G. S. BRAINERD.

Variable Exhaust for Locomotives.

No. 198,789. Patented Jan. 1, 1878.

Fig. 1

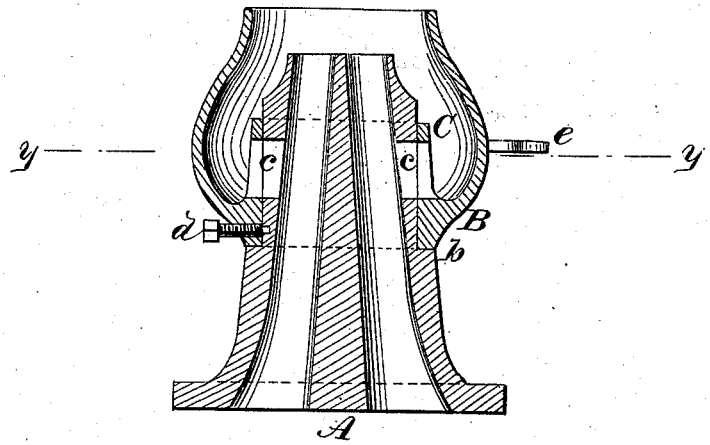
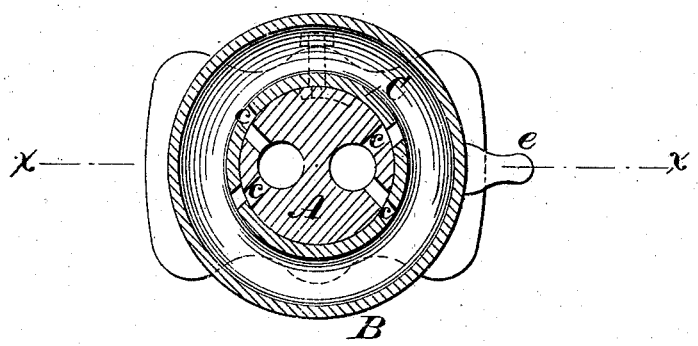


Fig. 2



WITNESSES:

C. Noreux

J. H. Scarborough.

INVENTOR:

G. S. Brainerd.

BY Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE S. BRAINERD, OF ST. ALBANS, VERMONT.

IMPROVEMENT IN VARIABLE EXHAUSTS FOR LOCOMOTIVES.

Specification forming part of Letters Patent No. **198,789**, dated January 1, 1878; application filed November 30, 1877.

To all whom it may concern:

Be it known that I, GEORGE S. BRAINERD, of St. Albans, in the county of Franklin and State of Vermont, have invented a new and Improved Variable Exhaust for Locomotives, of which the following is a specification:

Figure 1 is a vertical section taken on line *x x* in Fig. 2. Fig. 2 is a horizontal section taken on line *y y* in Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention relates to exhaust or blast nozzles for locomotives and other engines requiring a variable exhaust; and it consists in a casting containing a single or double nozzle, in which the exhaust-pipes of the two cylinders of the locomotive terminate, and having a portion turned off cylindrically to receive a hollow cone having an inwardly-projecting sleeve, which surrounds the cylindrical portion of the nozzle. There are ports through the sides of the nozzle, and through the inwardly-projecting sleeve, which may be closed by turning the hollow cone.

The object of the invention is to provide a blast-nozzle by which the blast may be concentrated, so as to be effective or diffused, so that it does not increase the intensity of the fire in the locomotive fire-box.

Referring to the drawings, A is an exhaust-nozzle, which is placed in the front end of a locomotive, directly over the exhaust-openings in the center casting. This casting is made double—*i. e.*, with two exhaust-passages in the present case; but I do not confine myself to this construction, as the improvement may be used in connection with a single exhaust-nozzle.

The nozzle A is turned off conically at its upper end, and below the conical portion it is made cylindrical. A hollow cone, B, having a sleeve, C, projecting inwardly from its base, is placed upon the nozzle A, and supported by a shoulder, *b*, formed on the nozzle. The open mouth of the cone is equal in area to both of the exhaust-pipes, and projects a short distance above the nozzle, leaving an annular space between it and the nozzle. The object of this arrangement is to produce a vacuum by the steam issuing from the center nozzle drawing the relief-steam after it.

The sleeve C is accurately fitted to the cylindrical portion of the nozzle, and ports *c* are made through the nozzle and through the sleeve. In the present case there are two ports in each side of the nozzle communicating with the exhaust-passage; but I do not limit or confine myself to this number.

A stop-screw, *d*, passes through the base of the cone into a slot in the nozzle, and limits the distance through which the cone is turned. An arm, *e*, projects from one side of the cone, to receive a rod which extends to the cab for moving the cone.

When a strong blast is required, the cone B is turned so that the ports in the nozzle will be covered by the sleeve C. The exhaust-steam will then issue with great force from the passage of the nozzle, and, being concentrated, creates a strong draft in the smoke-stack of the locomotive; and when a blast is not required the cone is turned so as to open the ports *c*, permitting a portion of the exhaust-steam to escape through the ports into the cone. In passing through the cone the steam is deflected, so that its force is destroyed, and as it is projected from the nozzle it is so diffused as to produce little effect on the fire.

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

The combination of a movable cone, B, having the inwardly-projecting sleeve C, with the nozzle A, each being provided with one or more ports, as herein shown and described.

GEORGE S. BRAINERD.

Witnesses:
F. C. MERRIFIELD,
S. I. STROUD.