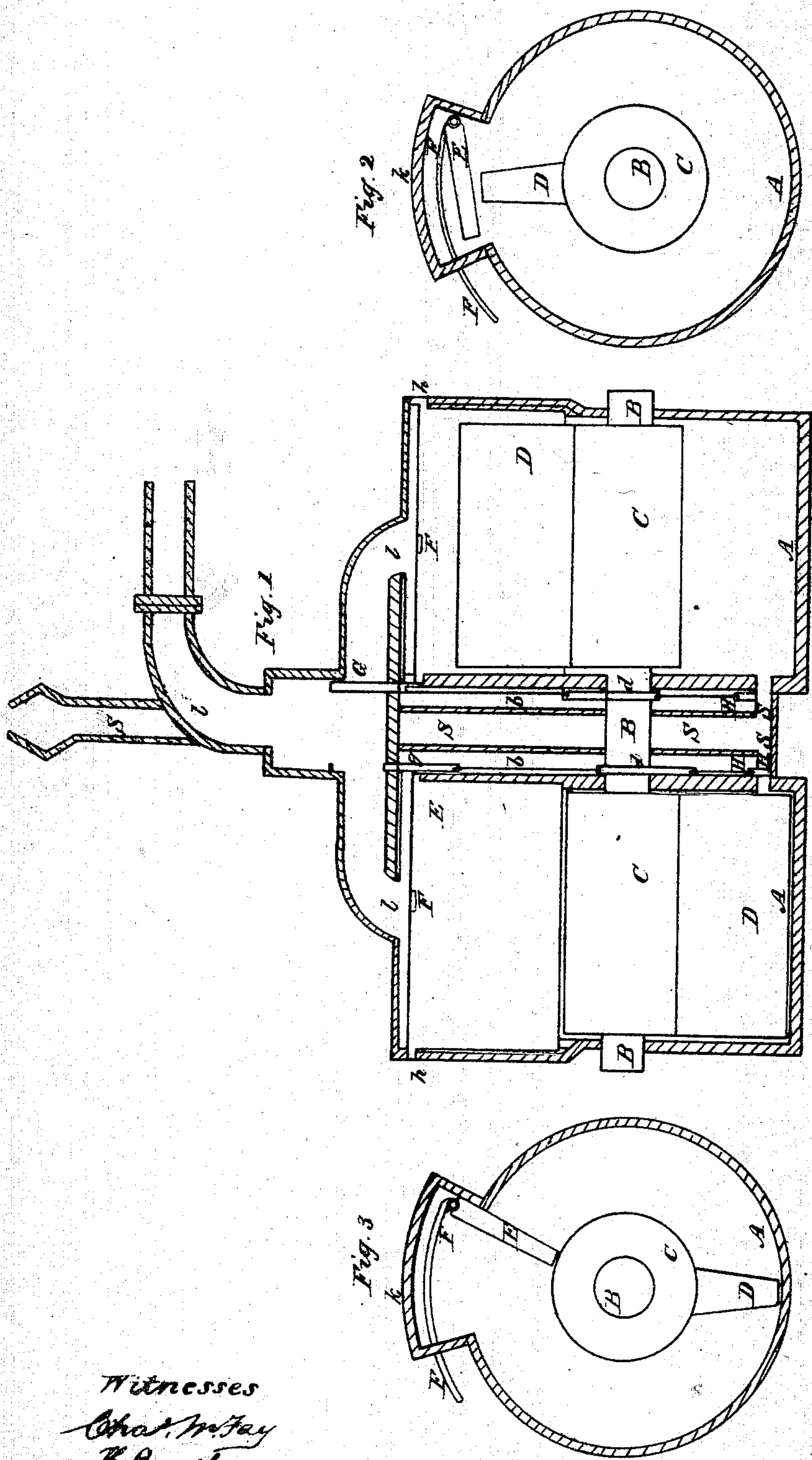


A. S. Harlan
Rotary Steam Engine.
N^o 71384 *Patented Nov. 26, 1867.*



Witnesses
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United States Patent Office.

A. S. HARLAN, OF BLOOMINGTON, ILLINOIS.

Letters Patent No. 71,384, dated November 26, 1867.

IMPROVEMENT IN ROTARY STEAM-ENGINES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, A. S. HARLAN, of Bloomington, in the county of McLean, and State of Illinois, have invented a new and improved Rotatory Steam-Engine; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon. In the drawings—

Figure 1 is a longitudinal vertical section, and

Figures 2 and 3 are end views of the interiors of the cylinders *a a*.

This invention belongs to that class of steam-engines termed rotatory, in which "the steam acts at once, in the production of circular motion, upon a revolving piston, without the use of any intermediate mechanism, such as the crank, for deriving a circular from a rectilinear motion."

It consists of two cylinders on one shaft, the latter being provided with two projecting ribs, one within each cylinder, which serve as pistons, said ribs being on opposite sides of the shaft, and said shaft being enlarged, as to the parts within each cylinder, as hereinafter fully described.

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

A A represent two cylinders, of equal dimensions, placed end to end. B represents a shaft, passing longitudinally through both cylinders. C C represent inner cylinders concentric with A A, placed upon the shaft B. The object proposed to be accomplished by the cylinders C is the expulsion of the steam from the central to the outer parts of the main cylinder, through the operation of centrifugal force. It is supposed that the inner cylinders in their revolution cause those portions of the steam in contact with and in the neighborhood of them, also to revolve with such speed as to overcome the centripetal force and cause the particles to seek the outer regions of the main cylinders, and form parts of a compacter mass of steam than would otherwise pervade the cylinder. The steam crowded to those parts of the main cylinder, near the surface, operates more strongly against the outer sides of the pistons D, at the points where its force is most advantageously applied. The power of a given number of pounds of steam is thus practically increased. D D represent the pistons, being ribs attached to the inner cylinders C, and extending nearly to the interior surfaces of the main cylinders A. As shown at fig. 1, these ribs are on opposite sides of the shaft B, in order that by the time the steam passing out of the eduction-port has ceased to act upon one, it may have commenced acting upon the other piston, which has just passed the induction-port in the other cylinder. A uniform rotation of the shaft is thus insured. The steam enters by the supply-pipe *e*, which terminates in two branches leading to the two cylinders A A. The branches are provided with valves G G, which are connected by rods *b b*, to eccentric-straps *d d*, which surround eccentrics on opposite sides of the shaft B. Thus the valves open and close the branches of the pipe *e* alternately. The same is true of the valves H, which play in the eduction-ports S, and are also operated by the eccentrics on the shaft B. It will be seen that the steam by this arrangement is admitted to each cylinder alternately, and presses against the piston in each cylinder for half a revolution. E represents large flaps, hung on pivots *h*, which rest in grooves made in the ends of the chambers *k*, which project from the upper parts of the cylinders A. The flaps E are of a length about equal to that of the cylinders A, and of sufficient width to reach the surfaces of the inner cylinders C. By means of the rods F, the flaps E may be drawn from one side to the other of the chambers *k*, and consequently from one side to the other of the induction-ports *l*, which are at the centres of the chambers *k*. The rods F are both attached to a bar on the outside of the chamber *k*, so as to be both operated at once. To reverse the engine, it is only necessary to draw the flaps E to the opposite side of the chambers, inasmuch as each flap forms a complete partition within each cylinder, and directs the steam to one side or the other of the piston, according as the flap is on one side or the other of the induction-port. S represents the escape-pipe, into which the eduction-ports open.

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

1. The arrangement of the flaps E E, so as to slide in grooves from one side of the induction-ports to the other, in order to reverse the engine, substantially as described.
2. The arrangement of the eduction-ports S of the cylinder so as to release the steam after a semi-revolution of the piston, substantially as herein set forth.

A. S. HARLAN.

Witnesses:

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