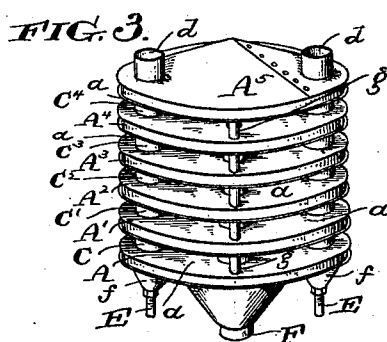
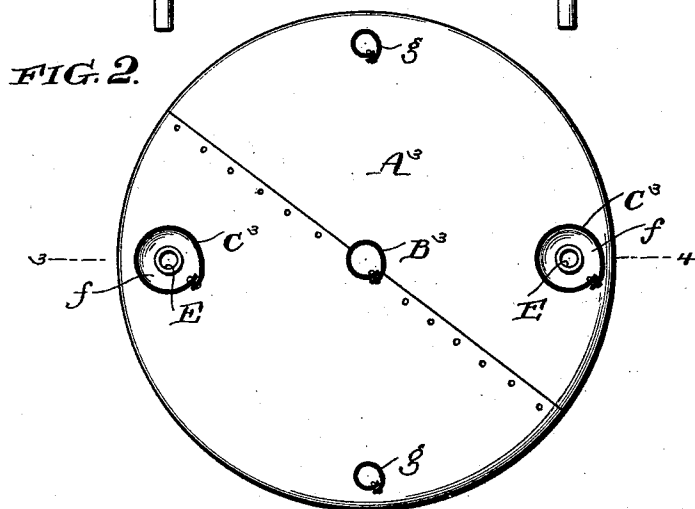
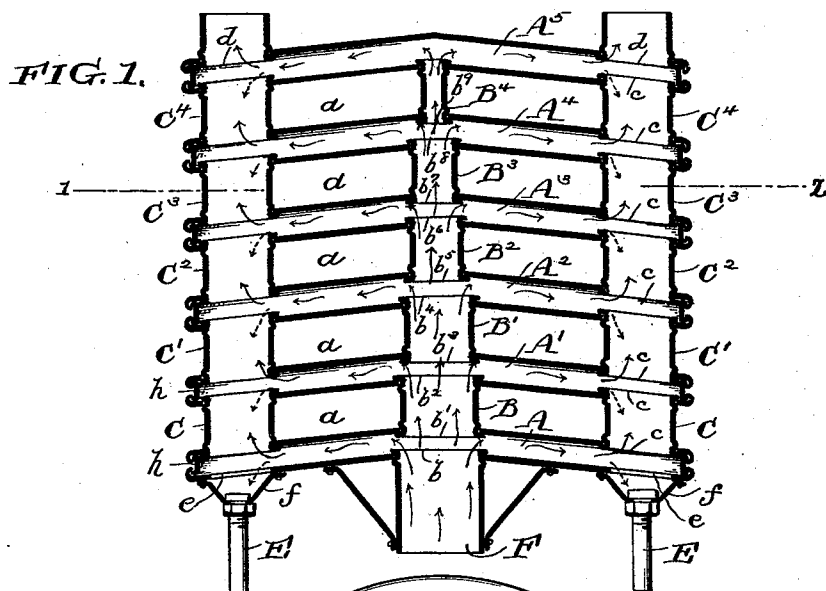


C. S. ONDERDONK.
CONDENSER HEAD.

Patented Nov. 29, 1892.



Witnesses:
Henry D. ...
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Inventor:
Charles S. Oudekork
By his atty.,


UNITED STATES PATENT OFFICE.

CHARLES S. ONDERDONK, OF PHILADELPHIA, PENNSYLVANIA.

CONDENSER-HEAD.

SPECIFICATION forming part of Letters Patent No. 487,036, dated November 29, 1892.

Application filed May 9, 1892. Serial No. 432,272. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. ONDERDONK, of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Condenser-Heads for Steam-Exhaust Pipes, of which the following is a specification.

My invention relates to condenser-heads for steam-pipes; and it consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings, which form a part thereof.

It is the object of my invention to provide an efficient condensing-head for exhaust-steam pipes which shall act to thoroughly condense the steam, so that little volume of uncondensed steam shall emerge from the head and the water of condensation may be easily carried off.

My invention is designed to avoid the carrying of water out with the steam that emerges from the head with the result of wetting the roof or adjacent parts of the building, and also to smother the noise usual with exhaust-pipes and to obtain a practically-noiseless condenser-head.

I shall now describe the construction of my improved condenser-head which I employ for the attainment of these objects.

In the drawings, Figure 1 is a vertical sectional view of my improved condenser-head on the line 3 4 of Fig. 2. Fig. 2 is a transverse horizontal sectional view of the same on the line 1 2 of Fig. 1, and Fig. 3 is a perspective view of the condenser-head on a reduced scale.

A A' A², &c., is a series of horizontal or approximately-horizontal hollow shells of more or less flattened shape, located one above the other and communicating with one another by openings b b' b², &c., at or about their middle portions through a series of cylindrical necks B B' B², &c., which serve both as a means of communication between the successive shells and also as a means of supporting the shells one above the other, so as to form intermediate horizontal air-spaces a between the adjacent outer surfaces of successive shells.

In each shell A A' A², &c., the aperture or opening b in the lower portion is larger than the opening b' in the upper portion, so that

the edge about the opening in the upper portion shall project more or less beyond the edge of the opening of the lower portion, and the successive connecting-necks B B' B², &c., are of smaller diameters one than the other to correspond with the decreasing diameters of the apertures b b' b², &c. If desired, however, these openings may be of the same size throughout. The topmost shell A is closed in its upper surface over the topmost neck B⁴.

C C' C², &c., is a series of necks by which communication is made between the successive shells through openings c therein adjacent to their outer edges. In the drawings I have shown two series of these communicating necks C C' C², &c., located upon opposite sides of the condenser-heads, with corresponding opening c in the shells. It will be understood, however, that one or any number of series of these communicating necks C C' C², &c., may be employed. The topmost shell is provided with one or more outlets d, located, preferably, adjacent to the outer edge of the shell, and the lower shell A is provided with one or more outlets e, preferably in line with the openings c. These outlets e may communicate with tubes or pipes E through funnels or inclined caps f, secured to the under side of the lower shell and surrounding the outlets e therein.

F is a steam-inlet pipe to the condenser-head, communicating with the opening b of the lower shell. To make the head more firm and to support the shells, intermediate collars or supports g may be employed. This, however, is a mere detail of construction and is in no wise essential to the invention. The lower surfaces of the shells A A' A², &c., are preferably inclined downward toward their outer edges, or the part where the outlet-apertures c are located.

While I have shown the condenser-head composed of six shells A A' A², &c., it is to be understood that any number, either more or less, may be employed.

G is a cap surrounding the steam-inlet neck F, secured to the bottom of the lower shell and to the neck F to more firmly support the neck.

Owing to the fact that the condenser-head is subjected to considerable heat, I prefer not to solder these seams between the different parts.

I therefore prefer to employ the construction shown, in which the shells are preferably made of two sheet-metal disks lap-seamed with an annular piece *h*, and the communicating necks B B' C C', &c., are sleeved in the openings in the metal disks of the shells. The free edges of metal are lapped and riveted, as shown, and the entire head is galvanized. The galvanizing process serves to close all joints and seams. These and other details of construction, while preferred, are in no wise, however, essential to my invention and may be varied, as desired.

I shall now describe the operation of the condenser-head. Steam enters the neck or inlet F and passes through the opening *b*. A portion of the steam strikes the projecting edge of the upper surface of the shell A about the opening *b'* and is deflected into the shell A, as is shown by the arrows in Fig. 1. The remaining volume of steam passes by the neck B through the opening *b*² in the shell A', and a portion strikes the projecting edge about the upper opening *b*³ and is deflected into the shell A', and so on throughout the head, a portion of the steam being deflected into each of the shells, and a comparatively-small volume reaching the topmost shell A⁵. The steam thus passes over a greatly-extended area of condensing-surfaces and the water of condensation passes down through the necks C C' C², &c., and out through the pipes E. Such volume of steam as may remain uncondensed in the upper shell may escape through the outlets *d*. This volume of steam being at most very small, there is no water thrown out of the outlets *d* and the noise of the exhaust is smothered. The intermediate spaces *a* permit a circulation of air between the successive shells, which thus serve to keep the shells cool and increases the condensing.

Instead of arranging the openings, as *b* and *b'*, of each shell in line with one another, with necks B B' B², &c., in the same line and in direct communication throughout the head, as shown, it is apparent that the opening in the upper face of each shell, as *b'*, may be out of line with the opening in the lower face of the same shell, as *b*, but in line with the opening in the lower face of the next shell, as *b'*, with the necks B B' B², &c., correspondingly situated. It will not then be necessary to make the openings in the upper face of each shell smaller than the openings in the lower face to deflect a portion of the steam, as the upper face of the shell will then extend over the opening in the lower face and will cause the deflection.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A condenser-head consisting of a series of hollow shells provided with communicating openings of successively-smaller diameters between the adjacent shells.

2. A condenser-head consisting of a series

of communicating hollow shells, the upper shell being provided with one or more steam-outlets and the lower shell with a steam-inlet and one or more drip-outlets.

3. A condenser-head consisting of a series of hollow shells A A' A², &c., the connecting steam-necks B B' B², &c., and the connecting drip-necks C C' C², &c., the topmost shell of the series being provided with outlets and the lowermost shell with a steam-inlet, whereby the steam being introduced in the lowermost shell shall pass successively through each one of the series to the topmost shell.

4. A condenser-head consisting of a series of approximately-horizontal hollow shells located one above the other and inclining slightly downward toward their outer edges, with communicating drip passage-ways between their outer portions and communicating steam passage-ways between their central portions.

5. A condenser-head consisting of a series of hollow shells located one above the other, each of said shells, except the topmost one, being provided with openings in their upper and lower faces at or about their centers, the opening in the upper face of each shell being of smaller diameter than the opening in the lower face of the same shell, the topmost shell being closed at the middle portion of its upper face, but provided with the opening in the lower face, necks between the adjacent upper and lower openings of successive shells, a steam-inlet to the outer shell, communicating with the opening at the middle of the lower face thereof, and necks forming communicating passage-ways between said shells adjacent to their outer edges.

6. A condenser-head consisting of a series of hollow shells arranged one above the other and provided at or about their middle portions with openings in their upper and lower faces, the opening in the upper face being smaller than the opening in the lower face, connecting-necks between the opening in the upper face of each shell with the opening in the lower face of the next shell, and communicating passage-ways between said shells adjacent to their outer edges.

7. A condenser-head consisting of a series of hollow shells having communicating passage-ways between successive shells, with a portion of the upper surface of each shell extending over the passage-way opening to the lower surface of the shell so as to deflect into the shell more or less of the steam entering through the passage, and communicating passage-ways between said shells for the egress of the water of condensation.

In testimony of which invention I have hereunto set my hand.

CHAS. S. ONDERDONK.

Witnesses:

ERNEST HOWARD HUNTER,
GEO. B. LAUER.