G. SEWELL.

Exhaust-Nozzles.

No. 157,231. Patented Nov. 24, 1874.

Fig. 3.

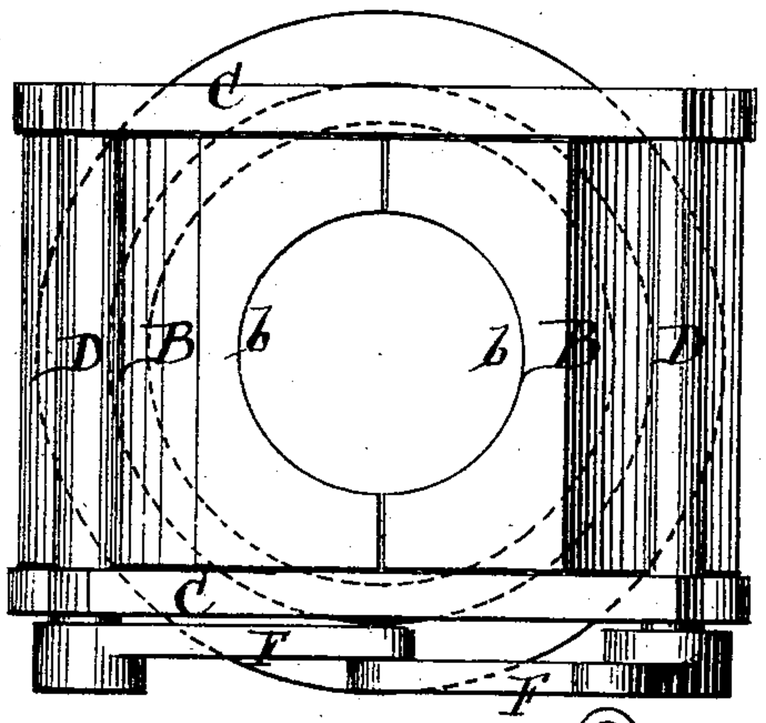


Fig. 4.

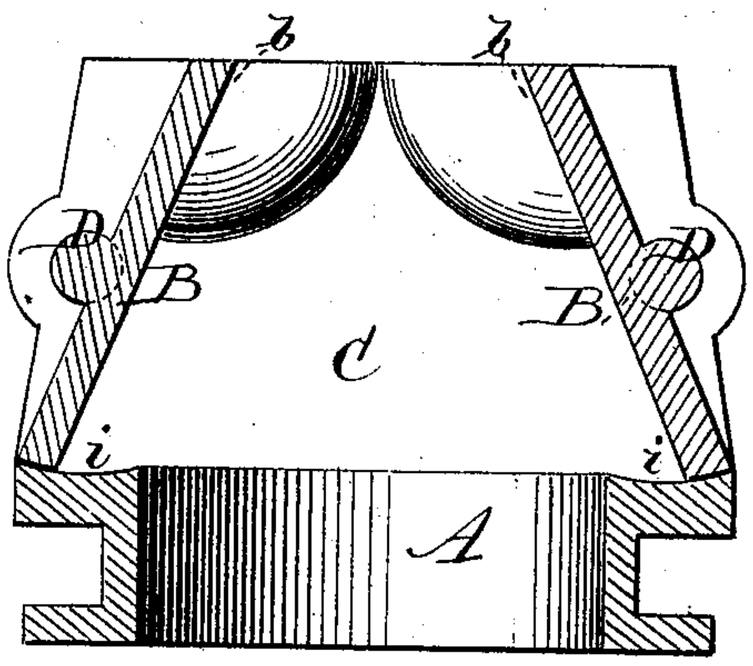


Fig. 1.

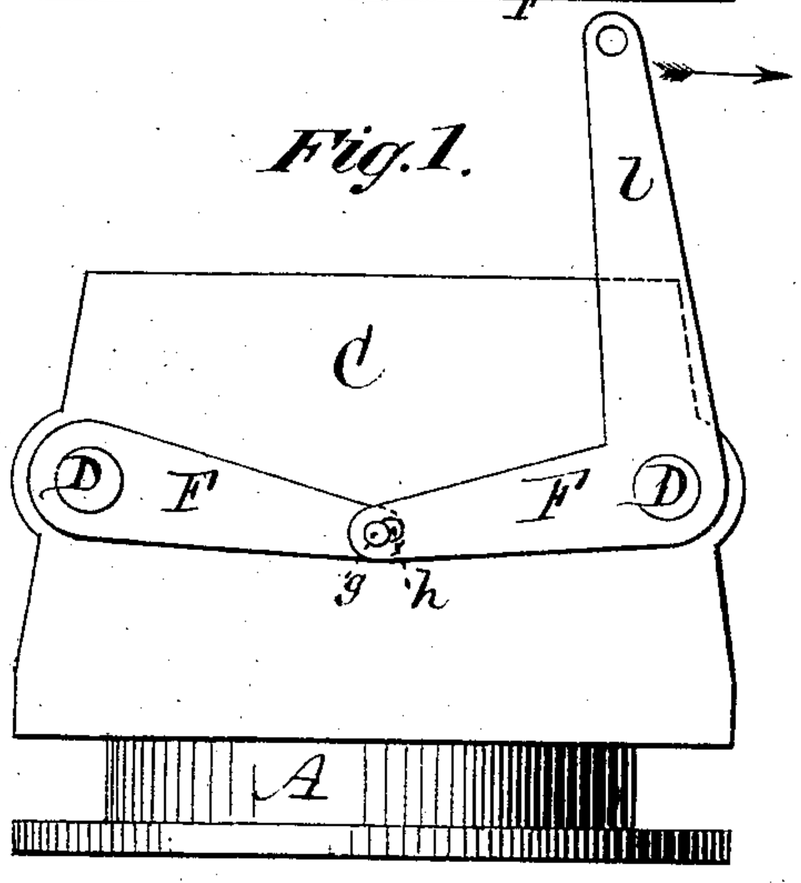
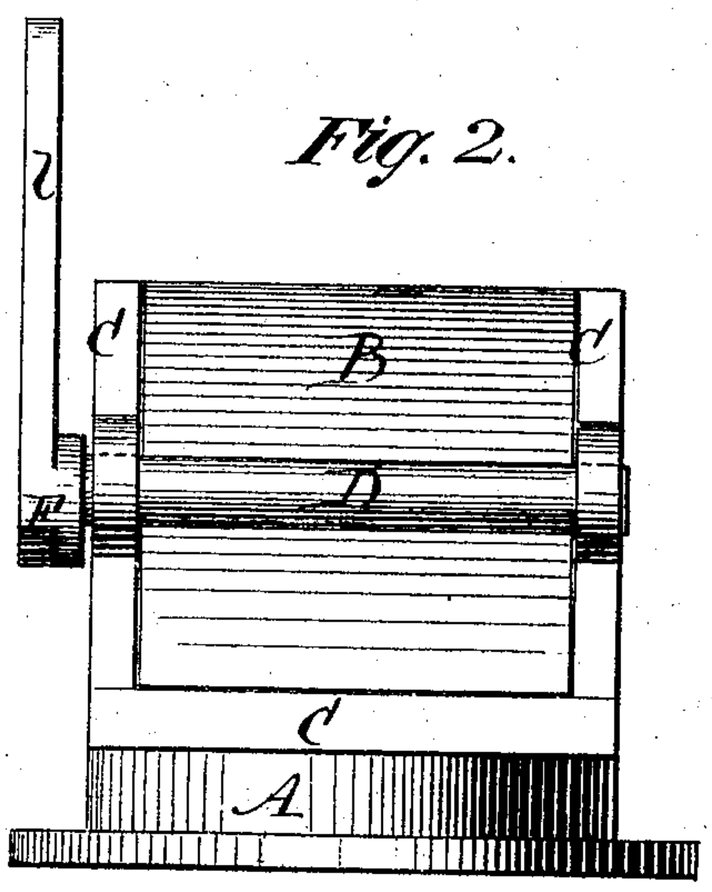


Fig. 2.



Witnesses.
John Becker.
Fred. Haynes

George Sewell
by his Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

GEORGE SEWELL, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN EXHAUST-NOZZLES.

Specification forming part of Letters Patent No. **157,231**, dated November 24, 1874; application filed November 7, 1874.

CASE B.

To all whom it may concern:

Be it known that I, GEORGE SEWELL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Exhaust-Nozzles; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification.

My invention relates to certain improvements whereby the engineer of a locomotive is enabled to vary the dimensions of the exhaust-nozzle, and thus control the velocity of the exhaust steam in its escape into the smoke-stack, and thereby regulate the draft and the steam-generating capacity of the boiler, and the back pressure on the steam-pistons.

The invention consists in the combination, with the exhaust-pipe, of a divided nozzle composed of two shutters pivoted at or near the middle of their depth, in a frame attached to the exhaust-pipe, and provided with a lever for opening and closing them, so that the dimensions of the nozzle may be varied, and the velocity of the exhaust steam regulated accordingly.

In the accompanying drawing, Figure 1 is a side view of my invention. Fig. 2 is a side view at right angles to Fig. 1. Fig. 3 is a top view. Fig. 4 is a vertical section.

The exhaust-pipe A is of any suitable construction, and to its end is attached a frame, C, to which the working parts of the nozzle are attached. The adjustable nozzle consists of two shutters, B B, the inner edge of each of which is concave, and terminates in a semicircular edge, *b*, so that when the edges of the two shutters are in contact with each other, a circular opening is formed between them, as shown in Fig. 3. Each shutter is attached to a shaft, D, the ends of which have their bearings in the side pieces of the frame C, so that the shutters may oscillate between said side pieces. At one end of each shaft is an arm, F, one end of which is rigidly attached to the shaft, and the other end extends toward the opposite end of the frame C. The inner ends of the arms F meet about midway of the length of the frame C, and are connected to each other by means of a pin or stud, *g*, on one of the arms working in a slot, *h*, in the other arm. One of the arms F is in the form of a lever with the shaft D for its fulcrum. The long arm *l* of this lever is connected by suitable connecting devices with the cab, so as to be under the control of the engineer. By the attachment of the shafts to the shutters midway of their width, instead of to their lower edges, both the upper and lower edges of each shutter move in an arc of a circle, the lower edge working in a concave surface, *i*, in the frame so as to fit snugly, and prevent leakage at those parts.

When motion is applied to the long arm *l* of the lever, in the direction of the arrow in Fig. 1, the shutters B are caused to turn on their axes, so as to move their lower edges toward each other, and their upper edges from each other, thus changing the tapering form of the space between the shutters, and increasing the dimensions of the opening between the upper edges. Thus the engineer is enabled, at pleasure, to vary the dimensions of the exhaust-nozzle, and thereby control the velocity of the exhaust steam, and regulate the draft and the steam-generating capacity, as before described.

One of these adjustable nozzles may be applied to each cylinder, or the exhaust-pipes from both cylinders may be joined in one pipe, and the nozzle applied to the end of such pipe.

What I claim as new, and desire to secure by Letters Patent, is—

1. The adjustable shutters B attached to the shafts D, and having both their upper and their lower edges moving in arcs of circles, substantially as shown and described.

2. The combination of the lever *l*, arms F F, shafts D D, shutters B B, frame C, and exhaust-pipe A, substantially as shown and described.

GEORGE SEWELL.

Witnesses:
MICHAEL RYAN,
BENJAMIN W. HOFFMAN.