

(No Model.)

E. F. LYMAN & J. P. WARREN.
STEAM EXHAUST HEAD.

No. 405,575.

Patented June 18, 1889.

Fig. 1.

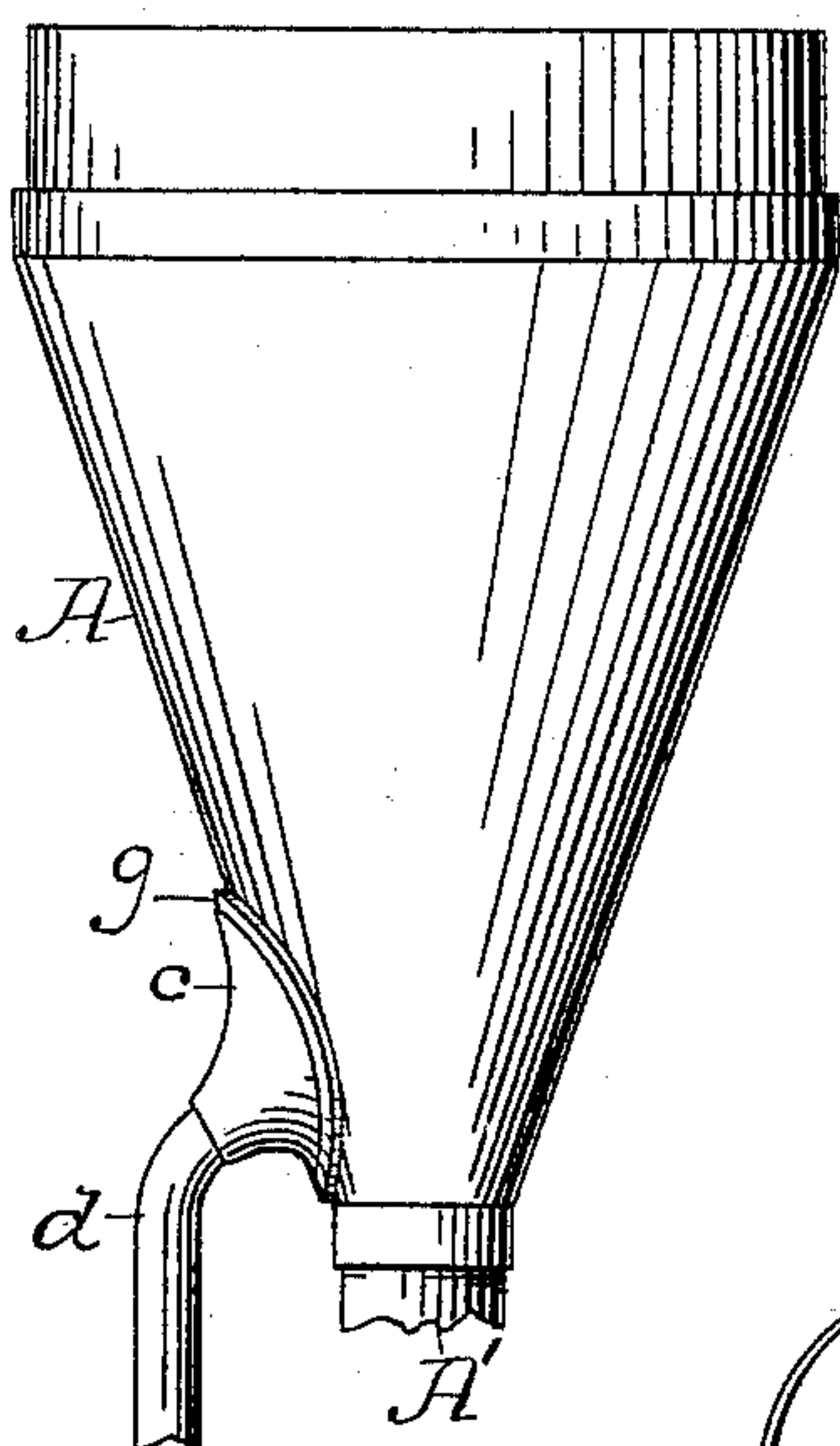


Fig. 2.

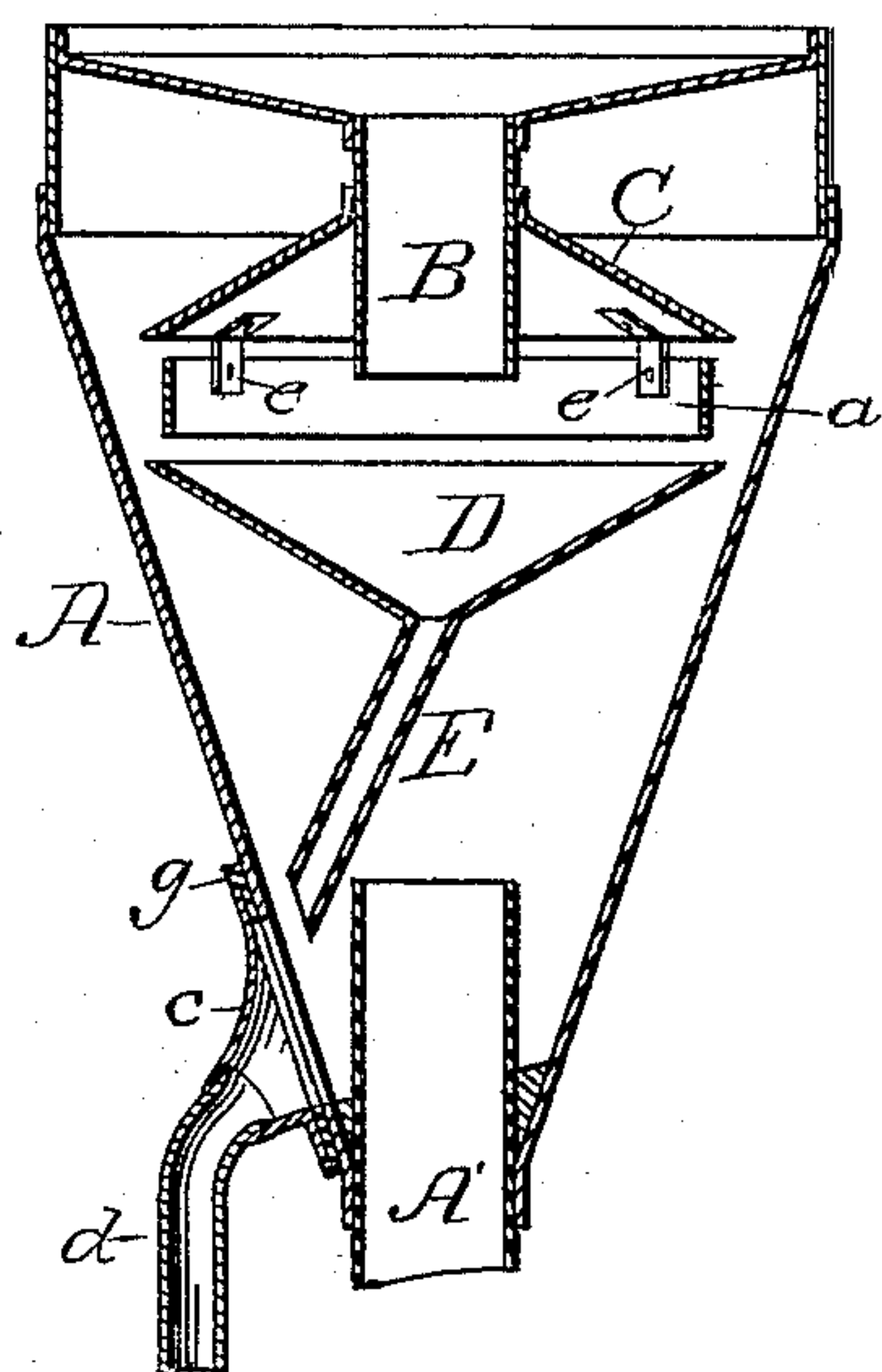
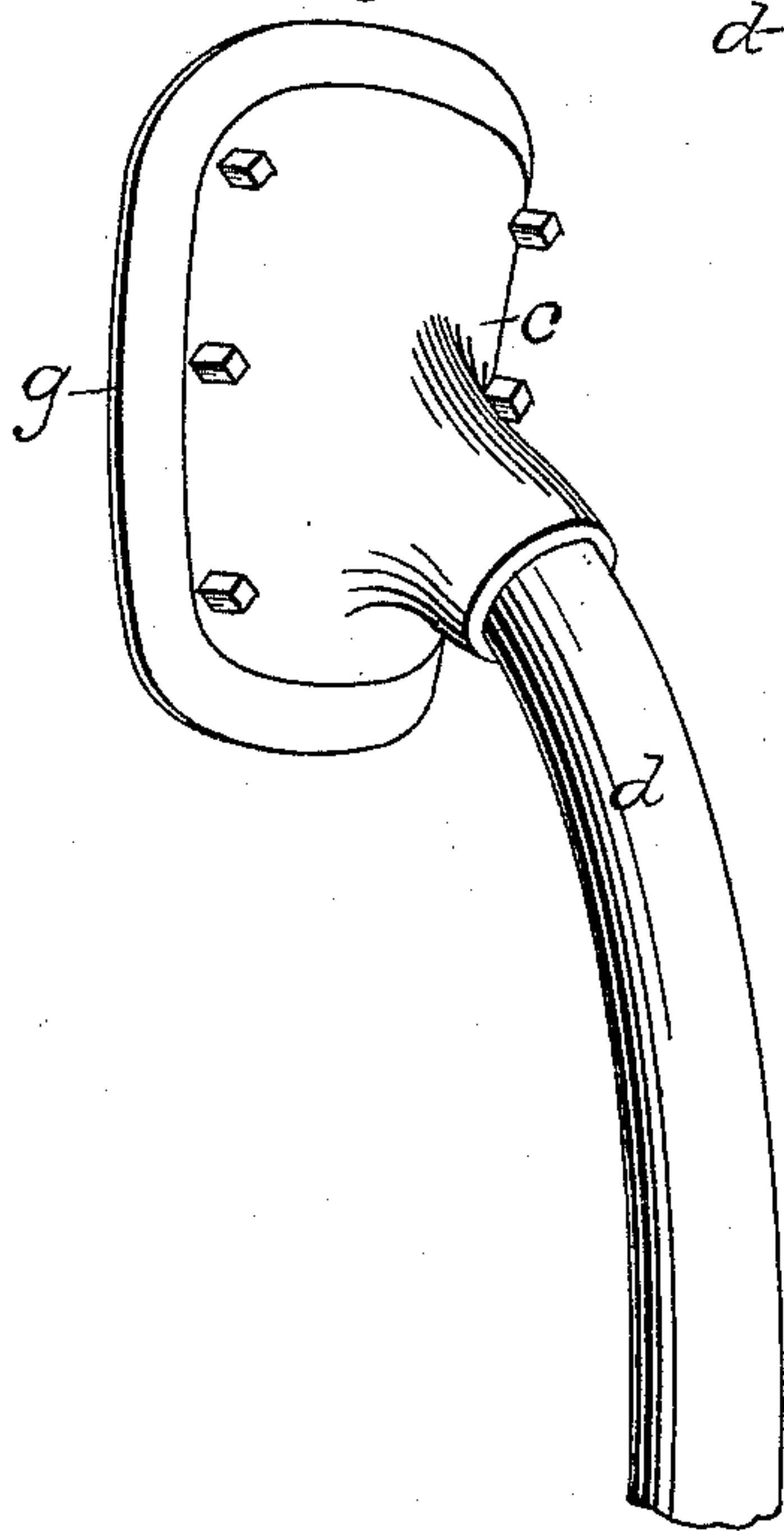


Fig. 3.



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STEAM-EXHAUST HEAD.

SPECIFICATION forming part of Letters Patent No. 405,575, dated June 18, 1889.

Application filed February 23, 1889. Serial No. 300,826. (No model.)

To all whom it may concern:

Be it known that we, EDWARD F. LYMAN and JAMES P. WARREN, both of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Steam-Exhaust Heads, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of our invention is to provide a simple and cheap exhaust-head, one which will thoroughly condense the steam and drain away the products of condensation, and which is so constructed that its interior can be easily gotten at and cleansed, substantially as hereinafter fully described, and as illustrated in the drawings, in which—

Figure 1 is a side elevation of our improved exhaust-head. Fig. 2 is a central vertical section, and Fig. 3 is a detail view of the drip-pipe and the exhaust-head connections thereof in perspective.

Referring to the drawings, A represents an exhaust-head consisting of an inverted cone suitably secured to the top end of a steam-exhaust pipe A', so that the said pipe extends up into said head a short distance, as shown, with an upper end preferably made cylindrical and closed by a head-plate, which dips to the center, where it is provided with an outlet-opening, from the circumferential edges of which the outlet-pipe B is secured and suspends.

Secured to and surrounding the outlet-pipe B is a cone-shaped deflector C, whose free circumferential edges descend to a horizontal plane a short distance above that of the lower end of pipe B, and which are of such diameter that they reach to within a short distance of the conical shell of the head. Arranged immediately below and concentrically with pipe B and deflector C is an inverted cone-shaped deflector D, which is of about the same diameter as deflector C and is suspended in position by suitable sheet-metal straps *e e*, secured thereto and to the cone-shaped shell of the head. The circumferential edges of these deflectors C and D are sufficient distance apart to permit of the placing of the sheet-metal ring or annulus *a* horizontally between them. This annulus is supported in position by straps from the shell of the head, or by up-

right posts from deflectors D, or in any other suitable manner, and we prefer to make its diameter slightly less than the diameter of the circumferential edges of the deflectors. In the apex of the lower inverted deflector D is an opening, and leading from this opening obliquely downward to below the mouth of the steam-exhaust pipe A' and to one side thereof is the drain E. This drain E empties the products of condensation, which gravitate into it into the mouth of a drip-pipe *d*, connected to and leading from the lower end of the inverted cone-shaped shell of the head just above the plane of the point where it is connected to the exhaust-pipe A'. The space between the said exhaust-pipe and the said shell below the plane of the mouth of the drip-pipe is filled up either by suitable casting or molten metal in such manner that the products of condensation drain in said drip-pipe.

The operation of the exhaust-head as thus far described is as follows: The exhaust-steam issuing from the exhaust-pipe is deflected toward and against the exterior shell by the lower deflector D and to a certain extent condensed. The larger volume of the steam, however, is by the pressure of the following successive pulsation of steam from said exhaust-pipe crowded up past the lower deflector D, after which some of it passes between the edges of upper and lower deflectors and the annulus into the chamber inclosed by the same, from whence it escapes into the open atmosphere. The steam that does not pass directly into the chamber inclosed by the deflectors and annulus after it has passed upward by the circumferential edges of the lower deflector arises into the chamber above the upper deflector, where it comes in contact with the side and head plate of the head, and describing an inward roll or evolution it passes down the inclined sides of the said upper deflector around the edges of the same into the chamber referred to and inclosed within the deflectors and annulus. From this chamber the steam passes out of the exit-pipe B, so relieved of its moisture that the vapors are disintegrated and carried away by the upper currents of air without doing injury to the adjacent architectural structure.

The various contacts with the exterior shell of the head, the deflectors, and the annulus

which the steam makes in its efforts to escape contributes to very thoroughly condense it, and these products of condensation gravitate down the sides of the outer shell of the head or into the lower deflector and are directed to the lower filled end of the shell of the head, and from thence into the drip-pipe *d*. Now, it is an absolute necessity that some means of ingress into the head be provided, because there is at all times accompanying the discharge of exhaust-steam some foreign substance—as, for instance, oil—which, when it condenses forms a glutinous substance that clings to the interior surface of the head, accumulates, and oftentimes seriously impairs the operation of the head unless removed in time. We provide for such ingress by adopting a special form of connection for said drip-pipe with the head. This consists of a bell-shaped plate *c*, with its barrel protruding outward and slightly downward, with the drip-pipe *d* inserted into the open end thereof and expanded and brazed thereto. The edges of the mouth of this plate *c* are flared outward in such manner as to conform to the shape of the lower end of the inverted cone-shaped shell of the head to which it is secured. A hole is cut in said shell which conforms to the shape of the edge of the mouth of plate *c*, and covering and protecting the edges of this opening is a rim-plate *e*, which is riveted or otherwise suitably secured to the shell. The outer surface of this rim-plate *e* next the inner edges thereof is rabbeted to a depth corresponding to the thickness of the edges of the flanged mouth of plate *c*, which latter is placed against and fits snugly within said rabbet, and is bolted to plate *e* by suitable bolts passing through plate *c* and plate *e*, as shown. The lower surface of the barrel of plate *c* and

the surface of the filled-up lower part of the head are preferably all on the same inclined plane, tipping toward the pipe *d*, so as to facilitate the drainage from the head of the products of condensation.

We do not deem it necessary that the edges of the rim-plate overlapped by the mouth of the bell-plate *c* should be rabbeted, although we prefer it. Moreover, this rim-plate, while a valuable accessory, may be dispensed with altogether.

In order to make a tight joint between the plates *c* and *e*, rubber or other packing may be inserted between their overlapping edges.

It is not absolutely necessary that plate *c* should be bell-shaped. A flat plate would answer our purpose, although not so well.

What we claim as new is—

1. The combination, with a steam-exhaust head *A*, exhaust-pipe *A'*, exit-pipe *B*, and drip-pipe *d*, of the upper deflector *C*, the lower deflector *D*, having a drain *E* leading from the inverted apex thereof, and the annulus suspended between the circumferential edges of said deflectors, as set forth.

2. The combination, with an exhaust-head, exhaust-pipe *A'*, and exit-pipe *B*, of the drip-pipe, bell-shaped connecting-plate thereof, and the rim-plate secured around and bordering the hole in the lower end of said head, through which the products of condensation pass in transit to said drip-pipe and which has its outer surface adjacent to its inner edge rabbeted, as set forth.

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