

W. READ.
Steam-Engine.

No. 165,869.

Patented July 20, 1875.

Fig. 1

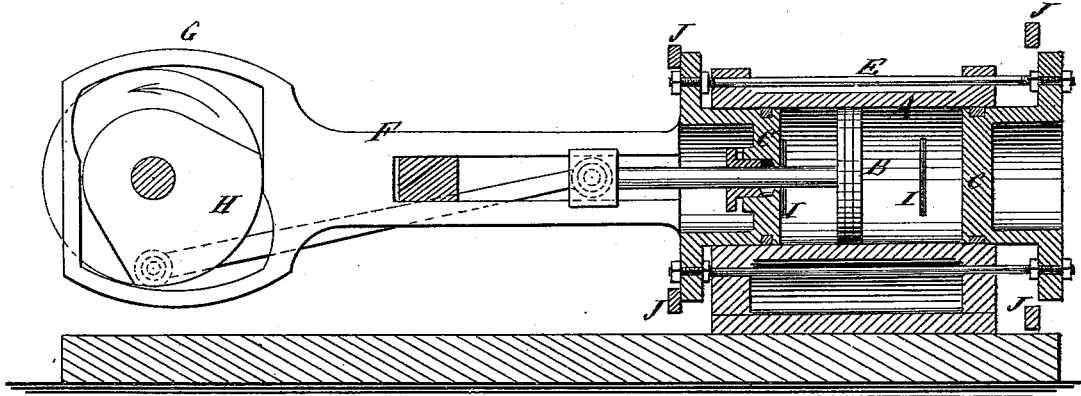


Fig. 2

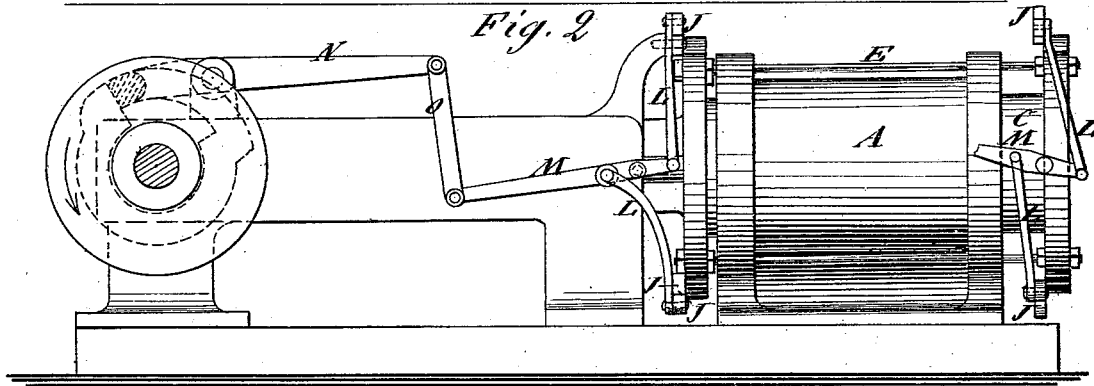


Fig. 3

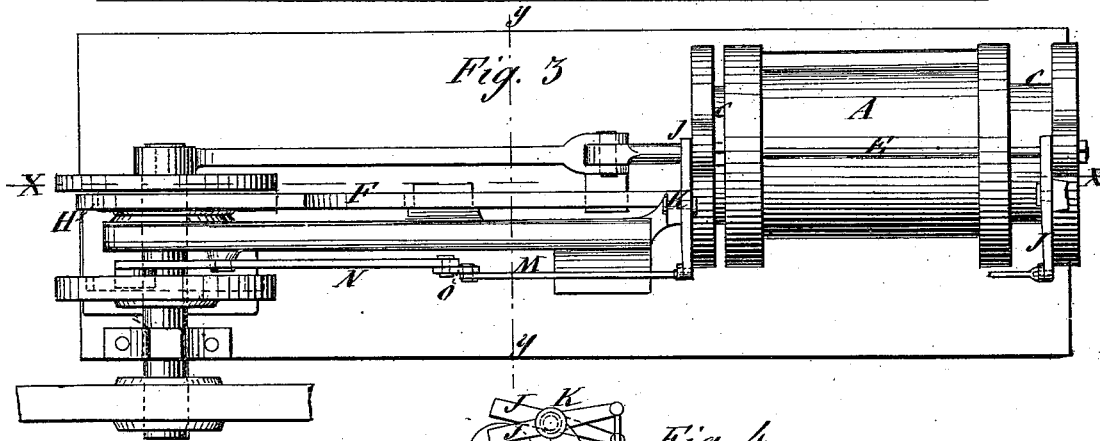
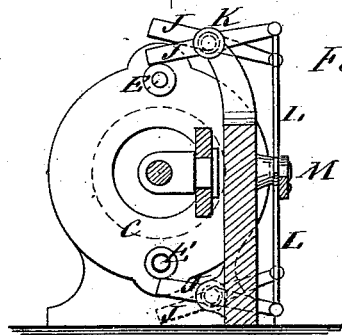


Fig. 4



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM READ, OF ST. CLOUD, MINNESOTA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **165,869**, dated July 20, 1875; application filed November 14, 1874.

To all whom it may concern :

Be it known that I, WILLIAM READ, of St. Cloud, in the county of Stearns and State of Minnesota, have invented a new and useful Improvement in Steam-Engines, of which the following is a specification :

My invention consists of movable cylinder-heads, with apparatus to cause them to follow the piston until the crank has passed the centers sufficiently to be acted on with good effect, so that, by not admitting the steam until such point is reached, it will be economized by so much as the steam-space is thus contracted. The two heads of the cylinder are connected together by rods outside of the cylinder, so that as the one follows the piston the other will be returned to the end of the cylinder, out of the way of the piston. They are worked by a cam on the crank-shaft, and stops are provided to fall in behind and hold them against the back action of the steam, to relieve the cam by which they are operated from such pressure.

Figure 1 is a longitudinal sectional elevation of my improved engine, taken on the line *x x* of Fig. 2. Fig. 2 is a side elevation. Fig. 3 is a plan view, and Fig. 4 is a transverse section taken on the line *y y* of Fig. 3.

Similar letters of reference indicate corresponding parts.

A is the cylinder; B, the piston; C, the cylinder-heads; E, rods connecting the heads; F, connecting-bar; G, cam-yoke, and H the cam for working the cylinder-heads. The ports I are located toward the center of the cylinder as far as the heads of the same move, and the

valve will be geared so as to open at the moment the piston passes over the port and the head comes up and stops at the outer side of the same.

In order to relieve the cam H from the pressure of the steam, and thus prevent the friction that would be caused by it, I have contrived stops J to fall behind the heads at the moment they stop and steam enters to hold them against the back pressure. These stops are in this case pivoted at K, and connected by rods L with a lever, M, which is connected by rod O with another lever, N, which is worked by a cam on the crank-shaft; but any suitable contrivance of apparatus may be employed. These stops are not essential to the use of movable cylinder-heads, but it may be better to use them.

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

1. The movable cylinder heads C C and mechanism, substantially as herein described, for causing the same to follow the piston and stop when they reach the steam-ports, in combination with the cylinder and piston of a steam-engine, for the object stated.

2. The combination of stops J with the movable cylinder-heads, arranged to fall behind them when steam enters the cylinder, and hold them against the back pressure of the steam, substantially as specified.

WILLIAM READ.

Witnesses:

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