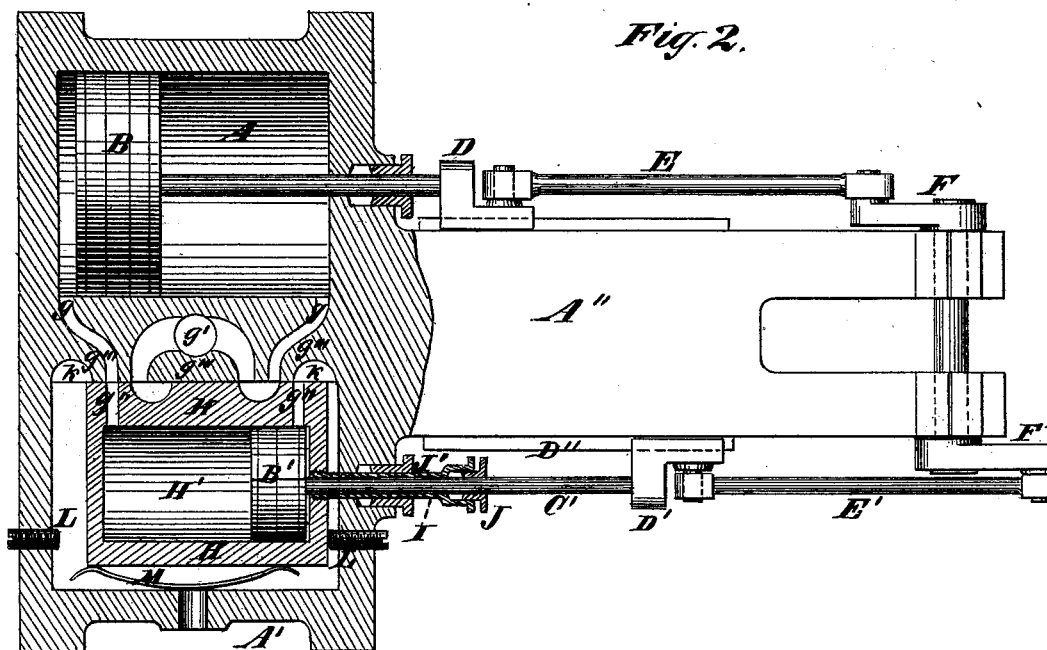
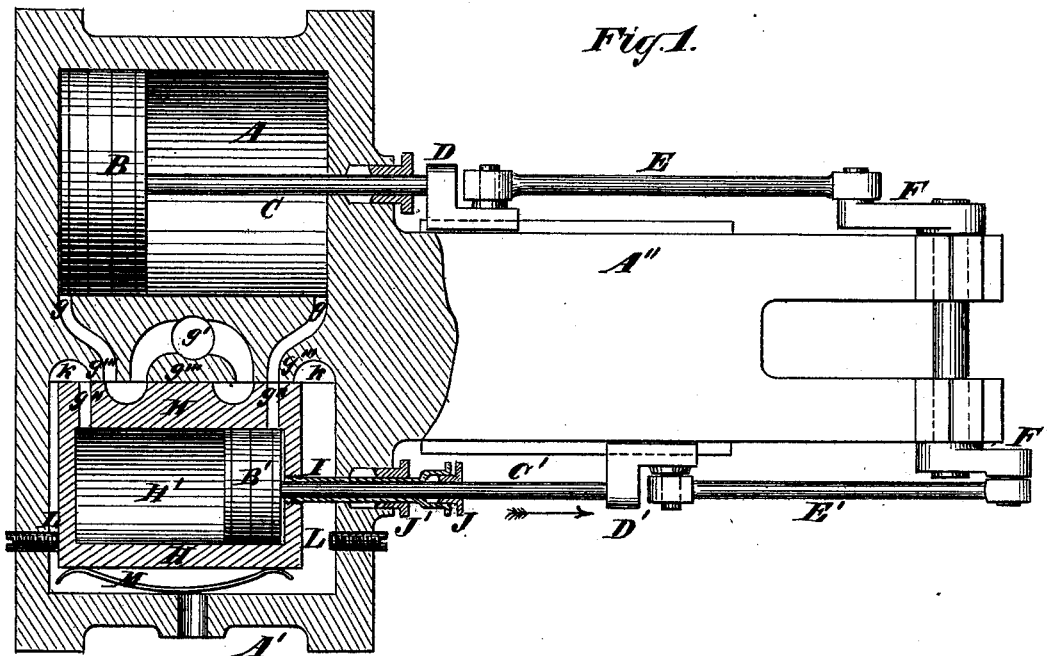


H. A. JAMIESON.
Steam-Engine.

No. 213,573.

Patented Mar. 25, 1879.



Witnesses
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UNITED STATES PATENT OFFICE.

HENRY A. JAMIESON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **213,573**, dated March 25, 1879; application filed August 23, 1878.

To all whom it may concern:

Be it known that I, HENRY A. JAMIESON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

My invention is more especially applicable to compound engines, and has for one of its objects the simplification of this class of engines and reduction of friction in the same, whereby I secure the advantages of greatly-reduced cost in construction and current repairs, and increased available power for the performance of useful work.

As a collateral advantage, I also secure a reduced clearance as compared with other constructions of compound engines which employ a slide-valve for both the high-pressure and low-pressure cylinder.

The invention is also, in part, applicable to other than compound engines.

Figure 1 in the drawings is a horizontal central section through the cylinders of a horizontal compound engine and a top view of other portions of the same constructed in accordance with my invention. Fig. 2 is a similar section and top view, but with the moving parts in a different position from that shown in Fig. 1.

A, A', and A'', respectively, represent the expansion or low-pressure cylinder, the steam-chest of the high-pressure cylinder, and the bed-plate of the engine, which are, preferably, all formed of a single piece of metal. B is the piston of the low-pressure cylinder. C is its piston-rod, which passes through a stuffing-box or gland in the head of the cylinder, and is connected with a cross-head, D, to secure parallel motion of the rod, and is pivoted at D to the connecting-rod E, through which its motion is transmitted to the crank F. The induction-ports of this cylinder are represented at *g*, and the exhaust-port at *g'*.

H represents the slide-valve, which alternately opens and closes the ports *g g'*. Said valve is preferably (but not necessarily) of that variety commonly known as "B-valves."

Said valve rests and operates on a valve-seat, *g'''*. The said valve is either attached to or it contains a high-pressure cylinder, H', its interior being bored out to receive a piston, B'. To the end of this combined cylinder and valve is attached a sleeve, I, in such manner as to leave a passage for the piston-rod C' of the piston B' through the said sleeve and the head of the said combined cylinder and valve. At the outer extremity of the sleeve I is a stuffing-box or gland, J, and the said sleeve also passes through a stuffing-box or gland, J', fitted into the steam-chest A'.

The piston-rod C' is connected with a cross-head, D', working on a guide, D'', and it is also pivoted to a connecting-rod, E', through which it transmits its motion to the crank F', that is keyed to the same crank-shaft as crank F. At the extremities of the cylinder H' in the valve H are ports *g''* for the alternate induction and eduction of steam to and from the said cylinder. The said cylinder receives its steam from the chest A', which is therefore also the valve-chest of both the cylinders H' and A.

Steam-cavities *k* are formed at the ends of the valve-chest A' in relation with the ports *g''*, over which the said ports pass when steam is to be admitted to the cylinder H', and which permit the free passage of steam through said ports into said cylinder. Adjustable abutments L, attached to or inserted through the ends of the valve-chest A', limit the motion of the combined cylinder and valve H H'. The said valve has a tendency to seat itself tightly under the pressure of the steam; but I prefer to supplement the action of the steam-pressure for this purpose by the action of a spring, M, placed within the valve-chest and adjusted to press against the side of the said combined valve and cylinder on the side opposite the face of the valve.

The ports *g''* are situated with relation to the ends of the cylinder H' on the inside of the same, in such manner that when the piston arrives nearly to the end of the stroke in either direction it covers the port near the end approached before the steam has all escaped from the said cylinder. By this means I obtain a steam cushion for the piston B', and

avoid shocks either of the piston against the ends of the cylinder, or of the combined cylinder and valve against the abutments L in the valve-chest.

The operation of the engine is as follows: Commencing with the combined valve and cylinder H H' in the position shown in Fig. 2, and supposing the engine to be in motion and supplied with steam, as the crank F' passes the center the piston B' moves into the position shown in Fig. 2, steam enters the port *g''* nearest the piston B', and, the combined cylinder and valve resting against the abutment L, the steam forces the said piston toward the opposite end of the cylinder H' till said piston covers the port *g''* at the end of the said cylinder toward which the piston is moving. The steam confined between the piston and the end of the cylinder is then compressed, and the combined cylinder and valve are pushed along to bring the port *g''* at the opposite end in conjunction with the port *g'*, which is in relation therewith, and through which the steam exhausts into the low-pressure cylinder A for expansion therein. At the same time one of the steam-cavities in the valve H covers the port *g* at the end of the cylinder A, toward which the piston B is advancing, and also the correlated branch of the exhaust-port *g'*, and permits the exhaust of the expanded steam from the cylinder A.

The thrusting forward of the valve H also brings the port covered by the piston B' over its correlated steam-cavity *k* in the steam-chest A', in such manner that when the crank F' turns over the center and the piston B' begins the return stroke steam freely enters the cylinder H', and follows the piston throughout the said return stroke. This action is repeated alternately at each end of the cylinder H', which renders the action of the engine continuous while steam is admitted to the steam-chest A'.

It will be seen that the piston B' acts also as the valve for induction of steam to the cylinder H', and that the valve H performs the function of an exhaust-valve for the said cylinder at the time it also acts as an induction-valve to the cylinder A.

I claim—

1. The combination, with the low-pressure or expansion cylinder and its contained piston in a compound steam-engine, of an externally-arranged high-pressure cylinder contain-

ing a reciprocating piston, and having a reciprocating motion and carrying a valve which effects the induction and eduction of steam to and from the low-pressure or expansion cylinder, substantially as herein described.

2. In a compound steam-engine, the combination of a low-pressure or expansion cylinder, a reciprocating high-pressure cylinder working in a steam-chest, which receives steam from the boiler, and a valve attached to or forming a part of the reciprocating high-pressure cylinder, and serving to effect eduction of steam from the high-pressure cylinder and the induction and eduction of steam to and from the low-pressure cylinder, substantially as and for the purpose specified.

3. The combination of a steam-cylinder, H', containing a reciprocating piston, and provided with ports *g'' g''*, to which the said piston acts as a valve for the induction of steam, a steam-chest, A', in which said cylinder is contained, and in which it has a reciprocating motion independently of its piston, a valve-seat, *g'''*, formed within the said steam-chest, and a valve, H, formed on or carried by said cylinder, and effecting the eduction of steam therefrom through ports in the said valve-seat, substantially as herein specified.

4. The combination, with the steam-chest A' and its contained reciprocating cylinder H' and with the reciprocating piston B, working in said cylinder, of the adjustable abutments L L, against which the said cylinder is supported during the stroke of said piston, substantially as and for the purpose herein described.

5. The combination of the steam-chest A' and its contained reciprocating steam-cylinder H', the piston B, and the piston-rod C', working within said steam-cylinder, the sleeve I, attached to said cylinder, and the stuffing-boxes J and J'.

6. The combination of the reciprocating cylinder H' and attached valve H, and the piston B', having a reciprocating motion within said cylinder, substantially as herein described, whereby the motion of the said valve is obtained through the motion of said cylinder derived from the motion of the said piston at each end of the stroke of the latter.

HENRY A. JAMIESON.

Witnesses:

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