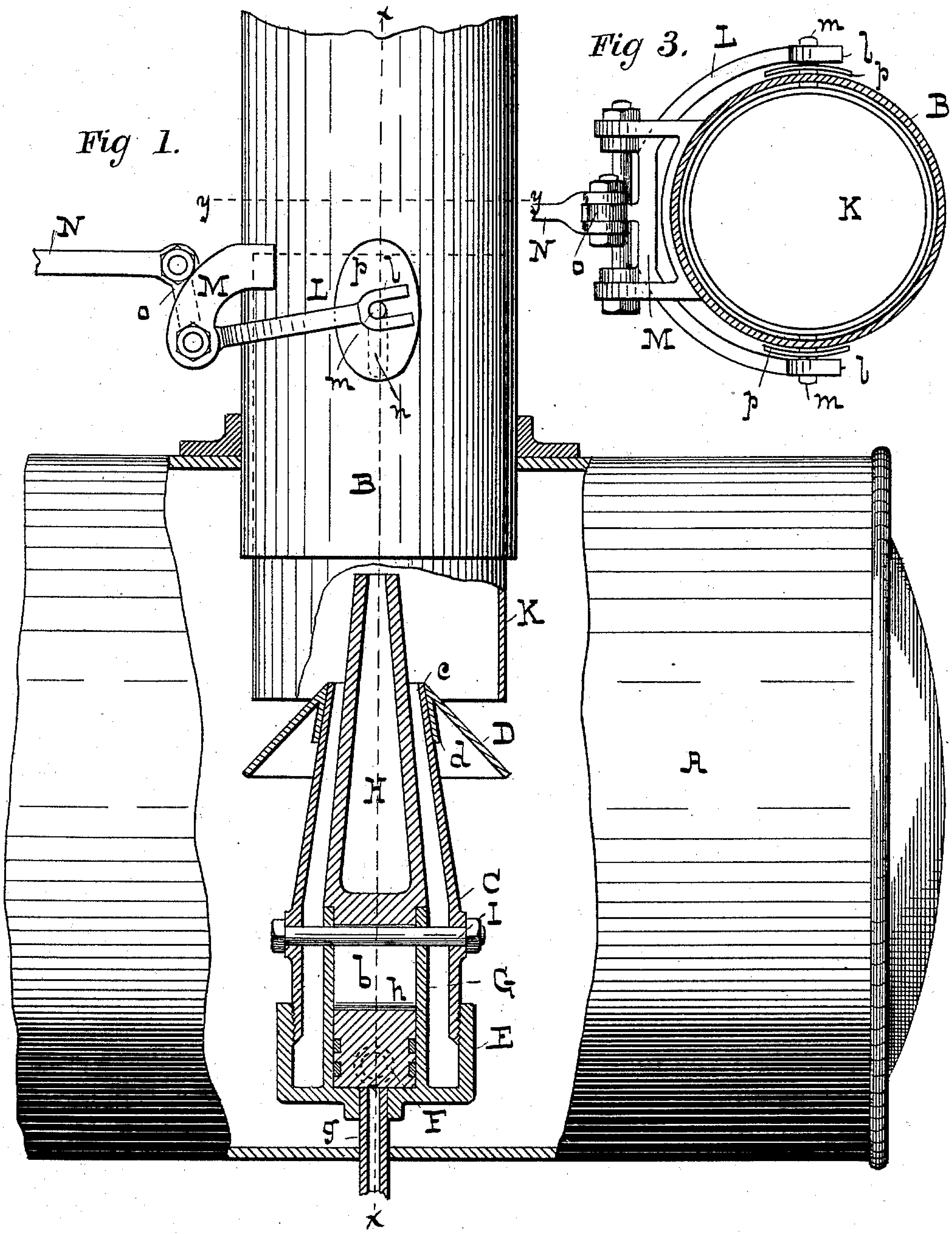
(No Model.)

2 Sheets—Sheet 1.

G. L. THIELL.

VARIABLE EXHAUST FOR ENGINES.

No. 522,864. Patented July 10, 1894.



-WITNESSES-

Dan'l Fisher

C. A. Andrews.

-INVENTOR-

George L. Thiell

by Geo. W. T. Howard, Atty.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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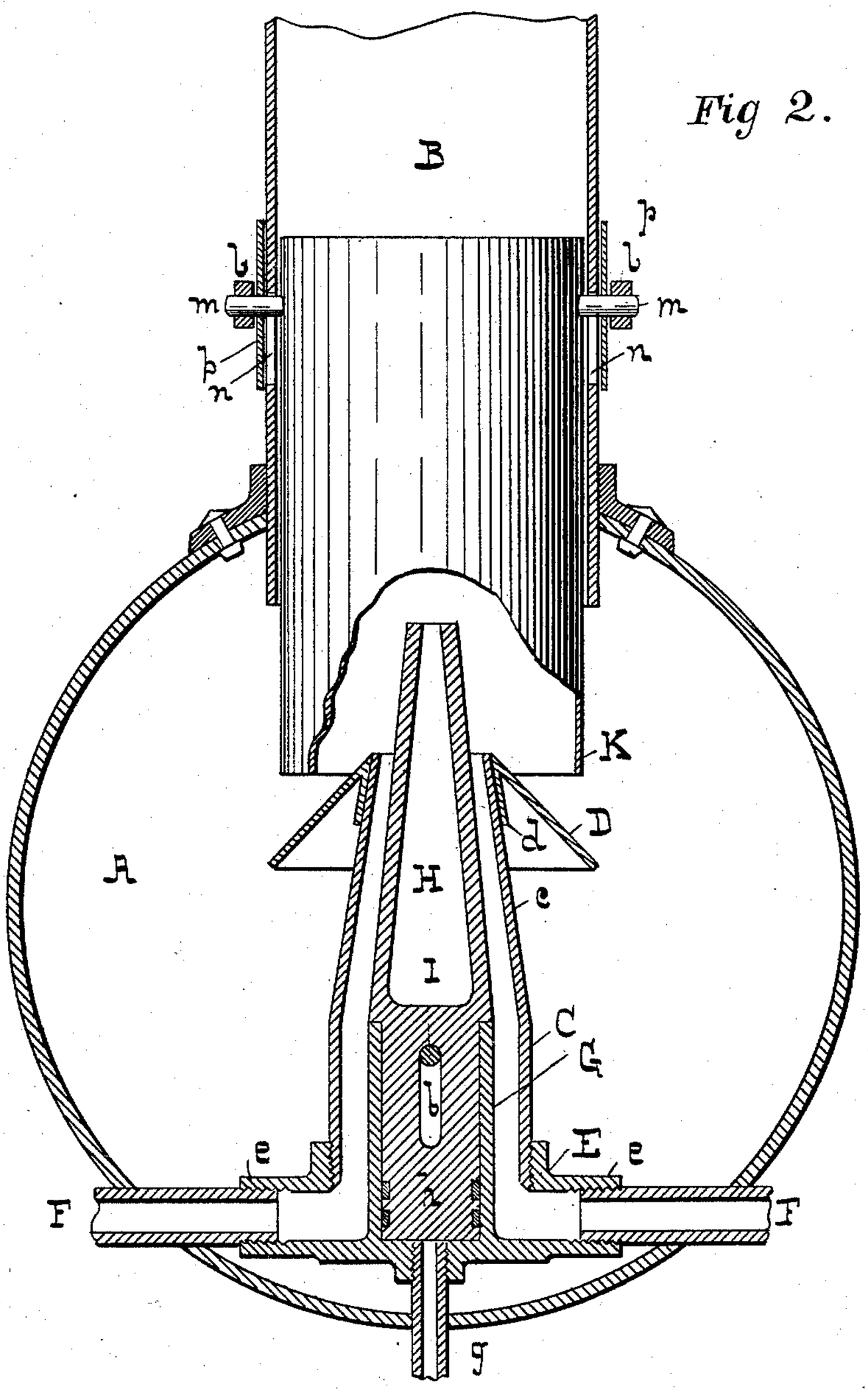
Fig 2.



-WITNESSES-

Dan'l Fisher
L. H. Andrews.

-INVENTOR-

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by Wm. W. T. Howard,
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UNITED STATES PATENT OFFICE.

GEORGE L. THIELL, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE THIELL COMBUSTION GOVERNOR AND MANUFACTURING COMPANY OF BALTIMORE CITY.

VARIABLE EXHAUST FOR ENGINES.

SPECIFICATION forming part of Letters Patent No. 522,864, dated July 10, 1894.

Application filed February 10, 1892. Renewed December 19, 1893. Serial No. 494,127. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. THIELL, of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Variable Exhausts for Engines, of which the following is a specification, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The object of my invention is to provide a variable exhaust for engines which may be easily controlled by the engineer; and my invention consists in the mechanisms hereinafter fully described.

In the drawings, Figure 1 is a side elevation, partly broken away and partly in section, of the forward end of a locomotive boiler embodying the invention. Fig. 2 is a vertical transverse section of the same, taken on the line *x*—*x*, Fig. 1; and Fig. 3 is a horizontal section through the smoke stack on the line *y*—*y*, Fig. 1.

Similar letters of reference indicate similar parts in the respective figures.

A represents the smoke box and B the smoke stack.

C is the exhaust nozzle having an upper tapered end *c*, on which is supported a bonnet D. This bonnet is in the form of a hollow frustum of a cone and provided with an interior collar *d* which fits over the exhaust nozzle C. The lower end of the exhaust nozzle is screwed into a casting E, the latter being provided with two lateral projections *e e* into which the pipes F F are screwed. These pipes lead to the exhausts of the engine cylinders not shown.

G represents a cylinder integral with the casting E, and extending upward from the base, centrally thereof. A pipe *g* leads from the bottom of the cylinder G to the steam space of the boiler and is to be provided with an ordinary two way cock within the reach of the engineer. Within the cylinder G the lower end *h* of a conical valve H is fitted, which lower end acts as a piston to operate the valve H. The valve extends upwardly beyond the end of the exhaust nozzle C and is made hollow for the sake of lightness in weight. The upward movement of the valve H is limited by a bolt I which passes through the nozzle C, the cylinder G and an elongated opening *b* in the piston *h*. When it is required to increase the draft of the furnace the engineer will admit steam to the lower end of the piston *h* which will cause the conical valve H to rise and thereby decrease the space between it and the top of the exhaust nozzle. This will have the effect of creating a sharper exhaust and thereby increase the draft of the furnace. The valve H will return to its normal position by gravity when the steam is permitted to escape from beneath the piston *h* through one of the branches of the two-way cock before mentioned, as will be readily understood. The draft may be still further increased by the following mechanism: A sleeve K is fitted within the lower end of the smoke stack to move freely therein. L is a forked lever pivoted in a bracket M securely fastened to the smoke stack. The prongs *l l* of this lever extend on opposite sides of the smoke stack and have slotted ends which engage with the outer ends of two pins *m m* secured to the sleeve, on opposite sides thereof, and extending through elongated holes *n n* in the smoke stack. A rod N is connected at one end to the other member *o* of the lever and leads to the cab of the locomotive, or to any other convenient point within reach of the engineer. Plates *p p* are secured to the pins *m m* to cover the elongated holes *n n* in the smoke stack.

The sleeve K extends at its lower end below the top of the bonnet D, and by operating the forked lever L to raise or lower the sleeve K the space between it and the bonnet can be increased or decreased at pleasure, and the draft of the furnace correspondingly decreased or increased.

Having described my invention, I claim—

1. The combination with an exhaust nozzle having an upwardly tapered upper end, of a steam cylinder within the said nozzle, a conical valve tapered in the same direction as the upper end of the nozzle with its lower end adapted to fit in the said steam cylinder and answer the purpose of a piston, and a steam pipe which connects the said steam cylinder below the piston therein, directly with the boiler having a two-way cock under the con-

trol of the engineer whereby in the operation of the cock steam may be admitted to the said steam cylinder, or the interior of the said cylinder placed in communication with the outer air, substantially as specified.

2. In combination with the smoke box of a locomotive boiler and the smoke stack leading therefrom, an exhaust nozzle having an upwardly extending tapered end, a steam cylinder within the said nozzle, a conical valve tapered in the same direction as the upper end of the nozzle with its lower end adapted to fit in the said cylinder and thereby answer the purpose of a piston, a steam pipe which enters the said cylinder below the piston therein, whereby the said cylinder may be placed in communication with the steam in the boiler, or with the outer air, a conical bonnet which fits over the top of the conical nozzle, a sleeve fitting within the said smoke stack and adapted to have a vertical reciprocating movement therein which sleeve constitutes the only passage to the smoke stack for air carried with the exhaust steam issuing from the said nozzle and suitable means for raising and lowering the said sleeve from the engineer's cab, substantially as specified.

In testimony whereof I have hereunto set my hand.

GEORGE L. THIELL.

Witnesses:
DANL. FISHER,
JNO. T. MADDOX.