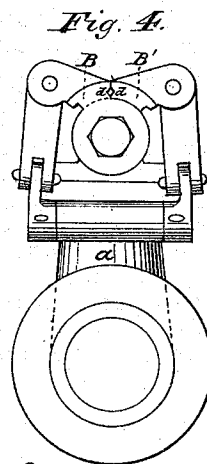
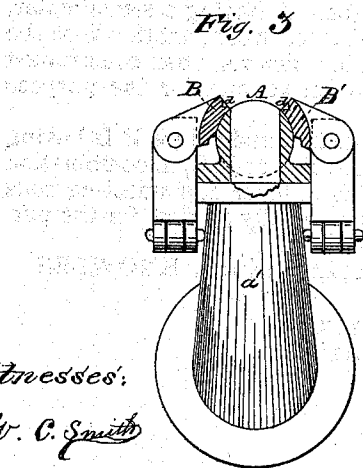
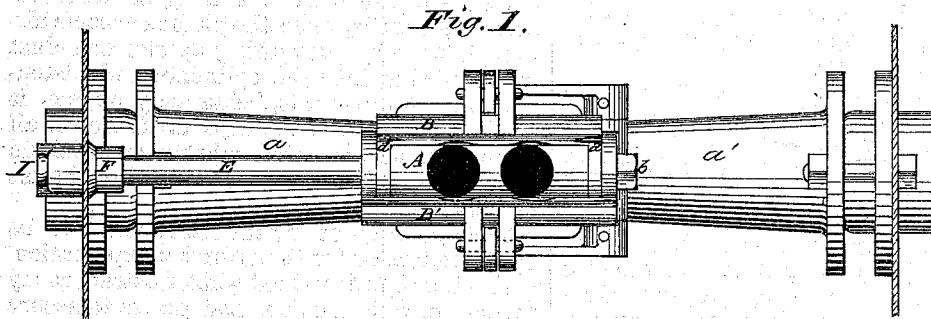
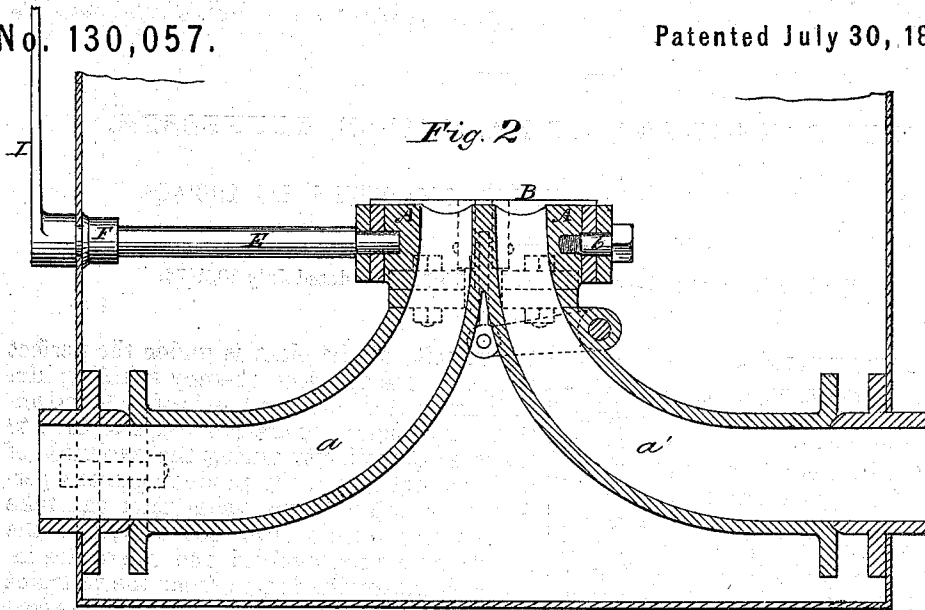


C. B. KNOWLES.

Improvement in Variable Exhausts for Locomotive Steam-Engines.

No. 130,057.

Patented July 30, 1872.



Witnesses:

W. C. Smith

W. F. Foster.

Inventor

Charles B. Knowles.

UNITED STATES PATENT OFFICE.

CHARLES B. KNOWLES, OF NASHVILLE, TENNESSEE.

IMPROVEMENT IN VARIABLE EXHAUSTS FOR LOCOMOTIVE STEAM-ENGINES.

Specification forming part of Letters Patent No. 130,057, dated July 30, 1872.

SPECIFICATION.

I, CHARLES B. KNOWLES, of Nashville, in the county of Davidson and State of Tennessee, have invented certain Improvements in Variable-Exhaust Locomotive Steam-Engines, of which the following is a specification:

This invention consists of a variable-exhaust blast-pipe for locomotive-engines, the object being to control the blast by contracting or closing, at pleasure, the orifice of the blast or exhaust pipe, which will free itself by its own action from any gummy matter that might or could be formed thereon; all of which is more fully described in the annexed specification, reference being had to the accompanying drawing forming a part thereof.

In the drawing, Figure 1 is a plan of my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a cross-section, showing the valves open. Fig. 4 is an end view, showing the valves closed.

A is a semicircular, oval, or beveled faced valve-seat, placed upon the top of the exhaust-pipes *a a'*. B B are two valves with circular ends C, so arranged as to work on the valve-seat A, covering, at the will of the engineer, the orifices therein. These valves B B are centered and secured on and over their seat by a pivot-bolt, *b*, at one end; secured, centered, and operated at the other end by shaft E. This latter shaft E extends through the side of the smoke-box, being journaled in a box, F. To the outside end of the shaft E is attached a lever, I, operated by the engineer through a connecting-rod extending into the cab of the locomotive. Valves B B are grooved (*d d*) on the joining and adverse edge to cut or scrape off any gummy matter, and give an escape for any accumulation that may form or gather on valve-seat A or its connections.

The advantages of my invention are, first,

the velocity of the blast is under the perfect control of the engineer, thereby enabling him to increase it when fresh fuel is added, and until the hydrocarbons are evolved, and then to decrease the velocity during the evolution of carbonic oxide, thereby producing more perfect combustion of the gases than can take place with a fixed orifice. Secondly, after the hydrocarbons are evolved and the orifice increased, the engine is free from the restraint due to the contracted orifice, and has increased power in proportion to the increased orifice. Thirdly, by this invention the engineer can close the orifice when not using steam in descending grades, when the pistons become air-pumps, thereby preventing sparks and dust from entering into the cylinders and piston-packing. Fourthly, it, being very simple, is easily repaired, and it keeps itself free of all gummy or accumulated substances which do form upon and render the valves now in use inoperative.

The operation of my invention will now be easily understood without further explanation.

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

1. The valve-seat A having a semicircular, oval, or beveled face, in combination with the blast-pipes of a locomotive, when constructed substantially as shown and for the purpose set forth.

2. The valve-seat A and valves B B having grooves *d* and circular ends C, in combination with bolt *b*, shaft E, lever I, connecting rods and cranks, substantially as and for the purpose herein described.

CHARLES B. KNOWLES.

Witnesses:

E. W. JONES,
G. W. PERRY.