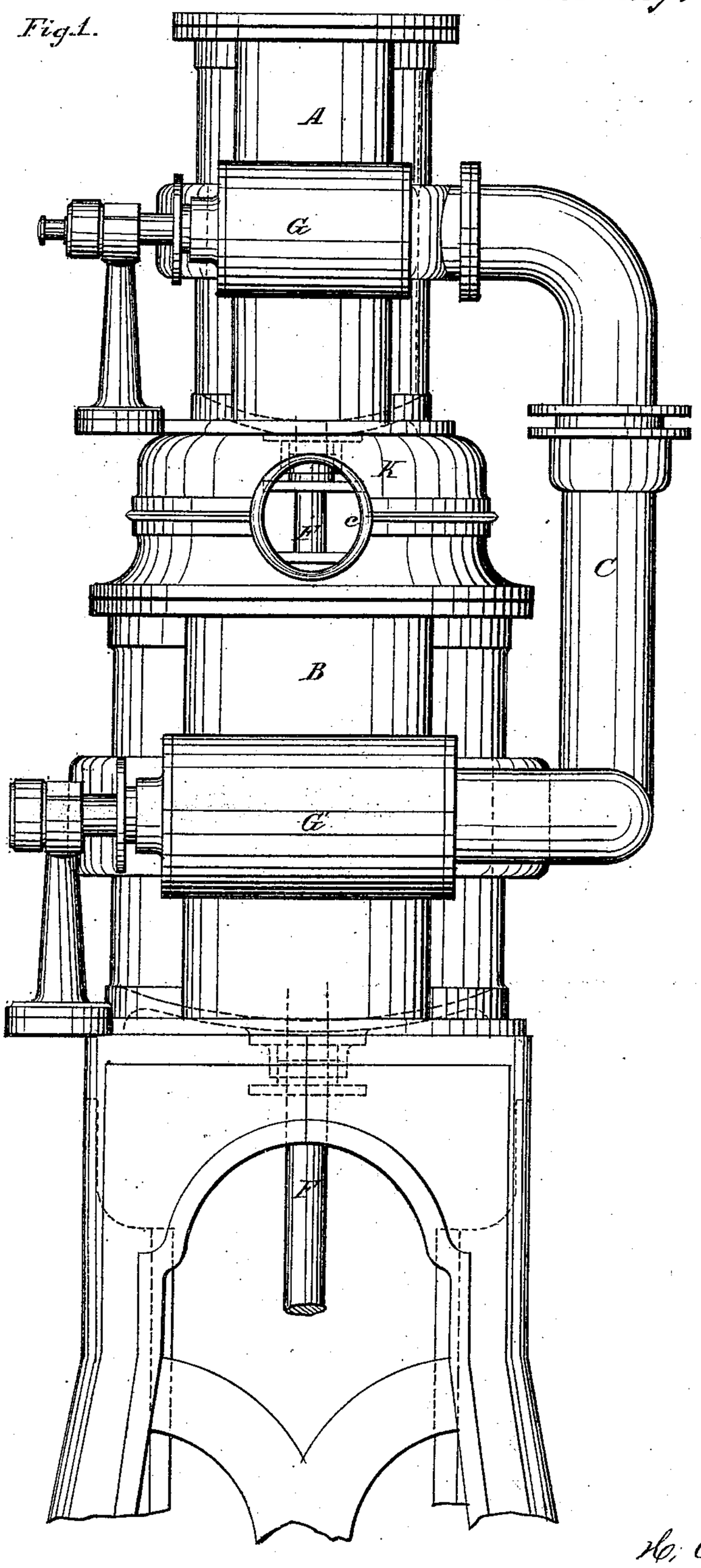
Perry & Lay.

Sheet 1, 3 Sheets.

Steam Engine.

No. 65,003. Patented May 21, 1867.

Fig. 1.



Witnesses

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Sheet 2. 3 Sheets.

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Steam Engine.

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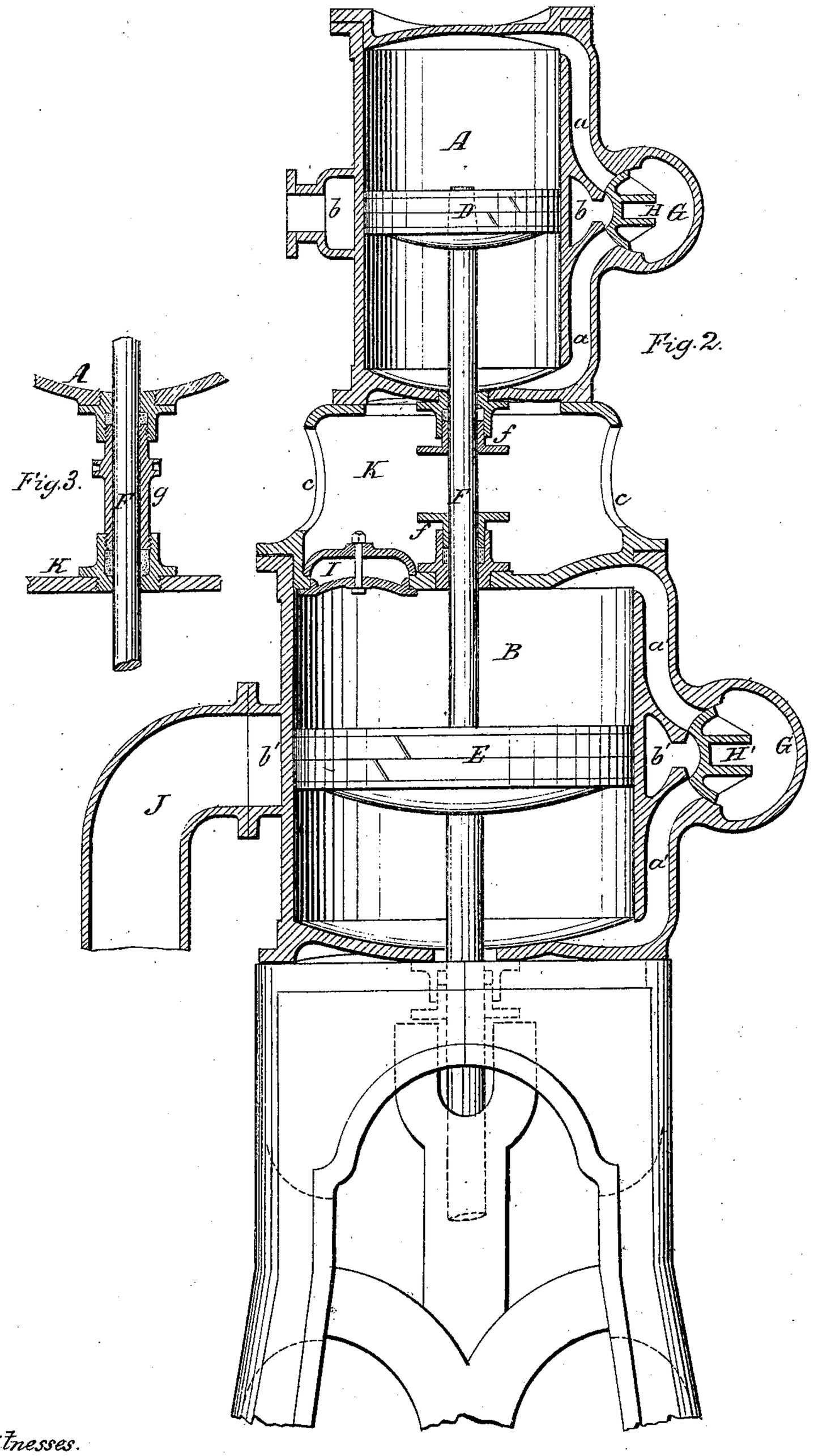

Fig. 2.

Fig. 3.

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Sheet 3, 3 Sheets

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Fig. 4.

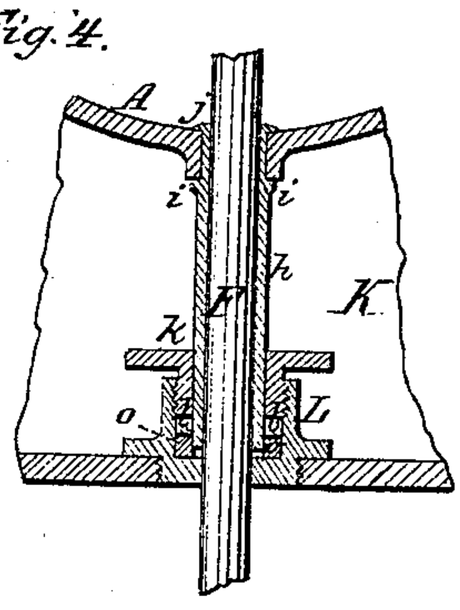


Fig. 5.

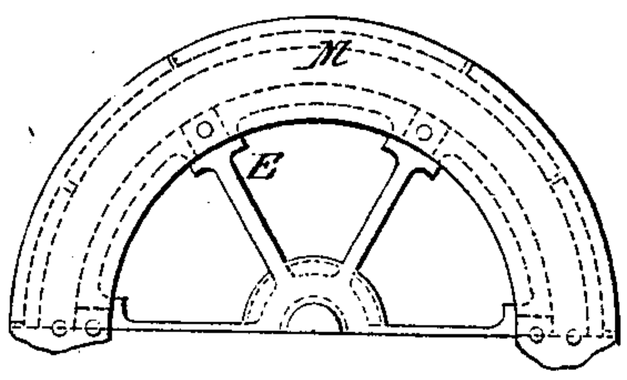


Fig. 7.

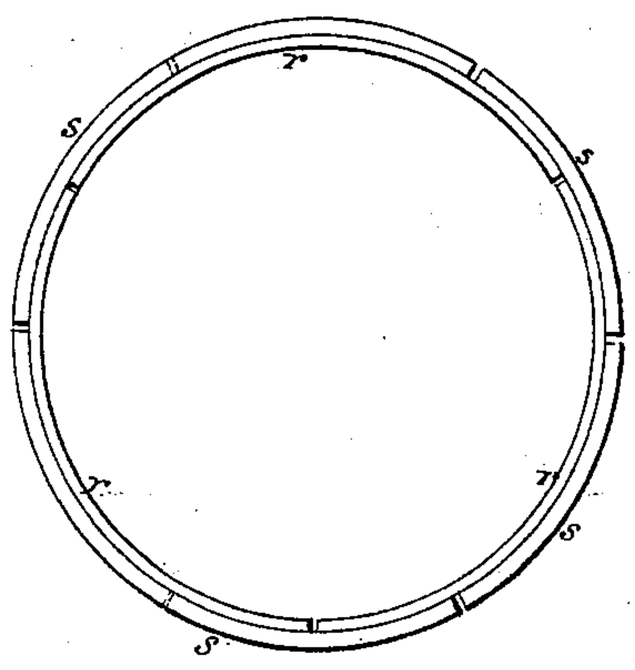


Fig. 6.

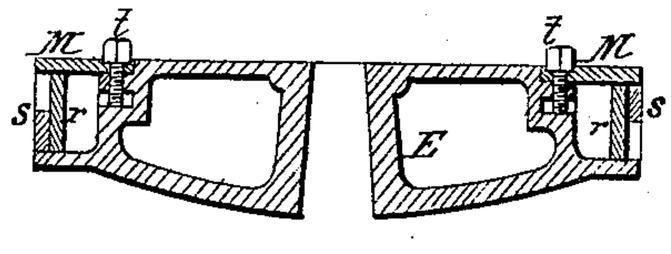
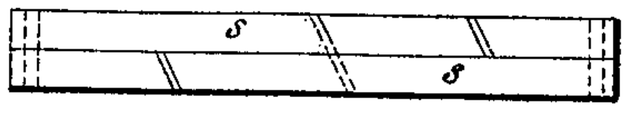


Fig. 8.



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United States Patent Office.

HORATIO O. PERRY AND JOHN L. LAY, OF BUFFALO, NEW YORK.

Letters Patent No. 65,003, *dated May* 21, 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 we, HORATIO O. PERRY and JOHN L. LAY, both of the city of Buffalo, in the county of Erie, and the State of New York, have invented certain new and useful improvements in Marine Steam Engines; and we hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a view in elevation.

Figure 2 is a vertical section.

Figure 3 is a detached view of a modification of the stuffing-boxes for packing the piston between the cylinders.

Figure 4 is a detached view representing a different method of packing the piston-rod, by which one stuffing-box suffices for packing the rod at both cylinders.

Figures 5 and 6 are a plan and section of a portion of the piston, showing the method of applying the packing.

Figures 7 and 8 are a plan and elevation of the packing-rings detached.

Like letters indicate corresponding parts in all the figures.

Our invention relates to that class of vertical engines in which the steam is first used at high pressure, and then exhausted into a low-pressure cylinder, acting in both upon pistons arranged upon the same rod. Hitherto, in some of the engines of this kind, access to the stuffing-boxes in the head or partition dividing the two cylinders has been attended with much difficulty and expense, necessitating the removal of the outer head and piston from one cylinder before the stuffing-box of the inner head could be reached, in fact, involving the stoppage and taking apart of the engine before repacking and ordinary repairs could be effected, and this alone unfitted them for marine purposes. Our invention is designed to obviate this objection as well as in other respects to adapt these engines to the purposes of navigation, especially on lake propellers, where, from the large amount of stowage room required below deck, space for the engine is restricted. It consists in the combination and arrangement of an intervening chamber between the two steam cylinders, whereby the stuffing-boxes are at all times rendered accessible without stopping the engine, and in the construction of a single stuffing-box for packing the rod in the proximate heads of the two cylinders, and also in the combination and arrangement of a man-hole in the bottom plate of said chamber, whereby the packing may be removed without removing the cylinder head; and in other features hereinafter described.

As represented in the drawings, A is the high-pressure cylinder, in which the steam is used direct from the boiler. The exhaust-pipe C from the cylinder leads directly to the valve-chest of the larger cylinder B, in which the steam is employed expansively, acting in both cylinders on pistons D E, affixed to the same rod F. G G′ are the valve-chests, H H′ the valves, *a a′* the induction passages, and *b b′* the exhaust ports, the former communicating by the pipe C with cylinder B, and the latter leading by the pipe J to the condenser. The cylinder K is preferably cast as a shell, having suitable openings, *c c*, for entrance through its sides, its top forming a seat for the base of cylinder A, and its bottom plate formed with a flange for bolting to the sides of the lower cylinder, thereby dispensing with the usual cylinder head. A man-hole, I, with suitable crab and cover, is also provided in the bottom plate, whereby access is readily obtained to the piston E, as will be described. It may, however, be constructed with columns, supporting the upper plate, instead of the enclosed sides, with equally good results. In the chamber K the stuffing-boxes may be constructed in the ordinary method, one for each cylinder, as shown at *f f*, in fig. 2, or as in fig. 3, where a single sleeve, *g*, provided with external screw-thread working in both boxes, forms a gland for both. I prefer, however, the construction shown in fig. 4, in which the sleeve *h* enclosing the piston-rod passes through the lower head of cylinder A, and is connected thereto by means of the shoulder *i* below, and a flange, *j*, turned over above or on the interior of the head, forming a steam-tight joint. The lower extremity of this sleeve extends nearly to the bottom plate of the chamber K, terminating in a stuffing-box, L, therein, and having a ring, *o*, surrounding it below the packing *l*. The gland *k* surrounds the sleeve *h* as well as the piston-rod, and the packing is compressed between it and the ring *o*, which latter is not in contact with the rod, and hence not subject to wear, but intervenes between the steam and packing. The use of this device dispenses with the construction and care of one stuffing-box, and, in connection with the chamber K, simplifies the construction of this part of the engine. The chamber K, by

admitting space in which to use the man-hole plate I, enables us to introduce an improvement in the piston E, by which the packing-rings may be removed and replaced without taking out the piston or removing the cylinder head. We construct the piston with an adjustable follower, consisting of a ring, M, which is bolted to the main casting of the piston, and covers a recess for the packing-rings *r s*. By loosening the bolts *t t* the follower may be raised sufficiently to admit of the removal of the packing-rings *r s*, (which are cut into three or more sections, as shown in figs. 7 and 8,) by hoisting through the man-hole. This is of great importance in cylinders of large diameter in the saving of time and expense. Connected with the exhaust of the high-pressure cylinder is a steam-pipe, O, communicating directly with the boiler, so that when the engine is stopped for reversing, steam may, by opening a valve in this pipe, be admitted into the large cylinder in order to reverse quickly.

Our improvements are particularly adapted to engines used for lake navigation, where compactness and simplicity are demanded, without the sacrifice of power. They are of a character which enables the upright engines now in use on lake propellers and other vessels to be modified to this construction by the addition simply of the casting constituting the chamber K and the high-pressure cylinder A, with its adjuncts, to the present cylinder of those engines.

What we claim as our invention, and desire to secure by Letters Patent, is—

The combination and arrangement of the shell or frame constituting the intervening chamber K with the two cylinders A and B, and continuous piston-rod F, its bottom plate forming the cover of the cylinder B, constructed substantially as and for the purposes herein set forth.

We also claim the stuffing-box, consisting of the sleeve *h* and packing-box L, in combination with the chamber K and piston F and cylinders A B, arranged and operating substantially as and for the purposes set forth.

We further claim the combination and arrangement of the man-hole I with the bottom plate of chamber K, forming the head of the cylinder B, whereby the adjustable ring M and sectional packing-rings *r s* of the piston E may be removed, substantially in the manner and for the purposes herein set forth.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

HORATIO O. PERRY,
JOHN L. LAY.

Witnesses:
JAY HYATT,
ALBERT HAIGHT.