

(Model.)

H. N. WICKERSHAM & W. HUSTON.

EXHAUST NOZZLE.

No. 285,192.

Patented Sept. 18, 1883.

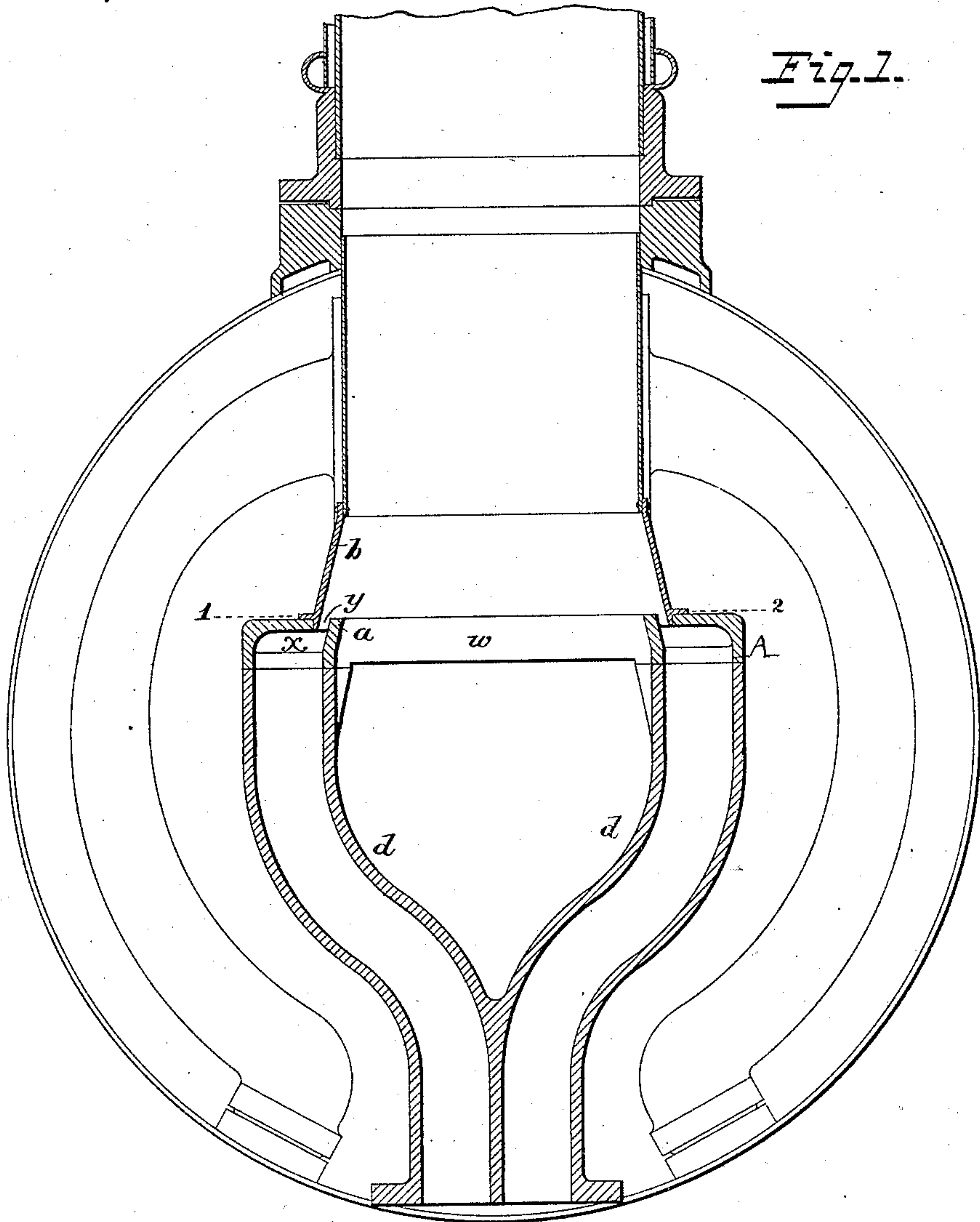


Fig. 1.

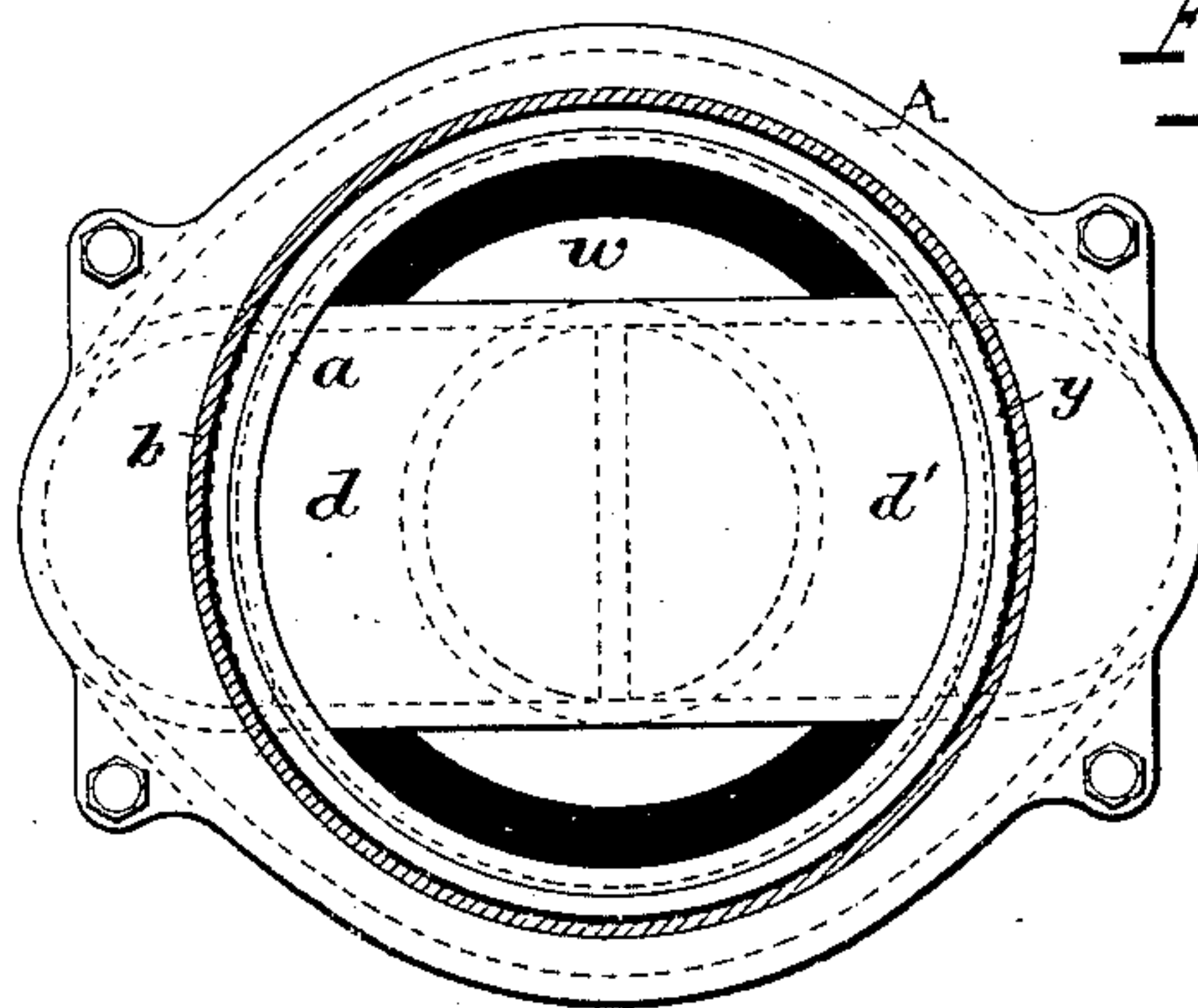


Fig. 2.

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HENRY N. WICKERSHAM AND WILLIAM HUSTON, OF WILMINGTON, DEL.

EXHAUST-NOZZLE.

SPECIFICATION forming part of Letters Patent No. 285,192, dated September 18, 1883.

Application filed March 5, 1883. (Model.)

To all whom it may concern:

Be it known that we, HENRY N. WICKERSHAM and WILLIAM HUSTON, of Wilmington, New Castle county, State of Delaware, have jointly invented certain Improvements in Ejectors, of which the following is a specification.

Our invention is an improved exhaust-nozzle for creating draft by a steam-blast, fully described hereinafter, the device being specially adapted for use in locomotives.

In the drawings, Figure 1 is a cross-section through the smoke box and stack of a locomotive, showing our improved exhaust device applied thereto. Fig. 2 is a sectional plan of the device on the line 1 2, Fig. 1.

The essential features of the device are a tube, *b*, which may be slightly conical or cylindrical, an inner concentric tube, *a*, above the upper edge of which the outer tube projects, and a casing of any suitable size and shape, containing a chamber, *x*, communicating with the annular space *y* between the two tubes, and to which the exhaust-steam is admitted, said space or channel being inclined inward to throw the steam to the center of the tubes. The space *w* within the inner tube, *a*, is in free communication with the fluid to be propelled—for instance, the air or gases in the combustion-chamber of a locomotive; and we have found that when the exhaust-steam from the cylinder issues from the orifice *y* the air within the tube *a* is put into motion and is rapidly propelled in an unbroken column outward.

We are aware that an exhaust-nozzle has been used in which the two tubes *a* and *b* are of equal length; but this construction results in imparting but little, if any, motion to the inner body of air, while a shortening of the inner tube effects a movement of a very large body of air.

A construction specially adapted for locomotives is shown in the drawings, the outer tube, *b*, being prolonged to extend through the shell and into the stack, (between which and the tube there may sometimes be a narrow annular orifice,) and the annular casing *A* communicating with two diverging exhaust-tubes,

d d. This construction permits the exhaust-opening to be made equal in area to that of the steam-ports of the cylinder, for we have found that we can secure all the draft desired without throttling the steam in the least. We therefore avoid the back-pressure that results from the ordinary constructions.

We are aware that an ejector has been proposed with concentric pipes and an annular opening from which the steam is passed upward to the chimney, our invention being distinguished from this by the fact, first, that the steam is thrown toward the center of the pipe, insuring a much more effective action, and, secondly, by the fact that the annular opening is about equal in area to the exhaust, so that the ejecting action is secured without any back-pressure.

We claim—

1. An exhaust-nozzle consisting of an outer tube, a shorter inner tube, open at both ends, the two being arranged to leave an intervening space or channel, *y*, equal in area to the exhaust-pipes, and inclined inward, and a casing containing a chamber communicating with said space, and an inlet-pipe whereby the exhaust is admitted to the said chamber, substantially as set forth.

2. The combination of the case *A*, tubes *a* and *b*, of different lengths, arranged to leave an intervening channel, *y*, inclined inward, and exhaust-pipes *d d*, arranged within a smoke-box of a locomotive, substantially as set forth.

3. The combination, with a locomotive-boiler, of the tubes *a b*, arranged within the smoke-box to leave an intervening channel inclined inward, a casing communicating with the space between the tubes, and exhaust-tubes *d d*, communicating with the casing, the tube *b* being extended through the shell of the smoke-box, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY N. WICKERSHAM.
WILLIAM HUSTON.

Witnesses:

GEORGE O'NEILL,
JAMES WOOLLEY.