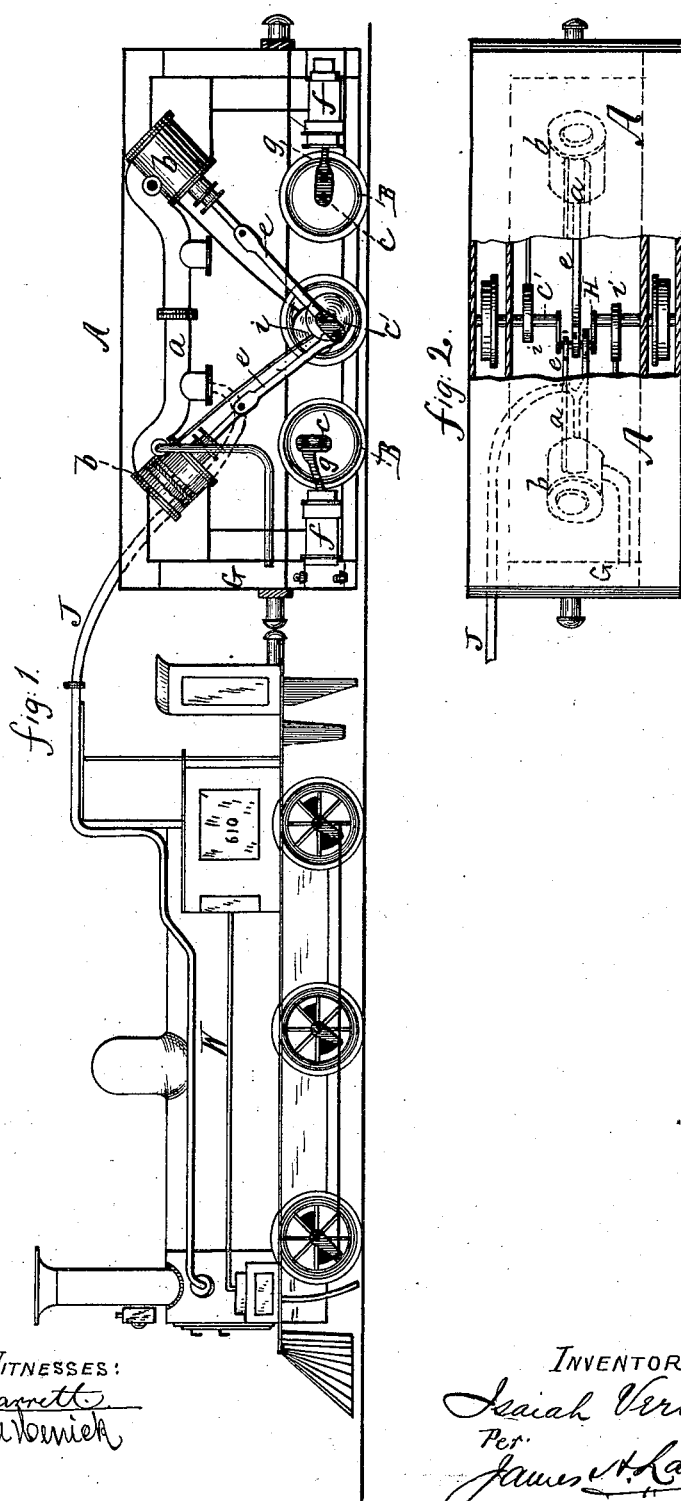


(No Model.)

I. VERNON.  
STEAM ENGINE.

No. 345,009.

Patented July 6, 1886.



WITNESSES:  
G. Barrett  
David Verick

INVENTOR:  
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# UNITED STATES PATENT OFFICE.

ISAIAH VERNON, OF GREAT BRIDGE, TIPTON, COUNTY OF STAFFORD,  
ENGLAND.

## STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 345,009, dated July 6, 1886.

Application filed August 4, 1885. Serial No. 173,572. (No model.) Patented in England July 3, 1884, No. 9,732.

*To all whom it may concern:*

Be it known that I, ISAIAH VERNON, a citizen of Great Britain, residing at Great Bridge, Tipton, in the county of Stafford, England, engineer, a subject of the Queen of Great Britain, have invented new and useful Improvements in Steam-Engines, mainly applicable to locomotive-engines, (for which I have applied for a patent in Great Britain, No. 9,732, bearing date July 3, 1884,) of which the following is a specification.

The object of my invention is to produce an auxiliary engine that will utilize the exhaust-steam from a high-pressure or other steam-engine.

Figure 1 is a sectional elevation of my improved engine attached to a locomotive. Fig. 2 is a plan sectional view of my improved engine.

A represents my improved exhaust-steam engine, supported on wheels B B, fastened upon the axles C C'. Within the framing of this truck is placed two cylinders, *b b*, which are provided with piston-head and slide-valve.

*a* is a pipe leading into the two cylinders.

*e* is the connecting-rods joining the piston-rods with the double crank H on the axle C'.

*i i* are two eccentrics operating the cut-off valves of the cylinders *b b*.

The steam (which may be exhaust-steam or steam from an adjacent boiler placed at a short distance from the engine or on top of same) is admitted or conducted into the pipe *a* and cylinders *b b* by the flexible or other kind of tube, J. It will be seen in Fig. 4 that this tube J is connected to the exhaust-pipe of the locomotive W, and to which my engine is coupled. The object of attaching my engine to the said locomotive is to increase the power

of the said locomotive by utilizing the exhaust-steam therefrom. By my invention I convert this exhaust-steam into another or additional power, and which, when applied or connected

to the locomotive, greatly increases its capacity. The same result would be attained by connecting my auxiliary engine by means of a flexible tube to a stationary steam-engine. The exhaust-steam from the said stationary engine in this case would be converted into an additional power, and may be utilized for moving articles from one part of the shop to another, or other like purposes.

The exhaust-steam from the cylinders *b b* is conducted into spaces G G, formed around the frame of the engine, where it is condensed and forced back into the original boiler by means of the pumps *f f*, placed at the lower corners of the engine. These pumps are operated by cranks and connecting-rods *g g*, attached to the driving-axes C C'.

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

1. In an engine for utilizing exhaust-steam, the cylinders *b b*, connected by pipe *a*, having exhaust inlet-tubes J J, and having piston-rods F, in connection with cranks H on axle C' of the truck A, substantially as set forth.

2. The pumps *f*, operated by crank and rod *g* on axle C, in connection with the exhaust-compartment G of the truck A, substantially as set forth.

3. In an engine for utilizing exhaust-steam, the combination of the truck A, provided with compartment G, the cylinder *b b*, the tube *a*, the pumps *f f*, the piston-rods F, the cranks H, the wheels B B, and the axles C C', all arranged substantially as and for the purpose set forth.

In testimony I have affixed my signature in the presence of two witnesses.

ISAIAH VERNON.

Witnesses:

W. WILSON HOEN,  
F. W. BARKER.