No. 612,969.

Patented Oct. 25, 1898.

J. W. HAWKINS.

STEAM ENGINE.

Application filed Feb. 19, 1898.

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

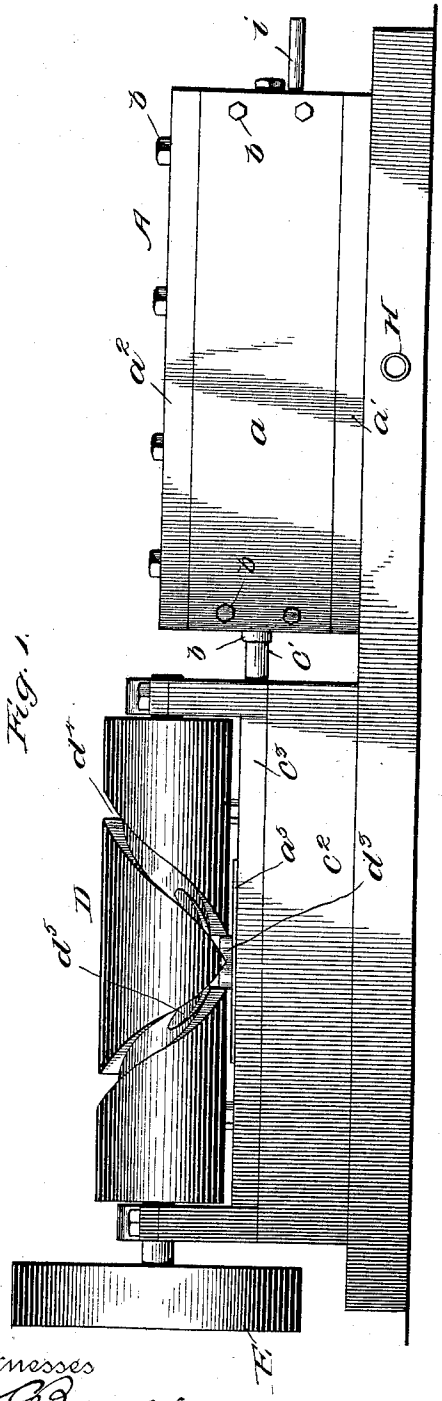
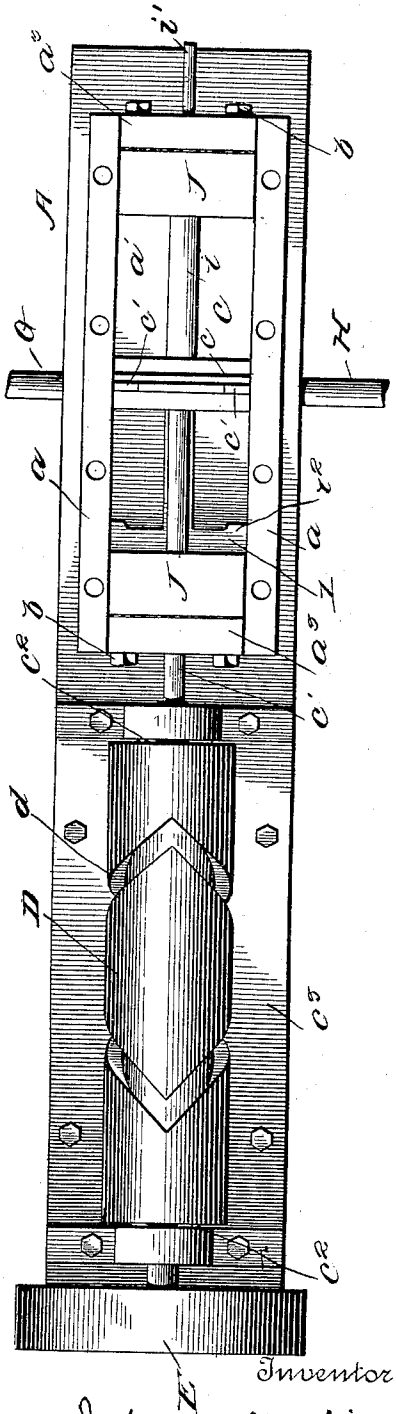


Fig. 2.



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Fig. 3.

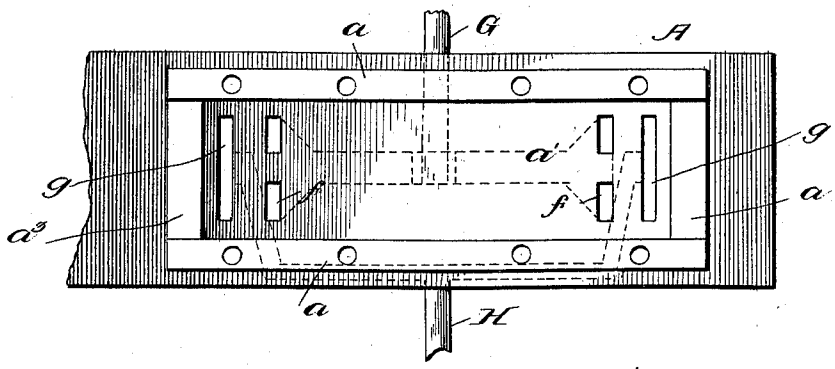


Fig. 4.

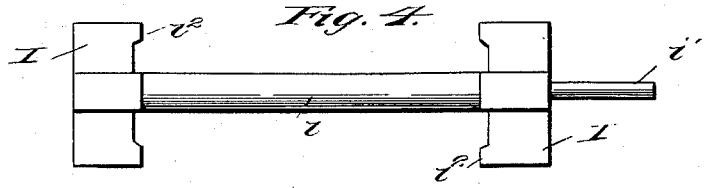


Fig. 5.

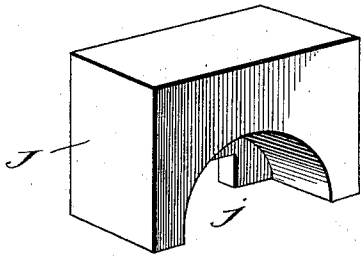


Fig. 6.

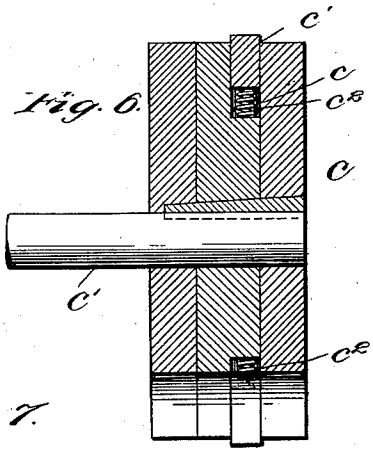
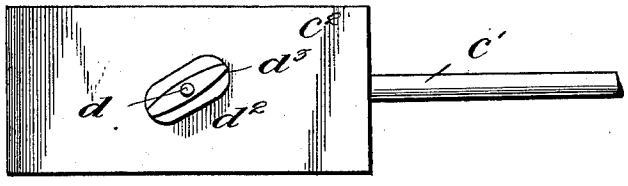


Fig. 7.



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UNITED STATES PATENT OFFICE.

JOHN W. HAWKINS, OF MUNFORDVILLE, KENTUCKY.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 612,969, dated October 25, 1898.

Application filed February 19, 1898. Serial No. 670,890. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HAWKINS, a citizen of the United States, residing at Munfordville, in the county of Hart and State of Kentucky, have invented certain new and useful Improvements in Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as 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 the letters of reference marked thereon, which form a part of this specification.

This invention relates to steam-engines.

The object of the invention is to provide a steam-engine which shall be more simple and cheaper than devices of this kind as at present constructed.

Further, the object of the invention is to provide means entirely within the cylinder whereby the inlet and exhaust of steam into and out of the same may automatically be controlled without depending upon any extraneous means.

Further, the object of the invention is to provide a steam-engine of such construction that the dead-centers incident to the use of the ordinary crank-shaft for transmitting motion from the piston shall be avoided, and therefore the more smooth and uniform running of the engine insured.

With these objects in view the invention consists of a steam-engine constructed and provided with the various novel details of construction and combinations of parts, substantially as hereinafter described, and particularly pointed out in the claims.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side view of an engine constructed in accordance with my invention. Fig. 2 is a plan view of the engine, the top of the cylinder being removed in order to show the interior arrangement of parts. Fig. 3 is a plan view of the cylinder with the piston and other parts removed, showing the inlet and outlet ports. Fig. 4 is a plan view of the valve or cut-off by which the steam and exhaust ports are alternately opened and closed. Fig. 5 is a perspective view of one of the blocks by which the valve or cut-off is retained in position. Fig. 6 is a sectional view of the piston. Fig. 7 is a plan view of the means for imparting motion to the grooved cylinder from the piston-rod.

In the following description and claims the word "cylinder" will be applied to that portion of the present invention which corresponds to the cylinder of an ordinary engine, although in the present instance the part is not cylindrical in form.

In the drawings, A represents the cylinder, which is, as shown in the drawings, made rectangular in cross-section, as I have found that by employing this form great economy in construction and accuracy of fit of the moving parts when formed and arranged as herein described are secured. The cylinder is made up of six flat plates, those designated by the letter a forming the sides, that marked a' the bottom, that marked a^2 the top, and those marked a^3 the ends. At the point of juncture of the parts suitable packing is interposed between the meeting faces and the several parts are held together by bolts b. Arranged within the square body thus formed is a piston C, which in form and size corresponds to the cavity in the cylinder. The piston is preferably made up of two or more plates suitably secured together, and in each of the four sides is a groove c, which receives a plate c'. The plates are free to move in and out in the grooves. Arranged in each groove and permanently attached to the piston is a spring c^2, which bears against the plate c' and tends to force the same outward against the adjacent inner face of the cylinder. It will be clear that as the plates present plane faces to the respective inner faces of the cylinder wear on the plates will be readily taken up by the springs, and therefore a perfect fit of all the plates against the faces of the cylinder insured.

Connected with the piston is a piston-rod C, extending from the cylinder and provided at its outer end with a block C^2, which is adapted to reciprocate in groove c^3 in a frame C^3, arranged adjacent to the cylinder. Projecting upward from the face of the block C^2

is a pin d, and upon this pin is arranged a button d^2, having a reduced upper surface d^3, provided with tapering rounded ends. Mounted above the block C^2 is a cylinder D, having cut in the surface thereof two intersecting spiral grooves forming a continuous way d^4. The cylinder is secured in suitable bearings arranged such a distance above the block C^2 as to cause the button d^3 to enter the grooves in the cylinder. The grooves d^4 for the principal part of their length are of a width corresponding to the total width of the button d^3 in order that a free movement of the button through the grooves may be permitted. At the point of intersection the main portion of the grooves are made shallow, leaving a channel d^5 in each of them corresponding in width to the reduced portion of the button. This construction insures the smooth passage of the button when in passing through one groove it crosses another and possibility of the button proceeding in the wrong direction is avoided. The described arrangement and construction of the parts will result in imparting a continuous rotary movement to the cylinder D as the piston-rod reciprocates, and the use of a crank for imparting revolution to a fly-wheel is avoided.

Arranged upon the shaft of the cylinder D is a fly-wheel E, which serves the usual purpose of equalizing the movement of the parts, as in an ordinary engine.

The manner of regulating the inlet and exhaust of steam to and from the cylinder constructed as described forms an important part of my invention. In each end of the cylinder, in the lower face thereof, are inlet-ports f and an outlet-port g. The inlet-ports f are connected with a steam-inlet G, and the exhaust-ports are connected with an exhaust H. Arranged in the lower portion of the cylinder is a valve or cut-off formed as shown in Fig. 4 of the drawings. The valve or cut-off is composed of two blocks I I, connected by a rod i, which has an extension i', projecting from the opposite end of the cylinder to that from which the piston-rod extends. The blocks I I are of such a width that when moved longitudinally of the cylinder to the limit allowed in one direction the inlet-ports will be opened at one end and the outlet-port opened at the other end, with the result that steam will be admitted on one side of the piston to move the same and steam will be allowed to exhaust on the other side in order to offer no impediment to the movement of the piston. Each block I is provided on its inner face with offsets or projections i^2, which correspond in width to the width of the ports, and thus when the piston is forced to the extent of its movement in one direction it will come in contact with the offsets or projections on one of the blocks and move it toward the end of the cylinder near which the block is placed, with the result that the inlet-ports at the end of the cylinder to which the piston is moved will be opened, the inlet-ports at the opposite ends will be closed, and the exhaust-port at the last-mentioned end will be opened, thus effecting automatically the reverse movement of the piston. The valve or cut-off is retained in place in the bottom of the cylinder by pieces J, which are preferably of metal and have their lower faces smooth and bearing upon the blocks I in order that the blocks may be held firmly against the bottom of the cylinder and at the same time allowed free reciprocating movement. The pieces J have openings j through them, allowing communication between the interior of the cylinder and the exhaust-ports when in the movement of the piston it is approaching one of the pieces referred to.

The reversing of the engine may easily be accomplished by shifting the valve or cut-off by means of the extension i' to open the inlet-port on the side of the cylinder, which will give the latter the desired direction of movement.

The advantages of the construction described will be apparent to one skilled in the art to which it appertains. In the first place great economy of construction is secured. Further, by avoiding the exposed valve-operating mechanism and arranging the valve in position to be operated automatically and directly by the piston great simplicity is effected.

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

1. A steam-engine cylinder having inlet and exhaust ports at its respective ends, a piston, a valve arranged at each end of the cylinder, the valves being connected, and pieces arranged above the valves to hold them in place and provided with openings for the passage of steam, substantially as described.

2. The combination with the reciprocating piston of a steam-engine of a block attached to the piston and having a pin projecting therefrom, a button having a reduced upper portion having tapering rounded ends, a cylinder mounted above the block and having two intersecting spiral grooves in its surface, the main portion of the grooves being shallow at their point of intersection and provided with a narrow deep channel, substantially as described.

3. A steam-engine cylinder having inlet and exhaust ports at its respective ends, a piston, valves or cut-offs for the ports connected to each other and arranged in the path of movement of the piston, and pieces arranged above the valves to keep them in place and provided with openings for the passage of steam, substantially as described.

4. A steam-engine cylinder square in cross-section, a piston of corresponding form, and having spring-seated projections at its edges, the cylinder having inlet and exhaust ports

at its respective ends, valves or cut-offs for the ports connected to each other and arranged in the path of movement of the piston, and pieces arranged above the valves to keep them in place and provided with openings for the passage of steam, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN W. HAWKINS.

Witnesses:
W. H. JONES,
LAWRENCE LIVELY.