

JOHN COOKE.

Improvement in Steam-Valves and Ports for Engines.

No. 126,379.

Patented May 7, 1872.

Fig. 1.

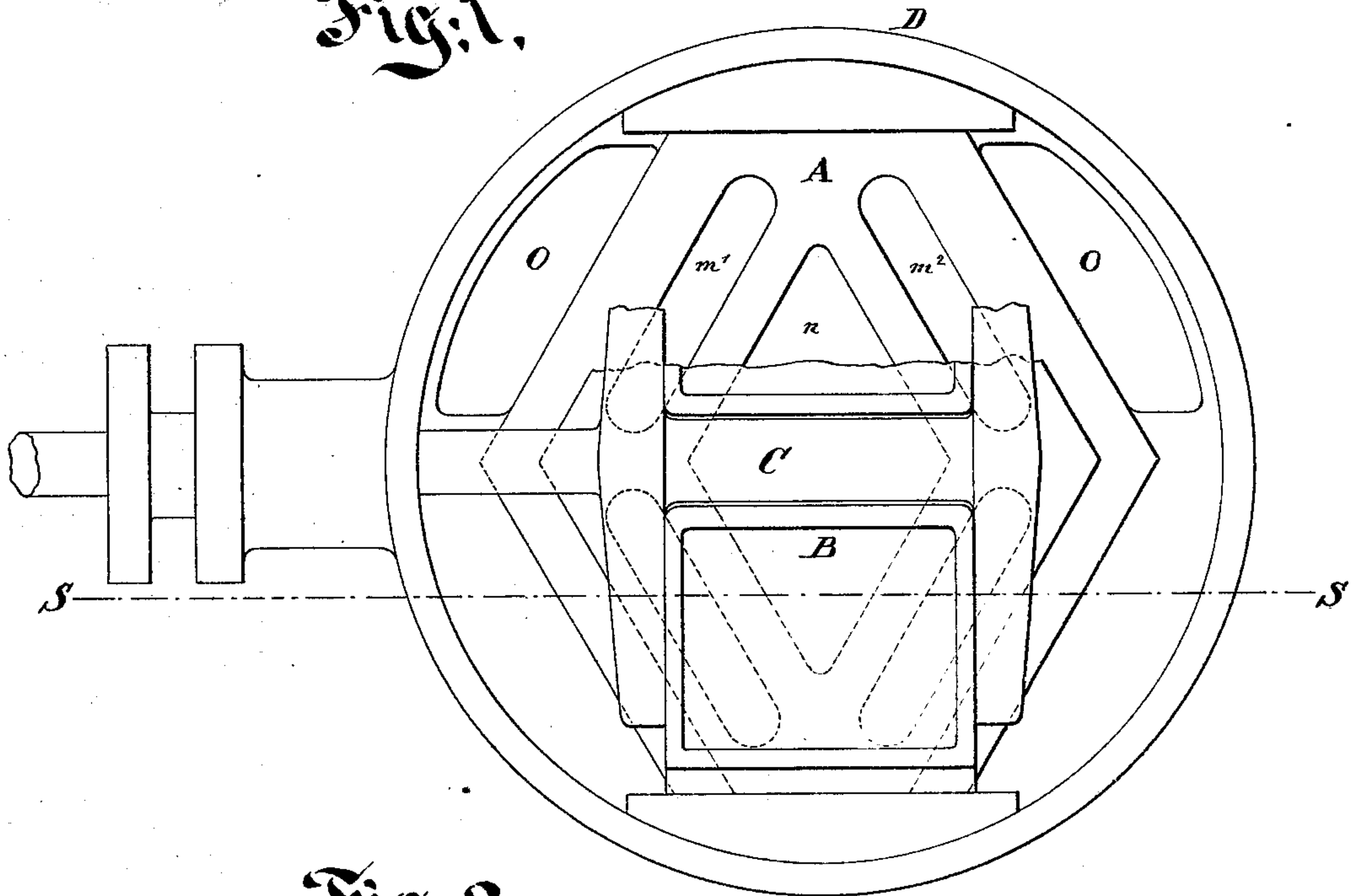
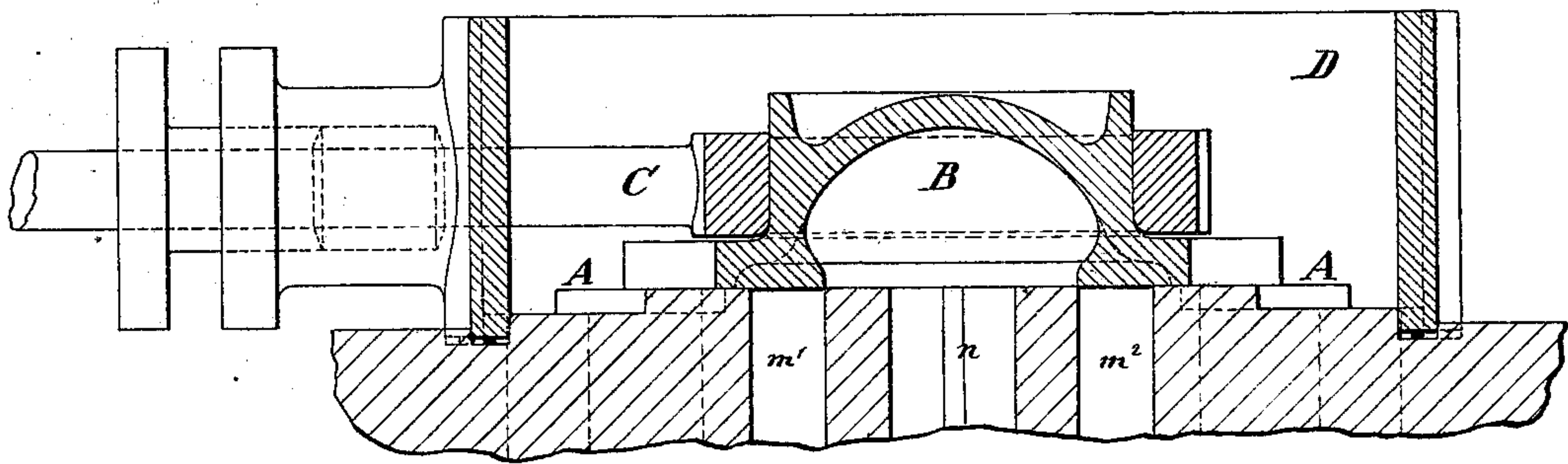


Fig. 2.



Witnesses:

*Arnold Hermann.*

*W. E. Dey*

Inventor:

*John Cooke*  
by his attorney

*J. S. Sisson*



# UNITED STATES PATENT OFFICE.

JOHN COOKE, OF PATERSON, NEW JERSEY.

## IMPROVEMENT IN STEAM VALVES AND PORTS FOR ENGINES.

Specification forming part of Letters Patent No. 126,379, dated May 7, 1872.

Specification describing certain Improvements relating to the Valves and Ports of Steam-Engines, invented by JOHN COOKE, of Paterson, Passaic county, New Jersey.

The invention is intended more particularly for locomotive-engines, but may be used on any where the steam is distributed to the respective ends of a cylinder, and also discharged therefrom by the movement of a single hollow-throated slide-valve. The ports, instead of extending in a right line parallel to each other, are bent so as to form a portion of a diamond figure; or, if preferred, instead of being thus bent at an angle, they may be curved gradually throughout their whole length. In either case each port is, in order to realize the full benefit of the invention, bridged across or interrupted so that the metal is better supported and strengthened than would otherwise be practicable. In other words, a port is divided into two distinct parts. The above refers to the cylinder-ports which convey steam to and from the cylinder ends, and refers to the form which they present at the cylinder-face. The exhaust-port stands between them as usual, but instead of being formed with parallel sides, as usual, is thickest in the middle, and tapers to a point, or nearly to a point at each end. The valve is correspondingly formed, so as to uncover the cylinder-ports by its movement, and cover them again in the same manner as if the valves and ports were rectangular. The difference in effect, however, is very marked. The invention allows better than the ordinary arrangement for the employment of a circular steam-chest, the advantages of which in facility for finishing in a lathe, and for sinking into a groove in the cylinder-face correspondingly prepared, have long been appreciated. The invention allows a greater area for the exhaust-port, and a greater area of opening for the admission of steam to the ends of the cylinder, respectively, with a given motion of valve, than is possible with the same dimensions of valve and the same width of cylinder-face as these parts are ordinarily arranged.

The following is a description of what I consider the best means of carrying out the invention:

The accompanying drawing forms a part of this specification.

Figure 1 is a plan view, with a portion of the slide-valve broken away to show the parts below; and Fig. 2 is a vertical section on line S S in Fig. 1.

Similar letters of reference indicate like parts in both the figures.

A is the cylinder-face. B is the valve, and C is the bridle which operates the valve, with liberty for the valve to rise a little to relieve it, as is well understood. D is the circular steam-chest. It will be understood that the latter is provided with a tight-fitting cover, and with facilities for securing it as usual. The cylinder-ports are marked  $m^1 m^2$ , and the exhaust-port is marked  $n$ . Certain ports or apertures corresponding to those ordinarily employed for the admission of steam from the steam-boiler, are indicated by O O. The connection from the mouths of the ports  $m^1 m^2$  to the respective ends of the cylinder are cored or otherwise produced through the casting, so as to correspond in position and function to the corresponding parts of an ordinary steam-engine. So, also, the connection from the mouth of the exhaust-port  $n$  to the blast-nozzle is cored as usual; but the novelty in the form and relation of the ports at the cylinder-face, and in the form of the valve, is very marked. Instead of three parallel ports extending nearly across the cylinder, I employ an approximately diamond-shaped port for the exhaust, and the two parts of a bent port for the passages leading to the cylinder-ends. The edges of the valves being correspondingly bent, it follows that when the valve B moves to one end or the other of its motion, it uncovers, by means of its angular or bent edges, correspondingly oblique or bent ports, and the area for the admission of the steam is increased by the obliquity of the positions. The bridging across, or the division of each port into two, takes away from the effective length of the port, but it greatly contributes to the stiffness and strength of the metal on each side of the port. It may be dispensed with in small engines carrying a moderate pressure, and the bent port may be made continuous from one end to the other, if preferred. It is better, however, to make the ports about as represented for all ordinary sizes of engines carrying very high steam. It is well known that corresponding divisions of straight ports have been employed.



The construction always tends to shorten the effective length of the port. My arrangement allows an equal or greater length of port, even when the bridges are employed, and when the bridges are omitted the increase in the length is very evident.

The valve B, according to my construction, requires greater dimensions along its center line than the ordinary valve, but it allows a corresponding contraction at each end. The general result is an equal, or about equal, area to that which would be required for the ordinary rectangular valve. The area of the exhaust-port for the free discharge of the steam downward is greater with my invention than with the ordinary form. The diminished width of the ends of the valve allows a large valve to work, and with a proper throw, in a circular steam-chest of small dimensions.

What is known as the Hackworth exhaust, in which the exhaust-port is divided into two,

with a suitable construction in the throat of the valve to uncover and cover both at the same time, may be readily applied with my invention. It will, I believe, require no separate drawings to enable the designing engineer to carry out this suggestion.

I claim as my invention—

1. The angular or bent ports  $m^1 m^2$ , and corresponding exhaust-port  $n$ , with a corresponding form of the valve arranged as shown, for the purposes specified.

2. The bridges or divisions, arranged as shown, across the bent ports  $m^1 m^2$ , for the purposes specified.

In testimony whereof I have hereunto set my hand this 23d day of March, 1872, in the presence of two subscribing witnesses.

JOHN COOKE.

Witnesses:

ARNOLD HERMANN,  
WM. C. DEY.