust-head comprising a casing having an outlet, a steam-inlet pipe extend-

ing into said casing, a perforated plate arranged in said pipe adjacent to one of the longitudinal walls thereof and formed with a longitudinally-extending gutter, a trough arranged at the lower end of said gutter having an outlet into the casing, an air-chamber arranged about said pipe, and a communication between said chamber and the exterior of the casing.

4. An exhaust-head comprising a casing having an outlet, a steam-inlet pipe extending into said casing, and a hood arranged at the discharge end of said pipe having its side wall provided with transversely-extending ribs and a trough at the lower ends of said ribs.

5. An exhaust-head comprising a casing having an outlet, a steam-inlet pipe extending into said casing arranged to discharge steam tangentially, a hood at the discharge end of the pipe comprising a horizontally-disposed curved side wall and an upper wall, ribs on said side wall, and a gutter at the lower ends of said ribs.

6. An exhaust-head comprising a casing having a steam-inlet and an outlet, two sleeves arranged in said outlet and depending into the casing, said sleeves being arranged one within the other and spaced from each other, downwardly-inclined lips at the upper edges of said sleeves, troughs at the lower edges thereof, and a pipe for conducting the water of condensation from said troughs.

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

WILLIAM F. WARDEN.

Witnesses:

WINNIE BURMAN,
AGNES REILLY.