Olney, Whelpley & Raren,

Reciprocating Steam Engine,

No. 4,588, Patented June 20, 1846.

Fig. 2.

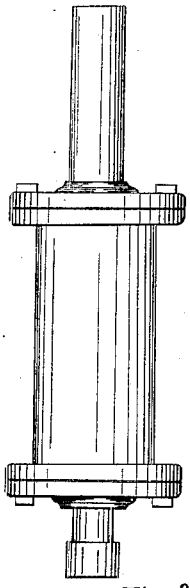


Fig. 1.

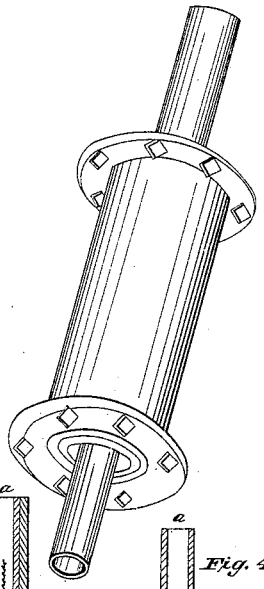


Fig. 5.

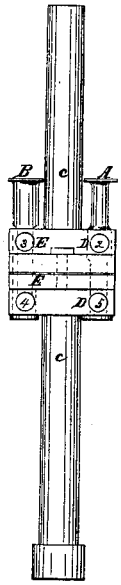


Fig. 3.

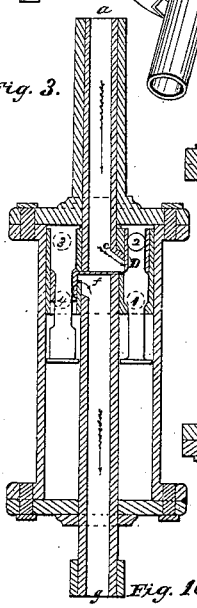


Fig. 4.

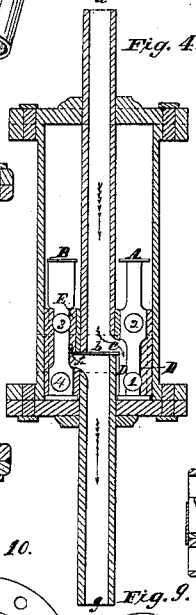
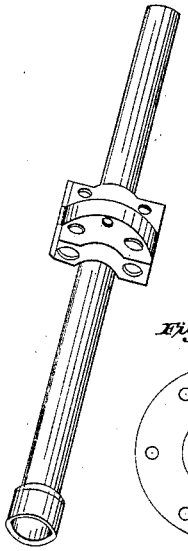
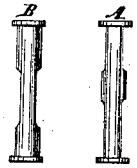


Fig. 6.





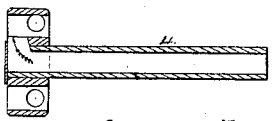


Fig. 11.

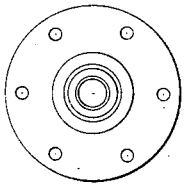


Fig. 10.

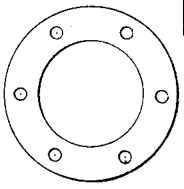


Fig. 9.

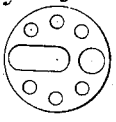


Fig. 8.

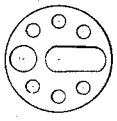
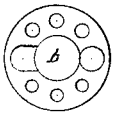


Fig. 7.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HEZEKIAH OLNEY AND DAVID G. RAVEN, OF GOUVERNEUR, AND JEREMIAH H. WHELPLEY, OF CHAMPION, NEW YORK.

IMPROVEMENT IN THE INDUCTION AND EDUCTION OF STEAM.

Specification forming part of Letters Patent No. **4,588**, dated June 20, 1846.

To all whom it may concern:

Be it known that we, HEZEKIAH OLNEY, of the town of Gouverneur, DAVID G. RAVEN, of the same town, county of St. Lawrence, and JEREMIAH H. WHELPLEY, of the town of Champion, Jefferson county, and State of New York, have invented a new and useful method of supplying steam to the cylinders of steam-engines by means of a hollow piston-rod and valves placed within the piston; and we do hereby declare that the following is a full, clear, and exact description of the same, and its construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the cylinder and piston-rod; Fig. 2, a longitudinal elevation; Fig. 3, a longitudinal section of the cylinder, piston, piston-rod, and valves, cut through them vertically; Fig. 4, a longitudinal section of the upper part of the piston-rod and half of the piston; Fig. 5, a piston, piston-rod, and valves on the ascending stroke, showing the valves closed in the lower half of the piston. As it ascends toward the top of the cylinder, the valves will be depressed when they come in contact with the cylinder-head and close the openings between the upper and lower portions of the cylinder. Fig. 6 is the same in perspective.

Letter A, induction-valve; B, eduction-valve; C, the piston in two parts, (secured together by strong screwed bolts,) through which are drilled the steam-passages; D D, steam-passages; E, the passage through which the steam escapes into the lower part of the piston-rod C, and is discharged into another pipe which conveys it to a chimney or into the open air.

Figs. 7, 8, and 9 show the arrangement of the interior of the two parts of the piston when opened, and Fig. 7 shows a circular plate, *b*, which cuts off the steam between the upper and lower portions of the hollow piston-rod and causes the steam to change its course from one valve to another to complete the circuit contemplated by this arrangement of the openings and valves; Fig. 10, section of top of cylinder; Fig. 11, top of cylinder-head.

When the steam enters the hollow piston-rod from the boiler, it passes through the rod to plate *b*, thence through an opening in the side of the piston at C, and enters the tube in which valve A slides, escapes at aperture No. 1 and fills the space between the piston and the lower head of the cylinder, and presses the piston upward. While the piston is ascending the steam in the upper end of the cylinder is pressed through aperture No. 3, along tube E, through the side of the rod *f*, and is discharged at *g* into a hollow tube, which conveys it to a chimney or to the open air. When the piston is descending, apertures 1 and 3 are closed and apertures 2 and 4 are open, the steam passes through the side of the piston at C and through aperture 2 and fills the upper end of the cylinder. While the piston is being depressed the steam in the lower end of the cylinder passes through aperture 4 to *f* and escapes at the end of the rod at *g*, as stated above.

The two ends of the piston-rod are to be secured to the piston by set-screws, or by the ends within the piston being turned a little larger than the rest of the rods.

What we claim as our invention, and desire to secure by Letters Patent, is—

The method of inducting and educting steam to and from the cylinder of our engine by means of a hollow piston-rod in two parts connected to and united by a piston, in which are placed induction and eduction slide-valves operated by their projecting ends striking against the heads of the cylinder as the piston approaches them in performing its reciprocal vibrations, the induction-valve being in connection with one portion of the piston-rod and the eduction-valve with the other portion of the same, the whole combined and operating substantially in the manner herein set forth.

HEZEKIAH OLNEY.
J. H. WHELPLEY.
D. G. RAVEN.

Witnesses:
DANIEL FULLER,
DAVID FULLER.