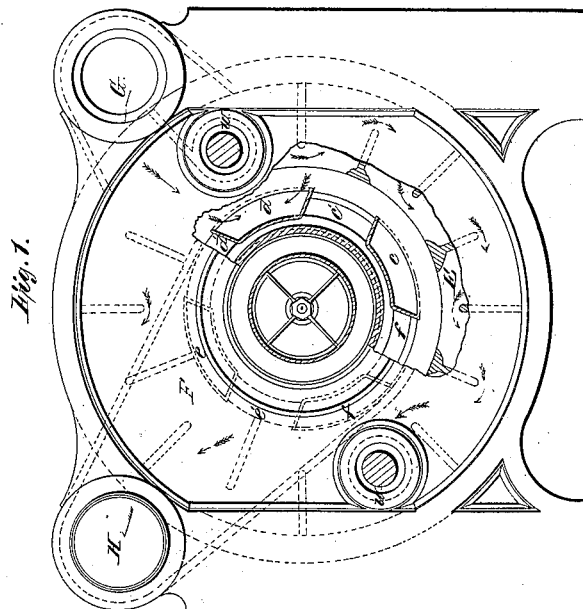
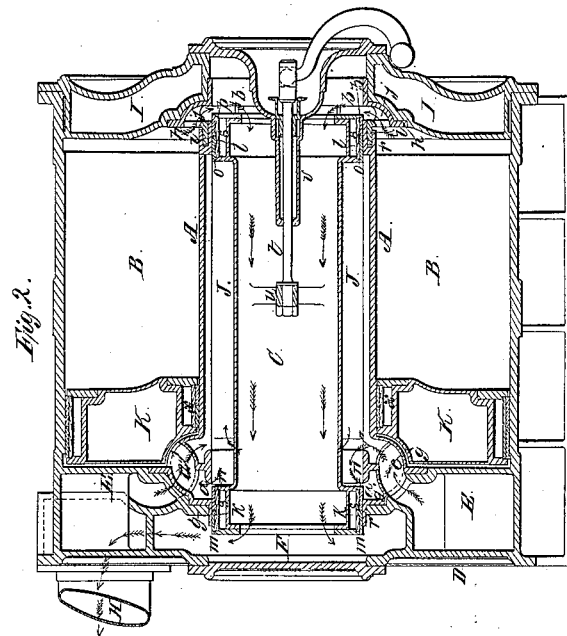


G. B. Whiting,
Steam Slide Valve.

N^o 51,885.

Patented Jan. 2, 1866.



Witnesses:
James H. Gridley
E. B. Forbush.

Inventor:
G. B. Whiting

UNITED STATES PATENT OFFICE.

GEORGE B. WHITING, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 51,885, dated January 2, 1866.

To all whom it may concern:

Be it known that I, GEO. B. WHITING, of the city of Washington, in the District of Columbia, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is an end elevation. Fig. 2 is a longitudinal vertical section.

Similar letters of reference indicate corresponding parts of the several figures.

The nature of my invention consists in making a cylinder for a reciprocating steam-engine with a fixed central cylinder-trunk for the steam-chest, which communicates with steam and vacuum chambers, which are made in one or both of the cylinder-heads, as the case may require, the trunk having steam-ports leading into the cylinder and fitted with a balance piston-valve, which is operated by any of the usual methods, the object of my invention being to diminish the capacity of the passages leading from the steam-ports to the cylinder to the least possible space and reduce the weights and bulk of the engines, at the same time providing the engine with an equilibrium-valve.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my cylinder without the usual valve-face, steam-ports, and steam-chest, and substitute in their place a fixed central cylinder-trunk, A, the axis of the trunk coinciding with the axis of the cylinder. The trunk A is made with suitable steam-ports *a b*, which communicate with the cylinder B B, and is fitted with a balanced piston-valve, C. One cylinder-head, D, is made hollow and divided into two chambers, E and F. E is the steam-chamber, the steam entering through the induction-opening G, as shown by arrows. F is the exhaust-chamber, the steam passing out through the eduction-opening H. One end of the trunk is made with a surrounding-case, which is subdivided into two or more compartments or passages *c c' d d' e e' f f'*, which open into the trunk. The passages *c d e f* communicate with the steam-chamber E, while

the passages *c' d' e' f'* lead into the cylinder B B. The trunk A is secured to the cylinder-head D by flanges *g g'*, which close the steam and vacuum chambers E F from the cylinder when the valve C covers the ports *a b*.

To allow for the variation of expansion of the cylinder and trunk, and to facilitate the adjustment and removal of the head I, I make one end of the trunk A with the steam-port *b* in a separate piece, and secure the same by the flange *h* to the cylinder-cover I, making a vacuum-tight joint, and connect it with the other part of the trunk by the tongue and groove *i*, the tongue being secured to flange *h* by a suitable number of webs, *j j*. The end of the main portion of the trunk serves as a margin for the port *b*, so that the steam lead will not be affected by the variation which may occur in the length of the trunk by expansion or the adjustment of the cylinder-head I.

I make the piston-valve C a hollow cylinder open at each end, and having the required cross-area through its whole length, which serves as an exhaust-passage from the steam-port B to the vacuum-chamber F. The annular space J J around the valve is used as a steam-chamber, in common with the steam-chamber E, being united by passages *c d e f*, as above described. I fit the valve C with a set of metallic packing-rings, *k l*, for each steam-port, and make the outside ring of each set in two parts, as is usual; but to prevent any liability of variation on the wearing-surfaces of the rings *m n* and *o p*, while passing the ports *a b*, I unite them with a tongue and groove, *r*. I likewise make grooves *s s* on the outer surfaces of the inner rings, and make the inner surfaces of the outer rings with tongues which fit the grooves *s s*, and secure the outer rings to the valve. I adjust the rings by any of the usual methods in use. The valve is fitted with a stem, *t*, which is secured to boss *u*, the stem passing through the stuffing-box *v*, and unites with the proper connections for receiving the motion required.

The piston K K is made annular, and fitted, as in the usual manner, with metallic packing-rings on its circumference. It is likewise fitted with metalling packing-rings *x*, working on the trunk A.

W W are the piston-rods, also fitted in the usual manner.

Operation: The steam being admitted to the annular steam-chamber J J, as above described, and the port *a* opened on the steam side, the steam enters the cylinder behind the piston through passages *c' d' e' f'*, while the port *b* is opened on the exhaust side, the steam passing out of the cylinder B B through the valve C into the exhaust-chamber F. When steam is taken on the opposite side of the piston and the port *a* opened on the exhaust side the steam passes out through the passages *c' d' e' f'* into the exhaust-chamber F, and out of it through the induction-opening H, as indicated by arrows.

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

1. Arranging the induction and induction valve of a reciprocating steam-engine so as to work within and through the piston, substantially as described.

2. The fixed central cylinder-trunk, A, with steam ports and passages, as described.

3. In combination with the fixed central cylinder-trunk, A, the piston-valve C, steam-chamber E, vacuum-chamber F, and annular piston K K, substantially as described.

GEO. B. WHITING.

Witnesses:

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