2 Sheets—Sheet 1.

R. N. ALLEN.

Exhaust-Nozzles of Locomotives.

No. 199,137. **Patented Jan. 15, 1878.**

Fig. 1

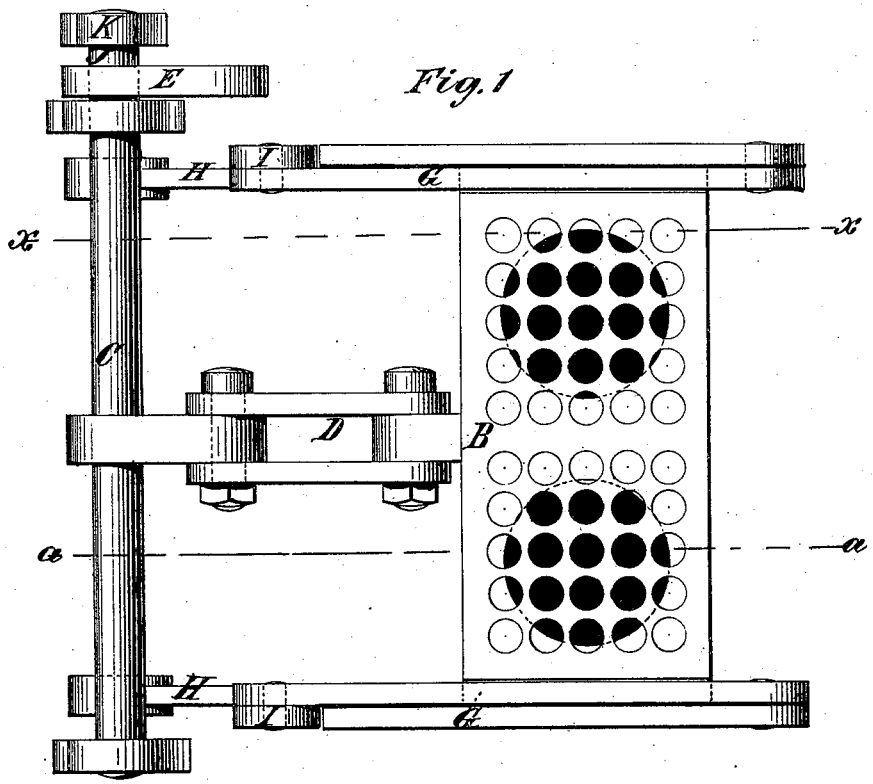
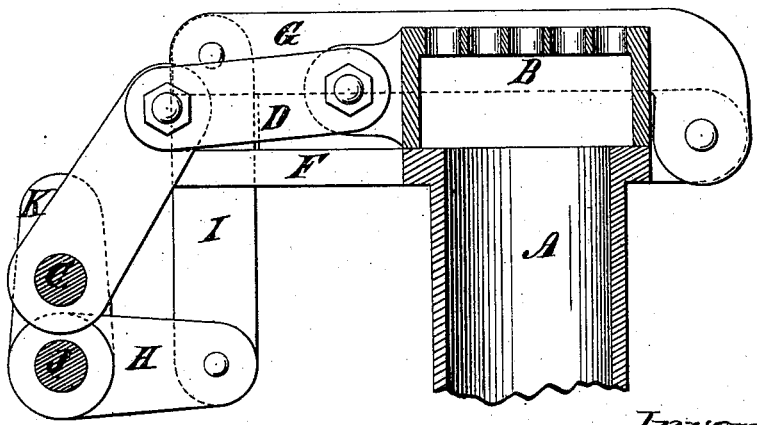


Fig. 2



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2 Sheets—Sheet 2.

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Fig. 3

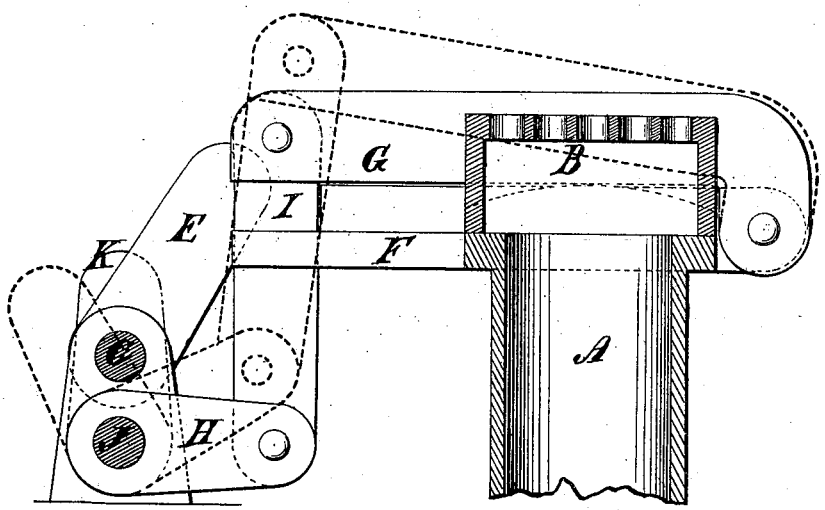
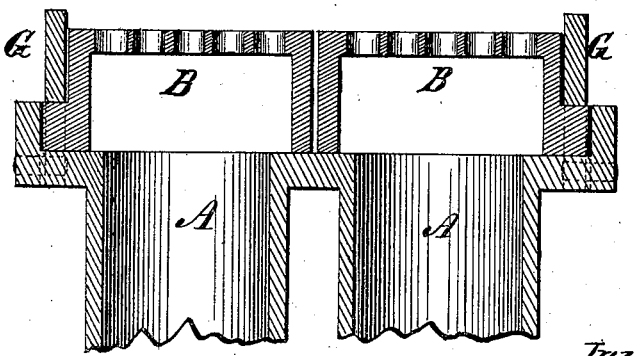


Fig. 4



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UNITED STATES PATENT OFFICE.

RICHARD N. ALLEN, OF HUDSON, NEW YORK.

IMPROVEMENT IN EXHAUST-NOZZLES OF LOCOMOTIVES.

Specification forming part of Letters Patent No. **199,137**, dated January 15, 1878; application filed July 12, 1877.

To all whom it may concern:

Be it known that I, RICHARD N. ALLEN, of Hudson, in the county of Columbia and State of New York, have invented a new and useful Improvement in Exhaust-Nozzles of Locomotives, of which the following is a specification:

The invention relates to exhaust-nozzles of locomotives; and consists in, first, the combination of a steam-distributer having a number of apertures, whose combined area is equal to or greater than the area of the nozzles themselves, with the exhaust-nozzles of a locomotive; second, the combination of the movable arms or pieces G G, hereinafter described, and the distributer, by means of which the distributer can be securely held in place over the nozzles, or, by raising the arms, can be released from its seat, so as to be easily removed from the nozzles at will and readily readjusted.

It is well known that the exhaust-nozzles of locomotives are usually placed in the smoke-box below the base of the stack, and in this situation are made to aid combustion by discharging the exhaust-steam up the stack, thereby producing a partial vacuum, which is supplied by the inflow of the air through the grate, and which causes an increased draft.

With the nozzles ordinarily used it frequently occurs, when the machine is carrying a heavy load, or is just starting up, or is running upgrade, that the exhaust-blast becomes so intense as to disturb the ignited fuel on the grate, or, in engineers' phrase, to "tear the fire in pieces."

It is the object of the present invention to obviate this difficulty attending the use of the exhaust-nozzles. To this end a hood or distributer, shaped like an inverted box and having its upper face or cover filled with small holes, is employed in connection with the exhaust-nozzles. This box being placed exactly over the upper end of the nozzles, the steam is discharged into its interior, and thence passed out through the holes in the perforated top and off through the stack. By this means the volume of the steam is subdivided into a large number of small streams, the effect of which is found in practice to be beneficial in preventing the difficulty above mentioned.

The aggregate area of the perforations in the distributer should, by preference, somewhat exceed the area of the two nozzles, and, as the holes are in the top of the distributer rather than its sides, the blast of the steam is not diverted from its general upward direction, and therefore not so much checked as to produce an inconvenient back pressure—an evil which is found to exist in certain devices of a reverberatory character heretofore sought to be used in this situation.

Preferably my distributer is made adjustable, so as either to cover the nozzles when the conditions of work are such as otherwise to produce too heavy a draft through the fuel, or to be wholly removed therefrom whenever the entire force of the draft can be used to advantage. This adjustment is easily effected by mounting the distributer on ways in a suitable frame and connecting it with a rock-shaft, which, by means of a rod, is placed within the control of the engineer.

In practice, however, it has been found somewhat difficult, when the distributer is held firmly over the nozzles, as it should be, to release it from its seat by drawing it out along ways or grooves, inasmuch as such ways or grooves are exceedingly liable to become packed with dust, cinders, and oil to such an extent as to resist the passage of the distributer along them.

It is to remedy this difficulty that the second part of my invention relates—the use of the movable arms or pieces which operate to clamp the distributer over the nozzles, and to release it, so that it can be readily removed therefrom.

The invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a plan view thereof. Fig. 2 is a sectional view along the line *a a* of Fig. 1, the link-connection, &c., being shown in elevation. Fig. 3 is a sectional view along the line *x x* of Fig. 1, the parts beyond being shown in elevation.

A A are the ordinary exhaust-nozzles. B is the perforated distributer. C is the rock-shaft; D, a link connecting the rock-shaft with the distributer; E, a second crank-arm on the rock-shaft, for receiving one end of a rod running to the cab; F, one of the ways on which the distributer moves; G G, the movable arms or pieces to clamp or release the distributer; I I, upright pieces, connecting the movable arms G G with the crank-arms H H; J, rock-shaft, to

which is attached the crank-arms H H; K, crank-arm attached to the rock-shaft J, to be operated from the engineer's cab to raise and depress the arms G G.

When it is desired to move the distributer off from the nozzles, the crank-arm K is moved slightly backward by means of the rod attached thereto, and an upward movement is thereby communicated to the arms G G through the rock-shaft J, the crank-arms H H, and the upright pieces I I. The movable arms G G are thus raised from the flanges on the sides of the distributer, and leave it free to be moved along on its ways. This movement is given to the distributer by rotating the rock-shaft C by means of a rod which is attached to its crank-arm E, and, by rotating the rock-shaft in the proper direction and to the requisite extent, the distributer can be entirely removed from the nozzles. By a reverse movement of the rock-shaft the distributer may be readjusted over the nozzles, where it may be securely clamped by the arms G G, which are brought down upon the flanges on the sides of the distributer by a reverse movement to that before described of the rock-shaft K.

Instead of having the two nozzles discharge into a common chamber in the distributer, each nozzle may be provided with a separate chamber, as shown in the longitudinal section in Fig. 4 of the drawings. These chambers may be attached so as to move together, or may be arranged to move independently of each other, as desired.

What is claimed as new is—

1. In combination with the exhaust-nozzles of an engine, a steam-distributer placed over the delivery end of the nozzles, and provided with a series of small apertures through its top for subdividing the steam, the aggregate area of the said apertures being equal to or greater than the area of the nozzles, substantially as set forth.

2. In combination with a steam-distributer placed over the delivery end of the nozzles, movable arms, which operate to clamp the distributer over the nozzles and to release it, so that it can be removed therefrom, substantially as described.

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