J. V. Merrick,

Reciprocating Steam Engines,

No. 63,281, Patented Mar. 26, 1867.

Fig. 1

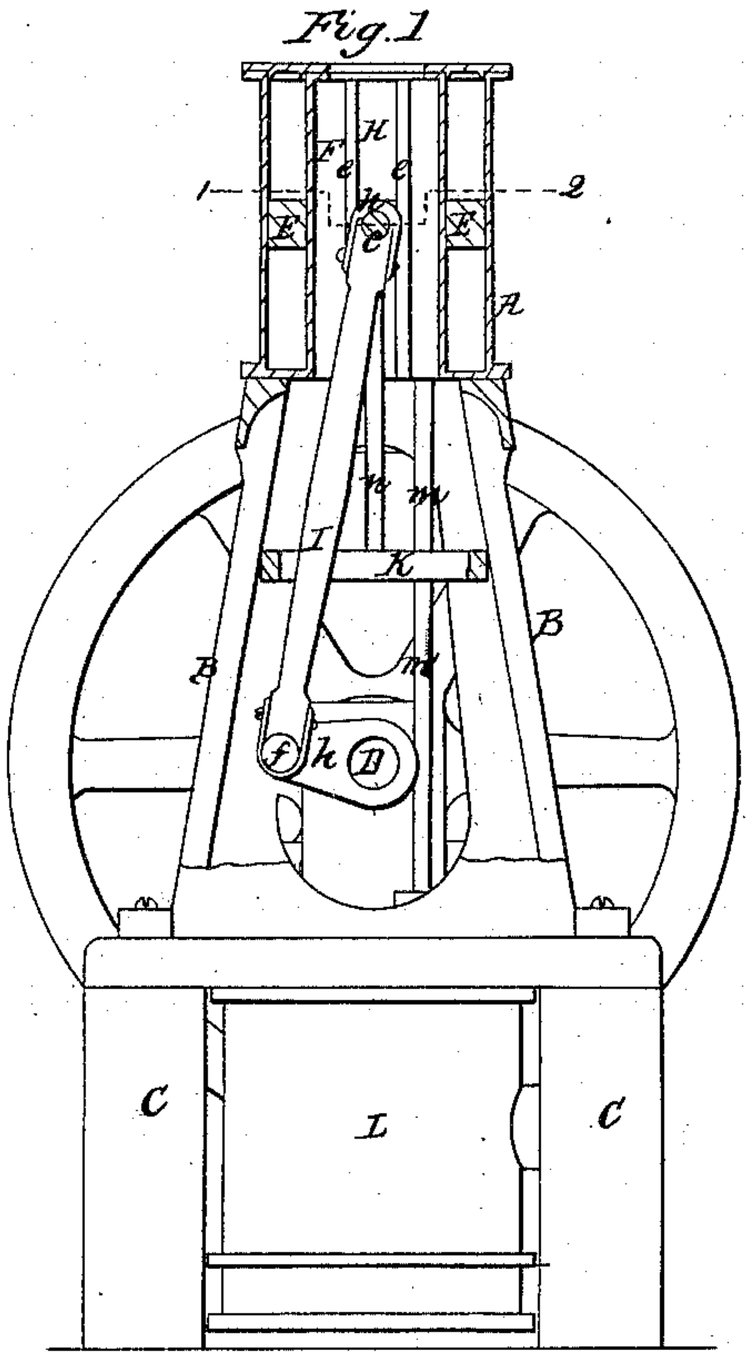


Fig. 2

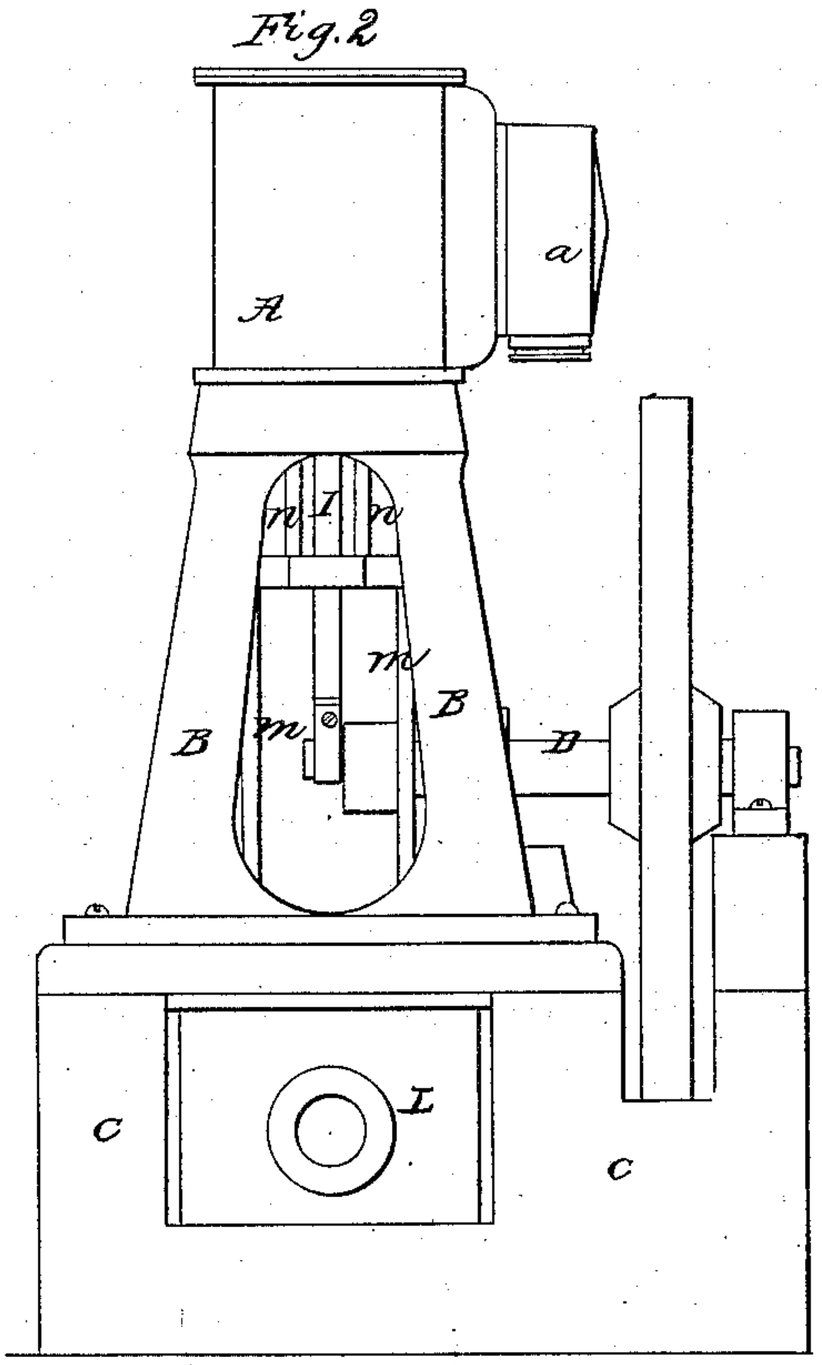


Fig. 4

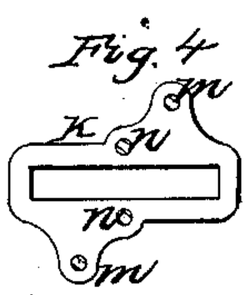
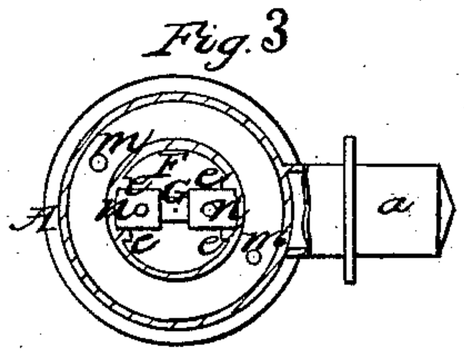


Fig. 3



Witnesses:

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United States Patent Office.

J. VAUGHAN MERRICK, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 63,281, *dated March* 26, 1867.

IMPROVEMENT IN 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, J. VAUGHAN MERRICK, of Philadelphia, Pennsylvania, have invented an Improvement in Steam Engines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention consists in the use of an annular steam cylinder, in combination with certain devices described hereafter, whereby a long connecting-rod may be obtained and the engine reduced in bulk and weight and rendered more simple and less costly than steam engines of the ordinary construction.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1 is a vertical section of a steam engine with my improvements.

Figure 2, a side view.

Figure 3, a sectional plan on the line 1–2, fig. 1; and

Figure 4, a plan view of a portion of the engine detached.

Similar letters refer to similar parts throughout the several views.

A is the steam cylinder, having a valve-chest, *a*, and valve of the ordinary construction, which may be operated by an eccentric in the usual manner. The steam cylinder is secured to the framework B and the latter to the base or foundation C, on which are suitable bearings for the crank-shaft D. The steam space of the cylinder is annular and adapted for the reception of a piston, E, of corresponding form, the said annular space surrounding a central opening, F, which extends through the cylinder, and in which are vertical ribs, *e e*, forming guides for the cross-head G, the latter being embraced by the upper end of the connecting-rod I, the lower end of which is adapted to the pin *f* of the crank *h* on the shaft D. To the annular piston are secured two rods, *m m*, which pass through suitable stuffing-boxes in the bottom of the cylinder, and which are secured to a plate or cross-head, *k*, fig. 4, to which are also secured rods, *n n*, the upper ends of the latter being connected to the cross-head G. The plate *k* has an elongated opening, through which the connecting-rod I passes, and within which the said rod operates freely. In the present instance, rods *m' m'*, forming continuations of the rods *m m*, extend below the plate *k* and are secured to the piston or bucket of an air-pump, L. In constructing steam engines for different uses, it frequently becomes necessary to place the cylinders so near to the crank-shafts that when such cylinders are of the usual construction very short and consequently very objectionable connecting-rods are indispensable. This will be observed in many of the horizontal engines used for driving screw-propellers. In vertical engines for the same purpose, and in direct-action engines for driving paddle-wheels, a moderately long connecting-rod can only be obtained, when the ordinary cylinders are used, by making the entire structure inconveniently high, cumbrous, heavy, and costly. The same remarks will apply with more or less force to many stationary or land engines, both high-pressure and condensing, used for pumping, blowing, and for other purposes. The accompanying drawing illustrates my invention as applied in constructing a stationary condensing engine. Although the cylinder is much nearer to the crank-shaft than in ordinary engines, it will be observed that the connecting-rod is of appropriate length owing to its upper end being connected to a cross-head moving in guides contained within the limits of the cylinder, instead of being outside the cylinder, as usual. A saving in the height of the engine equal at least to the length of the cylinder itself is thus effected. In addition to the advantages of saving in height and weight of framework, and obtaining a connecting-rod of appropriate length, my invention enables me to impart the desired movement to the bucket of the air-pump without the intervention of the costly array of beams, lever rods, &c., hitherto considered indispensable. If the ordinary blast cylinder be substituted for the air-pump L, a light, compact, and cheap blowing engine will be the result. It will be evident, too, that my invention is applicable to the construction of ordinary high-pressure engines, either vertical or horizontal, to be used in driving screw-propellers, as well as for other purposes; in fact, it may be applied to engines of almost every class with favorable results as regards saving of material, simplicity in construction, and diminution in bulk and cost.

Without limiting my invention, therefore, to steam engines of any particular class, I claim as my invention, and desire to secure by Letters Patent—

1. The combination of the annular cylinder A, its piston E, two or more piston-rods *m m*, plate or cross-head *k*, rods *n n*, cross-head G, connecting-rod I, and crank *h*, the whole being arranged and operating substantially as and for the purpose herein set forth.

2. The combination of the above with rods *m' m'*, for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. VAUGHAN MERRICK.

Witnesses:
WM. HALL WAXLER,
W. J. R. DELANY.