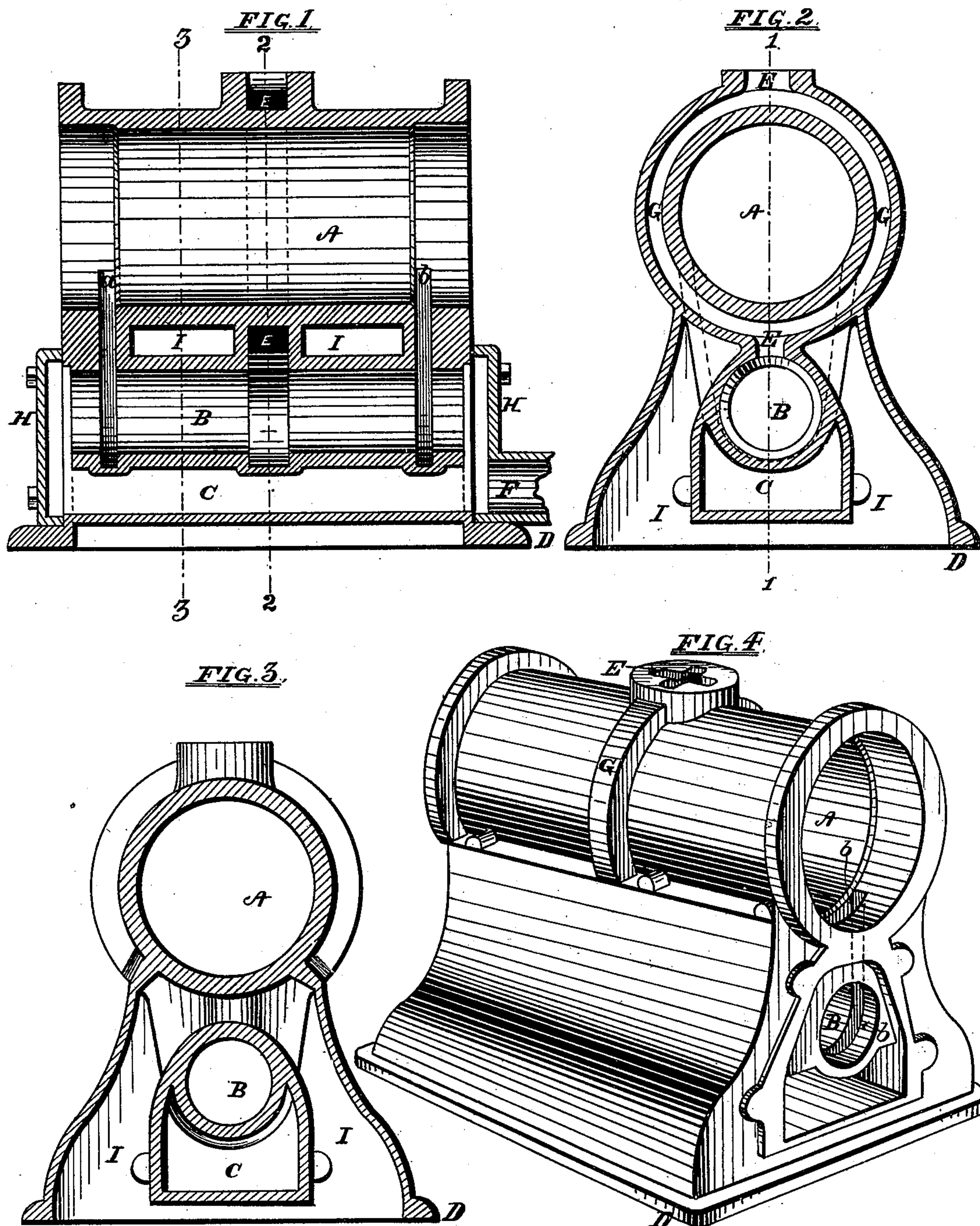


W. J. INNIS.  
Steam Engine.

No. 230,943.

Patented Aug. 10, 1880.



Attest

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# UNITED STATES PATENT OFFICE.

WILLIAM J. INNIS, OF OIL CITY, PENNSYLVANIA.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 230,943, dated August 10, 1880.

Application filed August 20, 1877.

*To all whom it may concern:*

Be it known that I, WILLIAM J. INNIS, of Oil City, in the county of Venango and State of Pennsylvania, have invented a new and useful Improvement in Steam-Engines, which is fully set forth in this specification and illustrated in the accompanying drawings.

The object of my invention is to construct the cylinder, steam-chest or valve-chamber, and exhaust-chamber of a steam-engine in a better, stronger, more compact and cheaper manner than has hitherto been done, and to effect a free discharge of all condensed water from the cylinder.

As now generally constructed the cylinders of steam-engines are first cast separately, and they must be planed and finished to receive the steam-chest, which must be likewise finished, as also the exhaust-chamber, and these are then secured together by bolts and nuts. This is not only expensive, but the joints are apt to leak.

To obviate these difficulties I cast the cylinder, the steam-chest or valve-chamber, and the exhaust-chamber all in one piece, and securing compactness and strength by having the steam-chest or valve-chamber and the exhaust-chamber in the base which supports the cylinder. By suitable cores in the casting unnecessary weight is avoided and an air-jacket is provided for the sides of the steam-chest or valve-chamber.

As cylinders are generally made the condensed water must be got rid of by special cocks. If these are not opened in time damage may result. If left open longer than necessary there is a waste of steam and some annoyance. My cylinder clears itself of water.

In the drawings, Figure 1 is a longitudinal section of the casting, taken on the line 1 1 of Fig. 2. Fig. 2 represents a cross-section of the same, taken on the line 2 2 of Fig. 1. Fig. 3 represents a cross-section on the line 3 3 of Fig. 1. Fig. 4 is a perspective view.

A is the steam-cylinder, B the valve-chamber or steam-chest, C the exhaust-chamber, and D the supports or base, and I represents an air-jacket.

On the base D is a flange by which the entire casting is secured to a suitable block.

The live steam enters at E, passes through the annular spaces G, around the cylinder to the valve-chamber or steam-chest B, and then alternately to the opposite ends of the cylinder, through the ports *a b*. The exhaust-steam passes through these ports *a b* as they are alternately opened by the valve, and through the hollow or recessed caps H, downward into the exhaust-chamber C, and through it to the atmosphere or condenser. The condensed water, if any, passes out of the cylinder through the same ports. The caps H are bolted to the cylinder in the usual manner, and give free access to the valve and exhaust chambers.

F is an extension of the exhaust-chamber to accommodate a greater length of heater-pipes than could be placed in the chamber C.

I have shown in the drawings a piston-valve bore, but the ordinary slide or other form of valve may be adopted without departing from the principle of my invention.

I claim as my invention—

1. The combination of the cylinder A, piston-valve chamber B, and exhaust-chamber C, arranged substantially as shown, and produced at one operation of casting.

2. The combination of a cylinder A, valve-chamber B, and exhaust-chamber C, and ports *a b* and E, cast and arranged substantially as shown, and for the purpose set forth.

3. As a new article of manufacture, a cylinder, valve-chamber, exhaust-chamber, air-jacket, supports, flanges, and suitable ports in one piece, constructed and arranged substantially as shown and described.

4. A horizontal steam-cylinder, valve-chamber, and exhaust-chamber with the valve-chamber arranged longitudinally and parallel with and below the cylinder, and the exhaust-chamber below the said valve-chamber, and said steam-chest and exhaust-chamber surrounded by an air-chamber formed by the support of said cylinder, substantially as shown and described, and for the purpose specified.

5. In a casting for a steam-engine, an air-

jacket formed by the supporting-base of the cylinder and surrounding the valve-chamber and exhaust-chamber, substantially as shown and described.

- 5 6. The base of a steam-engine cylinder, forming the leg of such cylinder and inclosing the exhaust-chamber, and so formed that an extension of such exhaust-chamber may

be bolted to one end of such base, so as to contain a greater length of heater-pipes than could be contained without such extension, substantially as shown and described.

WILLIAM J. INNIS.

Witnesses:

E. F. HOWELL,  
JAMES C. BOYCE.