

G. SEWELL.

Exhaust-Nozzles for Steam-Cylinders.

No. 157,230.

Patented Nov. 24, 1874.

Fig. 3.

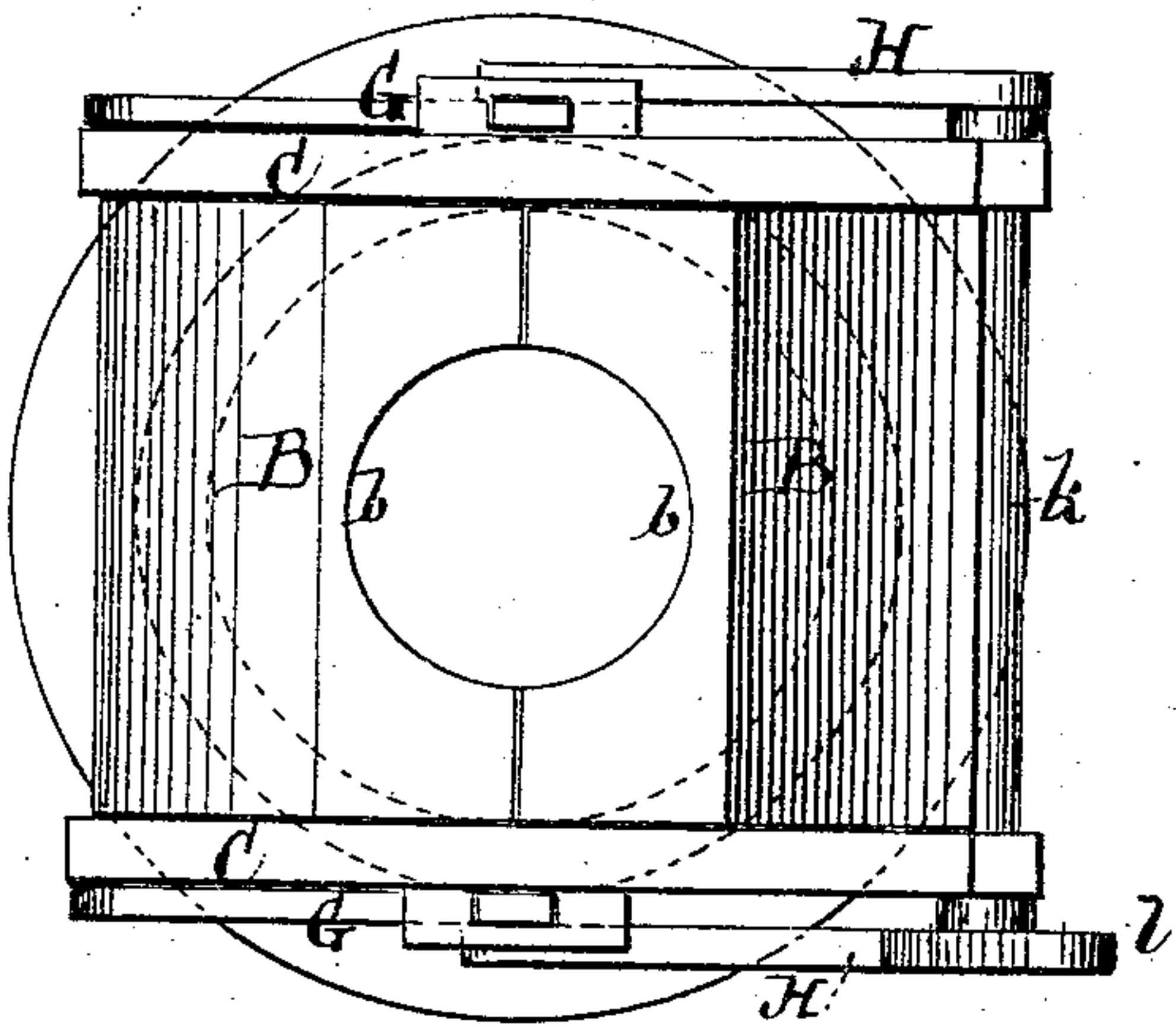


Fig. 4.

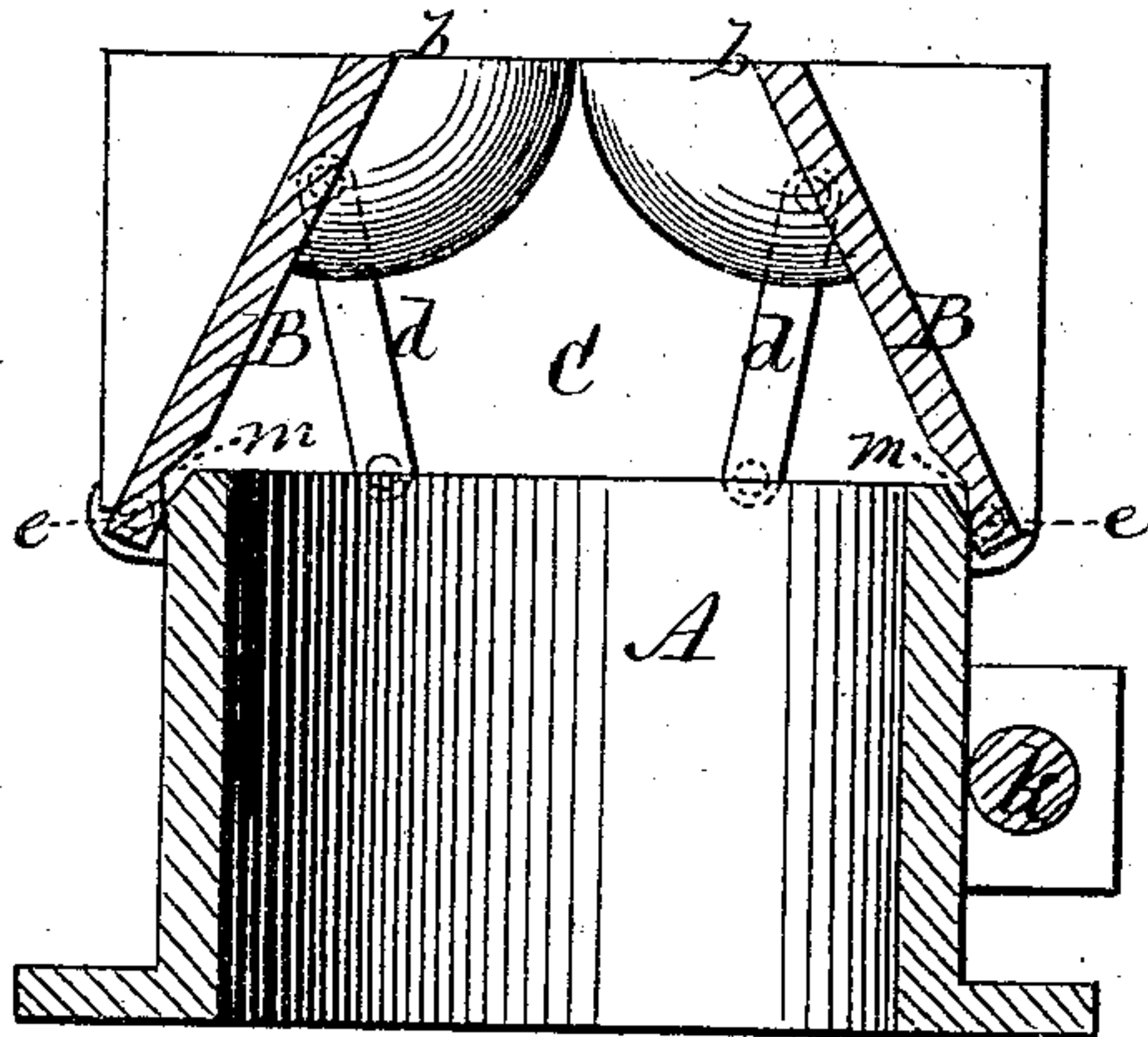


Fig. 1.

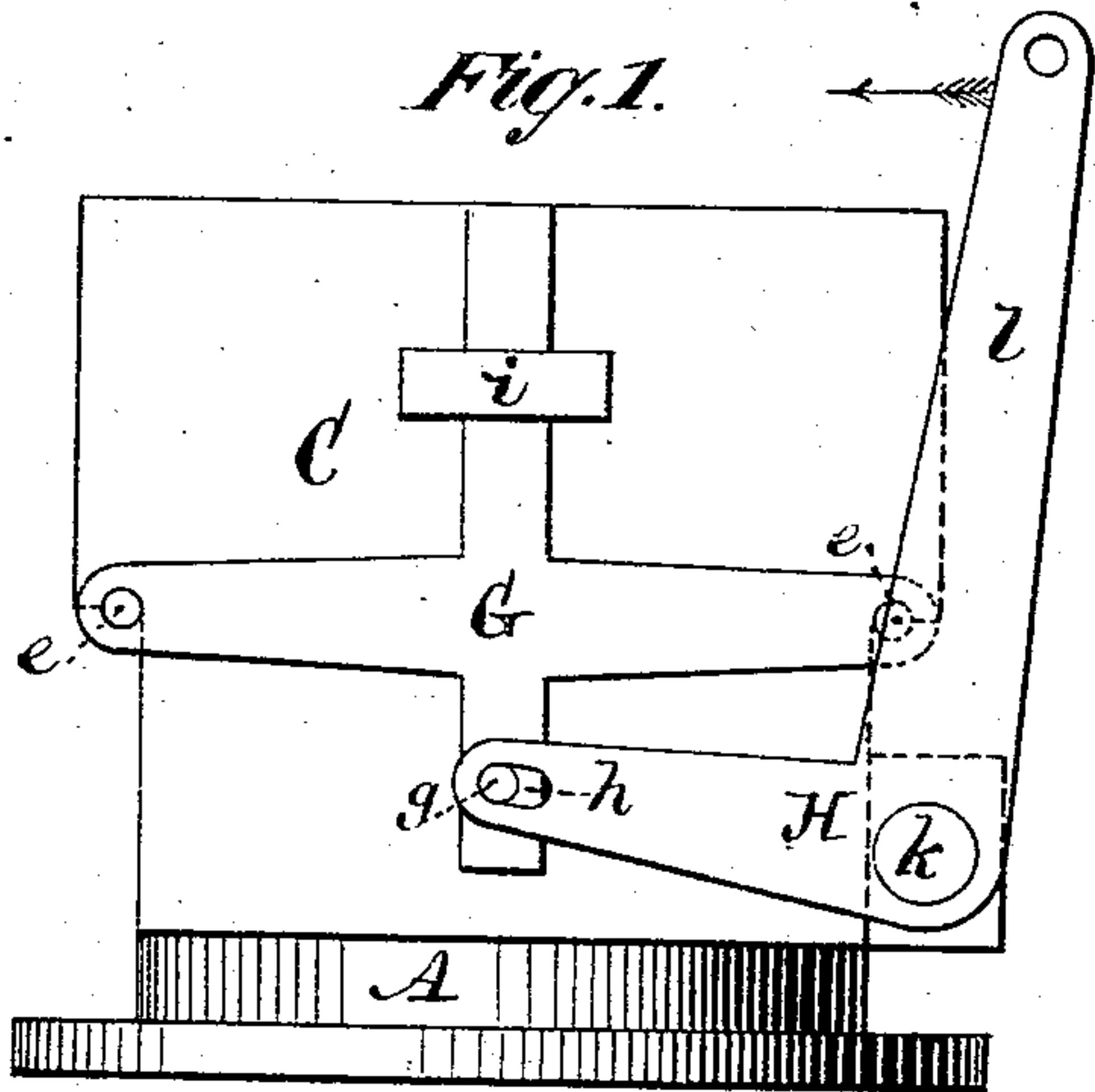
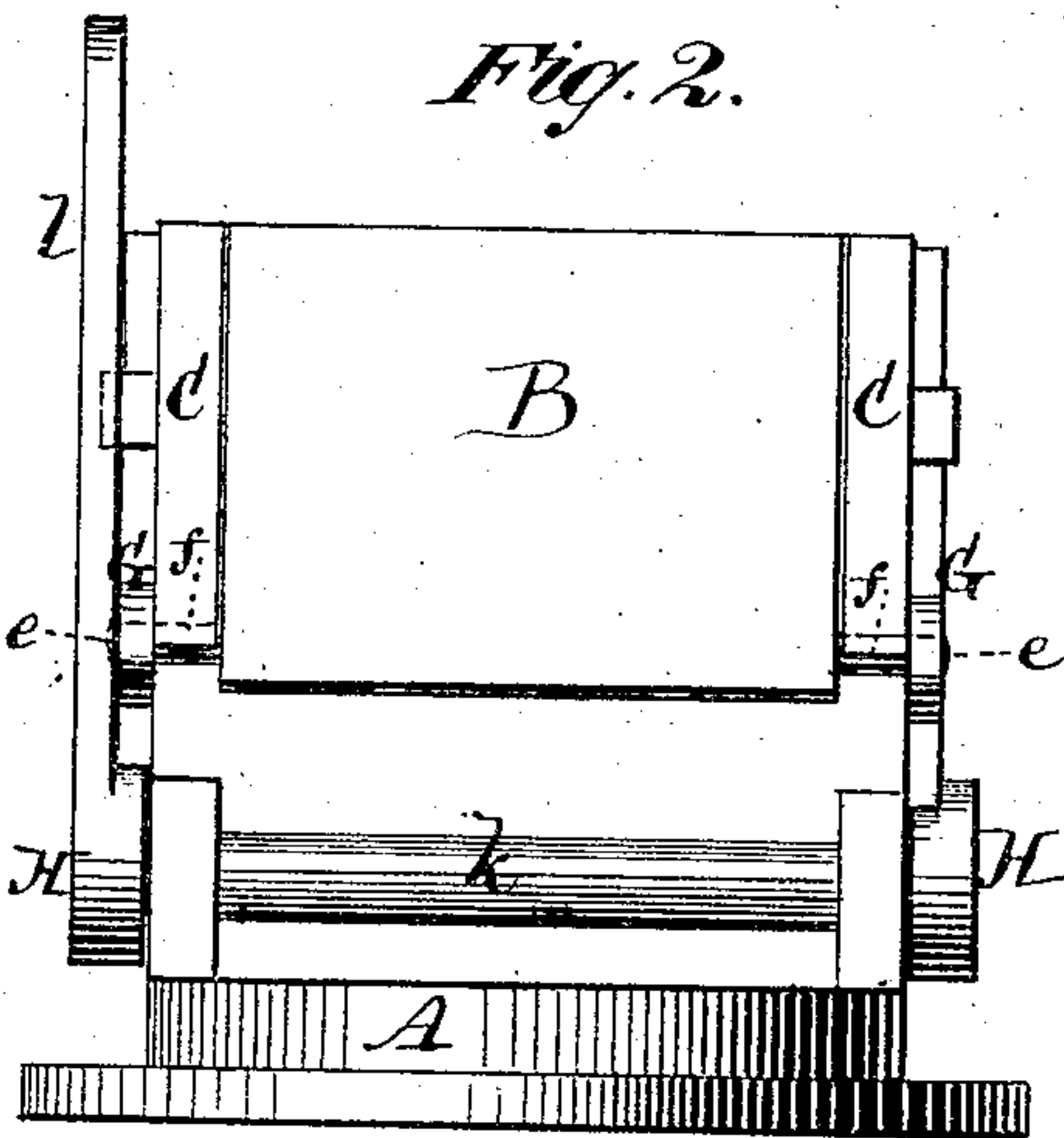


Fig. 2.



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 FOR STEAM-CYLINDERS.

Specification forming part of Letters Patent No. **157,230**, dated November 24, 1874; application filed November 7, 1874.

CASE A.

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 for Steam-Cylinders; 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 at pleasure the dimensions of the delivery or exhaust nozzles, and thus control the action or velocity of the exhaust steam in its escape into the smoke-stack, and thereby regulate the steam-generating capacity of the boiler, and at the same time regulate the back pressure on the steam-pistons of the engine.

The invention consists in a divided nozzle of novel construction applied to the end of the exhaust-pipe, and the combination therewith of connecting-links, cross-heads, and levers for varying the dimensions of the nozzle, and regulating the velocity of the exhaust steam escaping therethrough.

In the accompanying drawing, Figure 1 is an end view of my improved nozzle. Fig. 2 is a side view of the same. Fig. 3 is a top view of the same. Fig. 4 is a central vertical section taken in the line *x x* of Fig. 3.

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 surface of each of which is concave, and terminates in a semi-circular outer edge, *b*, so that when the outer edges of the two shutters are placed together a circular opening is formed between them, as shown in Fig. 3. Each of the shutters B is connected to the frame C by two links, *d d*, one at each end of the shutter. The upper or outer end of the link is pivoted to the shutter, and the lower or inner end is pivoted to the side pieces of the frame C, near the end of the exhaust-pipe A, the shutters working laterally between the side pieces of the frame C. The lower or inner edge of each shutter ex-

tends downward to about on a line with, or slightly below, the end of the exhaust-pipe A, where the corners are provided with pivots, *e*, extending outward on opposite sides beyond the side pieces of the frame C, transversely to the line of motion of the shutter, and fitting in notches *f* in said side pieces when the shutters are in a closed position. These pivots engage with the ends of cross-heads G, arranged one on each side of the frame C. The lower portion of each cross-head is pivoted to the short arm of a lever, H, and the upper portion works in a guide, *i*. The connection with the lever is made by means of a pin, *g*, on the cross-head, working in a slot, *h*, in the lever. The levers H are rigidly connected with each other at their fulcrums by a bar, *k*, which forms the pivot on which both levers oscillate, and by which means one long arm, *l*, serves for both levers. This long arm *l* has its end connected with the cab by suitable connecting devices, so as to enable it to be operated by the engineer. On the inner sides of the shutters B, near the lower edges, are depressions or cavities *m*, as shown in Fig. 4, which enable the shutter to pass freely over the end of the exhaust-pipe A, and to fit closely thereon when in the position shown in Fig. 4.

The operation of my invention is as follows: Power being applied to the long arm *l*, in the direction of the arrow in Fig. 1, the cross-head G is moved downward, depressing the shutters B toward a vertical position, and causing their upper edges to separate and increase the diameter of the opening between them more or less according to the degree of motion communicated to the levers. Upon reversing the motion, the shutters B are made to rise and, by the operation of the links *d*, to approach each other until their upper edges are in contact with each other, so as to reduce the diameter of the opening to its original dimensions, in which position the pivots *e* engage with the notches *f*, and prevent the possibility of displacement.

By this construction, arrangement, and combination of the various parts, the engineer is enabled at pleasure to vary the dimensions of the exhaust-nozzle, and thus 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 combination, with the exhaust-pipe A and frame C, of the shutters B and links d,

substantially as and for the purpose shown and described.

2. The combination of the shutters B, cross-heads G, and levers H, substantially as and for the purpose shown and described.

GEORGE SEWELL.

Witnesses:

MICHAEL RYAN,
BENJAMIN W. HOFFMAN.