D. Pyke,

Steam Balanced Valve.

No. 63,560. Patented Apr. 2, 1867.

Fig. 3.

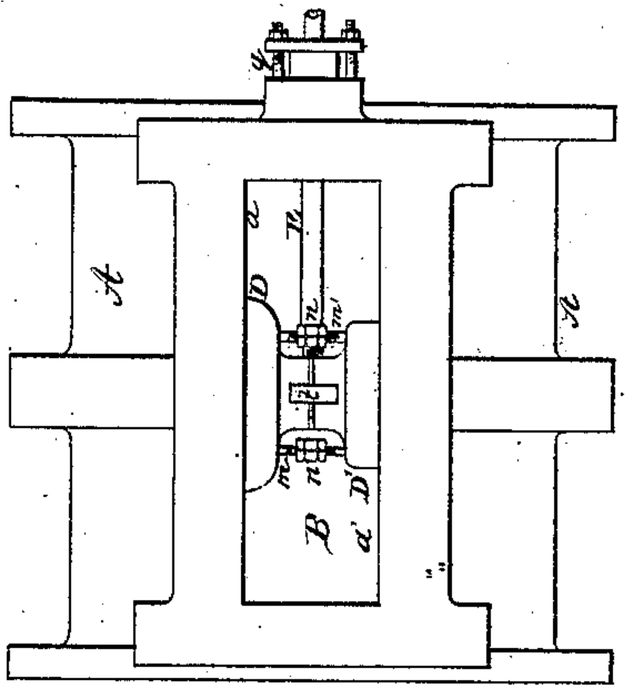
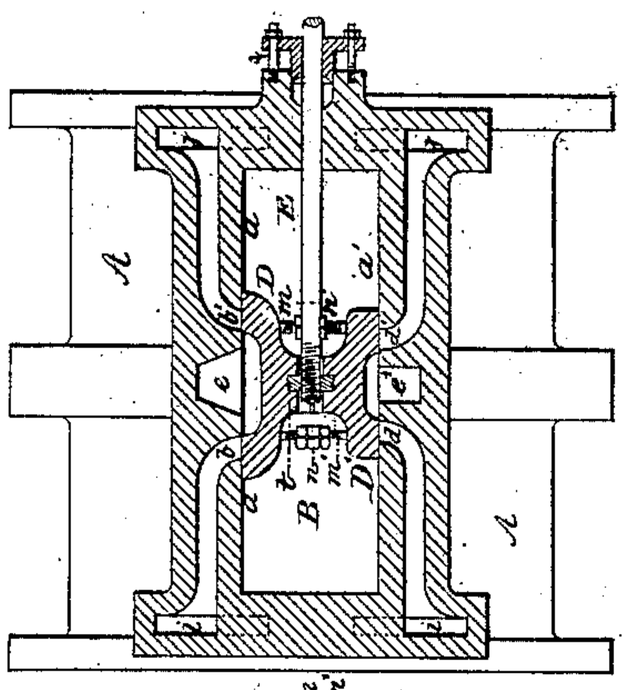


Fig. 2



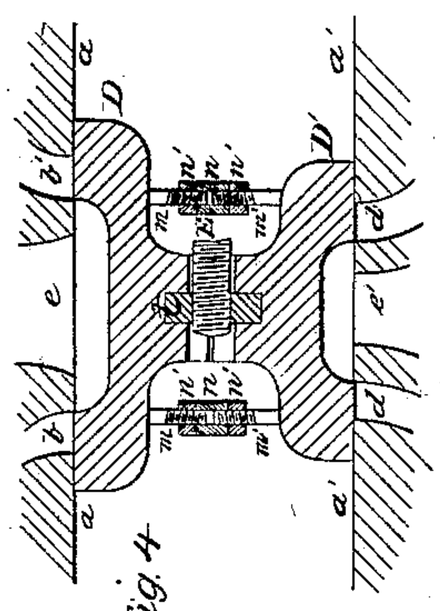
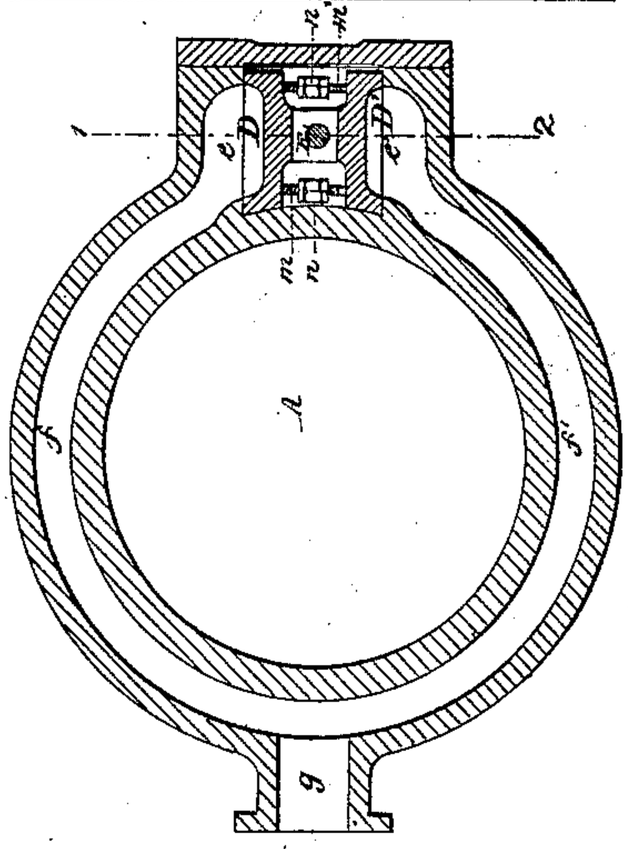


Fig. 4

Fig. 1



Witnesses

Wm. Albert Hall

Charles E. Foster

Inventor

D. Pyke

By his Atty

H. Howson

United States Patent Office.

DAVID PYKE, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 63,560, *dated April* 2, 1867.

IMPROVEMENT IN BALANCED SLIDE-VALVES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, DAVID PYKE, of Philadelphia, Pennsylvania, have invented an Improvement in Cylinders, Steam Chests, and Valves for Steam Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference made thereon.

My invention relates to that class of engines in which two valves are contained in one chest, the latter having two faces, in each of which are two steam ports and one exhaust port, and my invention consists of certain devices, fully described hereafter, for adjusting the valves and connecting them together and to the valve spindle. The object of my invention is to avoid the excessive friction which accompanies the operation of slide-valves of the ordinary construction.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation. On reference to the accompanying drawing, which forms a part of this specification—

Figure 1 is a transverse section of my improved cylinder steam chest and valves.

Figure 2, a longitudinal section on the line 1–2, fig. 1.

Figure 3, a front view of the cylinder and valve-chest with the cover of the latter removed; and

Figure 4, an enlarged view illustrating the mode of connecting the two valves together.

Similar letters refer to similar parts throughout the several views.

A is the steam cylinder, on which is formed the valve-chest B, having two faces, *a* and *a'*, made exactly parallel with each other. In the face *a* are the two steam ports *b* and *b'*, and the exhaust port *e*, and in the face *a'* are two similar steam ports *d* and *d'*, and exhaust port *e'*. The exhaust steam passes from the port *e* through the interior of a belt, *f*, to the branch *g*, to which the exhaust pipe is attached, and the steam from the opposite exhaust port *e'* passes through the interior of a belt, *f'*, to the same branch *g* and to the exhaust pipe. The steam passes from the chest through the opposite ports *b* and *d*, and through the passages *i i*, directly into the cylinder, and through the ports *b'* and *d'*, and directly through passages *j j'* into the opposite end of the cylinder. There are two valves, D and D', each having a face similar to that of an ordinary slide-valve, and the two valves are connected together at four points in the manner best observed on reference to the enlarged view, fig. 4, where *m* represents a screw-stud secured to the valve D, and *m'* a stud or bolt secured to the valve D'. One of these studs has a right-handed and the other a left-handed screw-thread, adapted to right and left-handed internal screw-threads on the nut *n*, against each end of which bears a jam-nut, *n'*, after loosening which the two valves may be readily adjusted from or towards each other by turning the nut *n*. E is the valve spindle passing through a stuffing-box, *q*, at the front end of the steam chest as usual, the inner end of the spindle screwing into a nut, *t*, part of which is fitted into a recess in the valve D, and part into a similar recess in the valve D'; the nut not only serving to connect the spindle to the valves, but also acting as a key which maintains the two valves in their proper position in respect to each other, and thus relieves the screw studs from the strains they would otherwise be subjected to. When the cylinder is arranged horizontally with the valve-chest at the side, in the manner frequently adopted in making marine engines for driving screw propellors, I make the area of the upper valve D somewhat greater than that of the lower valve D', as shown in fig. 4, so that there may be tendency sufficient of the steam to raise the lower valve from its seat in order to compensate for the weight of that valve, which if the areas of the two valves were equal would create more friction than the upper valve. When the cylinder is arranged horizontally with the valve on the top, or when the cylinder is arranged vertically, this excess of area of one valve over that of the other is unnecessary, as both valves will in these cases rest with their edges on the bottom of the valve-chamber. It will be evident to those familiar with the construction and operation of steam engines, that as there is the same pressure of steam on the backs of both valves there will be little or no friction on their faces, and consequently that the power of the engine consumed in operating ordinary slide-valves is in a great measure saved, and the heavy and costly appliances used for operating common slide-valves avoided by the substitution of much lighter mechanism for that purpose; at the same time the two valves admit of such nice adjustment that they can be brought in sufficiently close contact

with the faces *a* and *a'*, to prevent the possibility of leakage without causing them to bear with such force against the said faces as to create undue friction.

I claim as my invention, and desire to secure by Letters Patent—

1. The adjustable valves D D', constructed as described, and the spindle E with its nut *t*, the whole being arranged in respect to each other as specified.

2. The combination of the two valves D and D', their studs or bolts *m* and *m'*, those of one valve having left-handed, and those of the other valve right-handed threads, and the nuts *n*, having threads adapted to those of the said bolts or studs.

3. The upper valve D and lower valve D', the former having a larger area than the latter, when the two valves are used in connection with a cylinder, having a valve-chest on its side, as described for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID PYKE.

Witnesses:

JOHN WHITE,

W. J. R. DELANY.