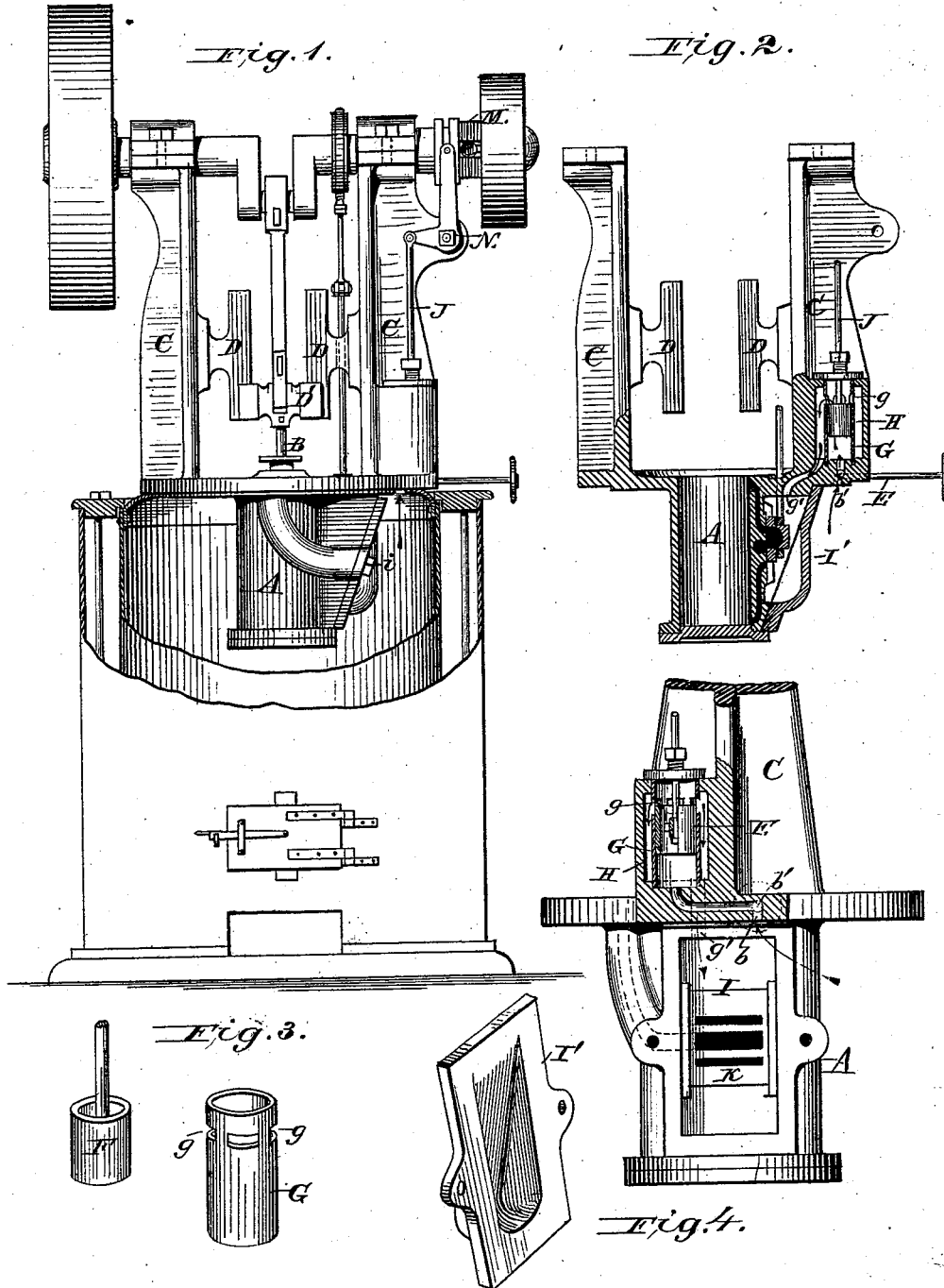


G. E. BANNER.  
 Steam-Engine Cylinder.

No. 204,282.

Patented May 28, 1878.



Attest:  
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# UNITED STATES PATENT OFFICE.

GEORGE E. BANNER, OF NEWARK, NEW JERSEY, ASSIGNOR OF ONE-HALF HIS RIGHT TO ANNA GRAY FALES, OF HARTFORD, CONNECTICUT.

## IMPROVEMENT IN STEAM-ENGINE CYLINDERS.

Specification forming part of Letters Patent No. **204,282**, dated May 28, 1878; application filed April 30, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE EDWARD BANNER, of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Steam-Engine Cylinders and parts formed therewith; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to the cylinders and adjacent parts of steam-engines; and consists in the construction, combination, and arrangement of the cylinder, suspending-flange, governor-valve, casing, and other parts, as hereinafter fully described and claimed, and also in forming the steam-chest with an inclined face, to allow easy access to the valve-seat for the purpose of allowing the same to be cleansed and smoothed conveniently; and, finally, in other features hereinafter set forth.

In the accompanying drawings, Figure 1 represents a front elevation of a steam-engine embodying my improvements, a part of the boiler being broken away to show the cylinder, steam-chest, &c. Fig. 2 represents a detail view, in vertical section, of the governor-valve, valve-seat, and steam-ports, taken on the line *xx* of Fig. 1. Fig. 3 represents, in perspective, the hollow governor-valve and cylindrical seat. Fig. 4 represents a detail view of the steam-chest and cover detached, showing the inside of the latter.

In said drawings, A designates the cylinder of a steam-engine, provided with the usual piston and piston-rod; and B designates a flat cylinder-head or flange below standards C C, which have guides D D formed on their inner sides. The office of said guides is to direct the vertical movement of the piston-rod, which has a grooved block, D', attached to it, moving in the said guides. Said parts A, B, C C, and D D are constructed in one piece with the steam-chest and valve-box hereinafter described. All of the steam passages or ports are made in this piece, so that the cylinder and contiguous parts carrying the shaft and

rods can be applied to any boiler without any special adaptation of the latter, or any disarrangement of the other parts of the machine.

The steam passes up from the boiler through a port, *b*, to a horizontal chamber or valve-seat, *b'*, for starting-valve E; thence through hollow governor-valve F and a cylindrical upright casing or valve-seat, G, to apertures *g*, arranged in circular series in the latter; thence into a surrounding space, G, in valve-box H; and, finally, down through passage *g'* in said cylinder-head and valve-box to the upper end of steam-chest I. The said governor-valve F is so constructed relative to casing G that when raised to its highest position within the same it will close the openings *g*, and thereby cut off the steam from the cylinder. If raised to a less extent it closes them in some degree only, and thereby lessens the flow of steam. The raising of said governor-valve is effected by the action of a suitable governor, M, arranged to lift the rod J of said governor-valve by means of bell-crank N or other suitable connections. The upward pressure of the steam against the valve-rod J aids in closing the ports or openings *g*; and hence a high pressure tends to neutralize itself. Thus excessive rapidity of running is prevented and more equable action insured.

The steam-chest I is made with a downwardly and inwardly inclined outer face, to which the cover I' corresponds. Said cover I' is secured to said steam-chest by short cross-bolts *i*. The said cover is detachable, and, when removed, the inclined construction of the face of said steam-chest allows convenient access to the valve-seat K, so that it can be readily cleansed and trued by vertical scraping, thereby preventing the escape of steam between the valve and seat. If a straight face be given to the valve it cannot be conveniently cleaned in this manner. In any other construction than mine the chest and cover are made loose from each other and from the cylinder, thereby multiplying the number of steam-joints, or else it becomes necessary to dig down into the steam-chest to get at the valve.

The valve-box H for the governor-valve is cast in one piece with the cylinder-head, so

that unnecessary joints are avoided and escape of steam rendered less likely.

The lower end of steam-chest I is more or less rounded on the inside, so as to diminish the steam-space there and thus decrease condensation.

I am aware that a patent has been granted having a horizontal cylinder arranged in a removable steam-dome, with its steam-passages, and therefore do not claim such; but

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

1. In combination with a ball-governor casing and governor-valve, a cylinder-suspending flange containing the steam-passages from the boiler to the cylinder, said parts being constructed and arranged substantially as shown and described.

2. In a steam-engine, a cylinder-supporting

flange containing the steam-passages from the boiler to the cylinder, said flange being cast in one piece with the cylinder, standards, and guides.

3. In combination with a steam-engine cylinder and slide-valve, a steam-chest having its face inclined longitudinally from top to bottom, the inclination being sufficient to allow the valve-seat to be cleaned and smoothed without a dipping or digging motion.

4. In a steam-engine, a steam-chest having its lower end rounded on the inside, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

GEORGE EDWARD BANNER.

Witnesses:

W. H. BABCOCK,  
W. J. BABCOCK.