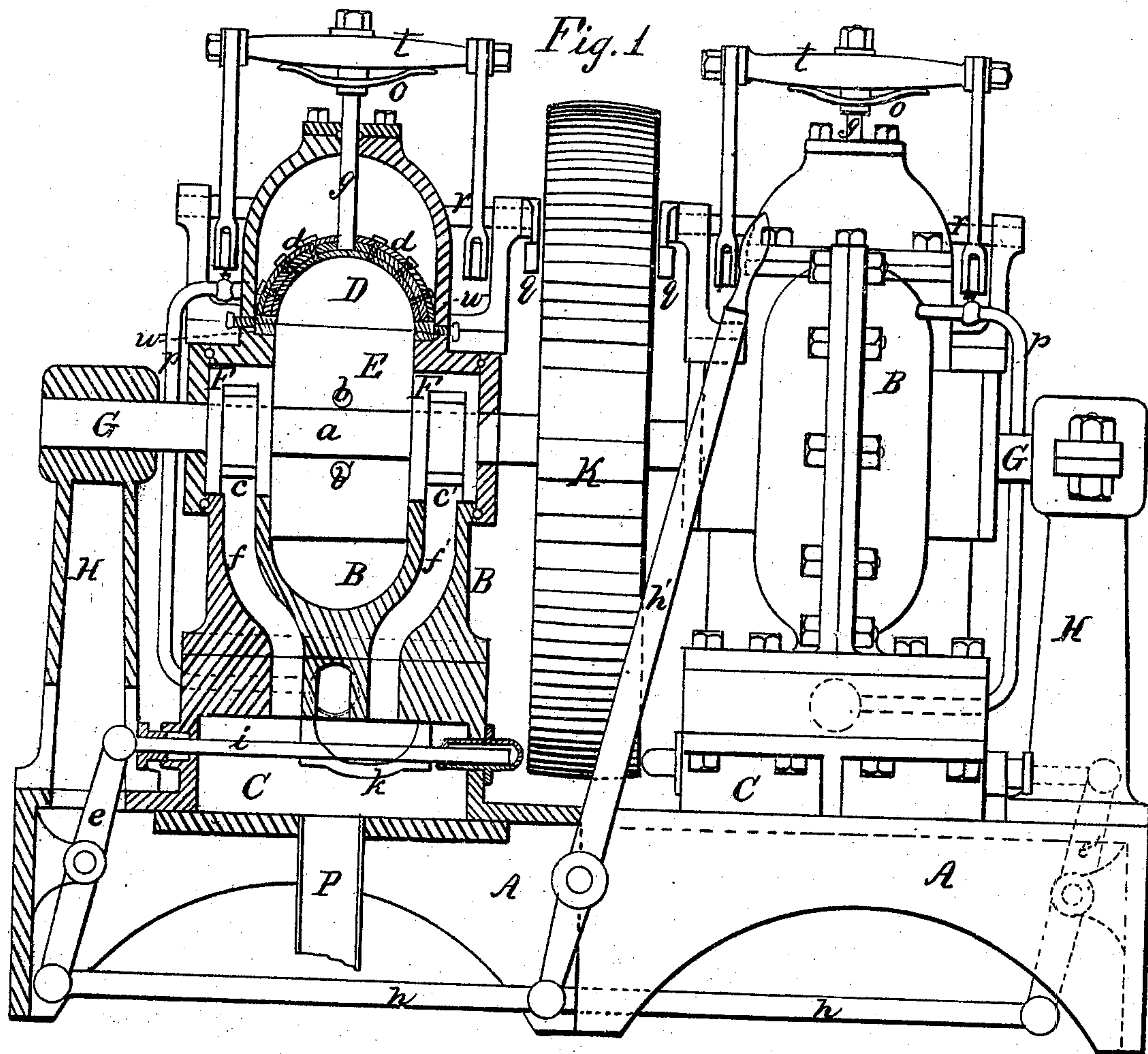


W. H. Holland,
Rotary Steam Engine,
No 66,085, Patented June 25, 1867.



Witnesses:
J. Adams
M. S. G. Wilde

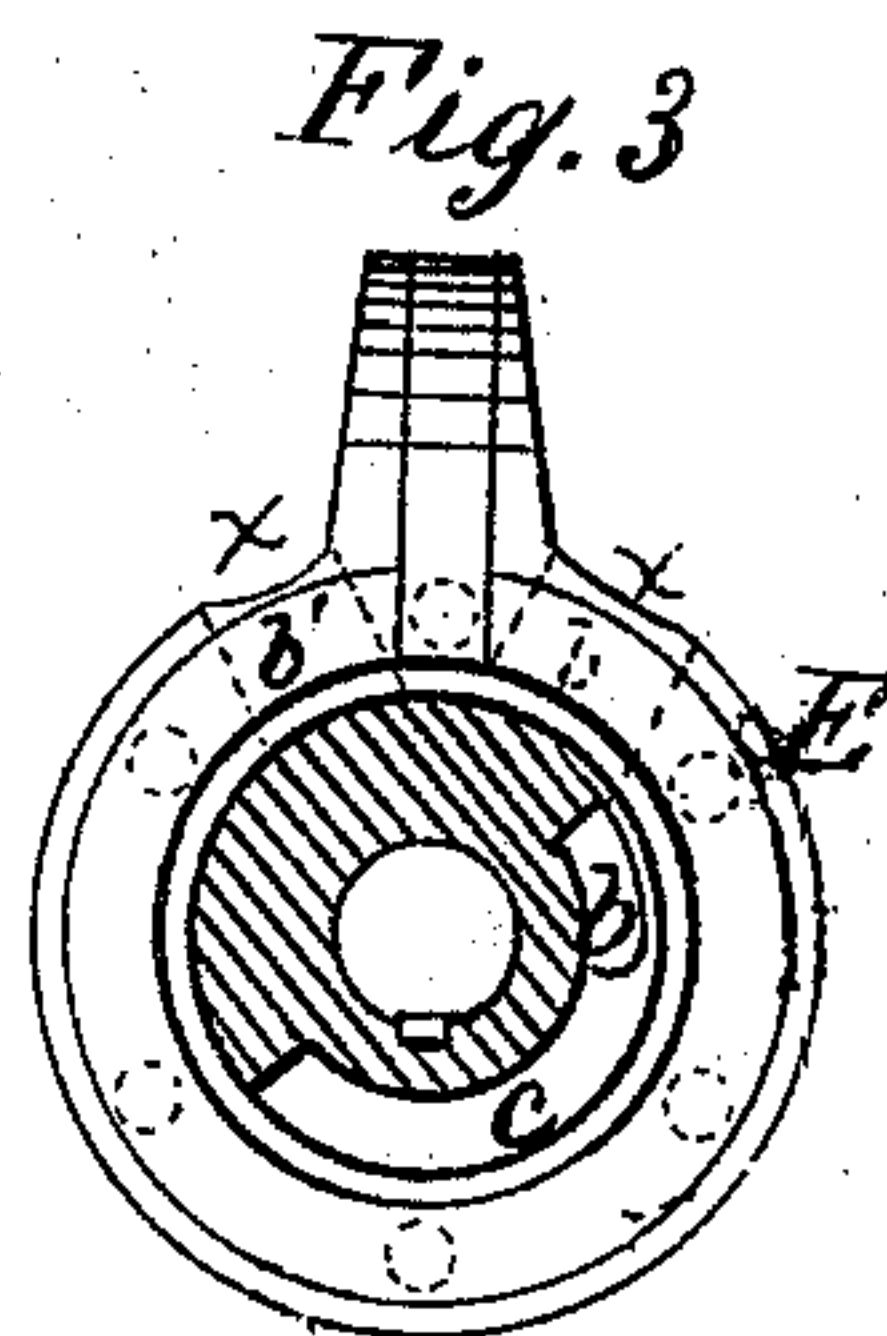
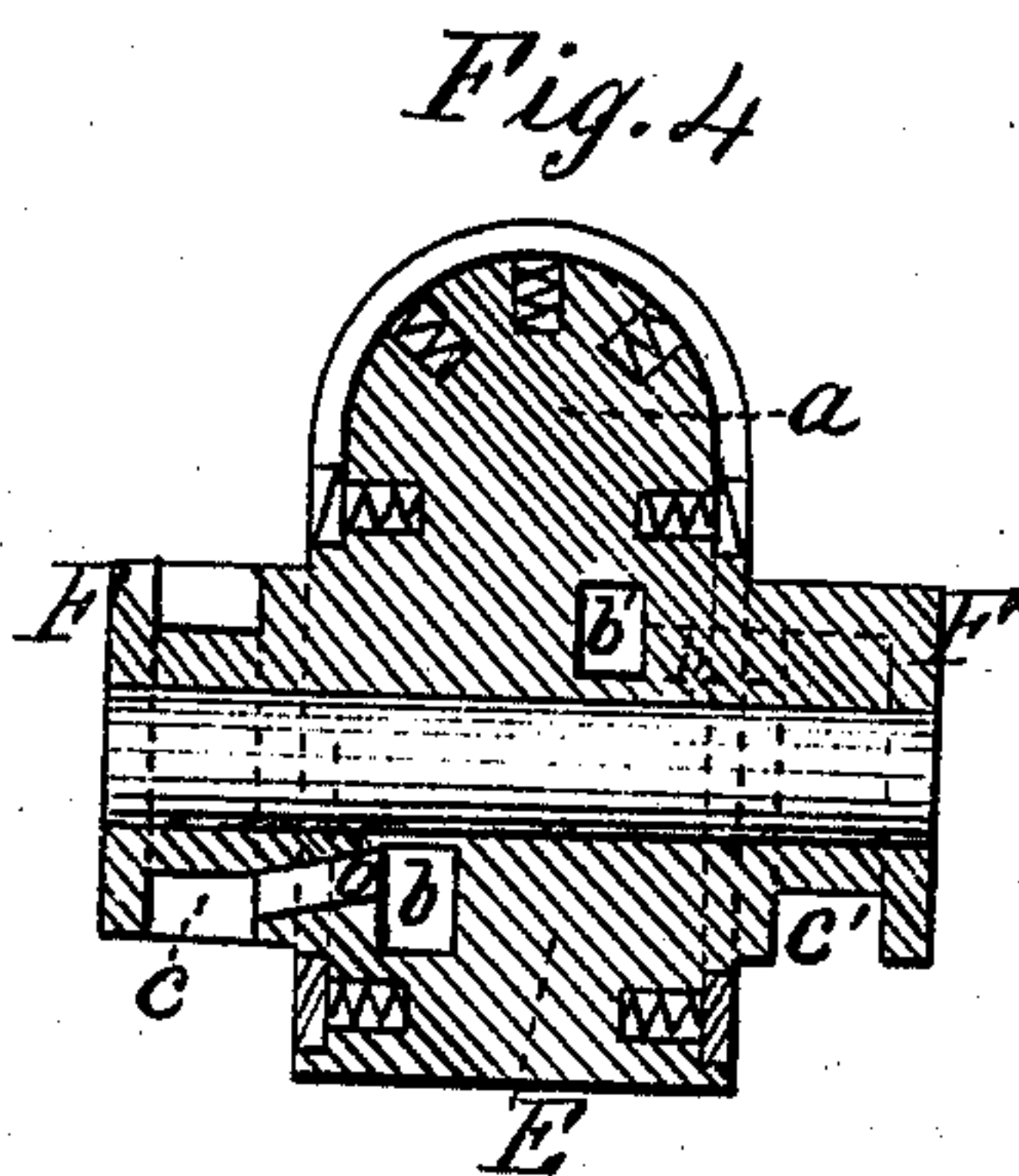
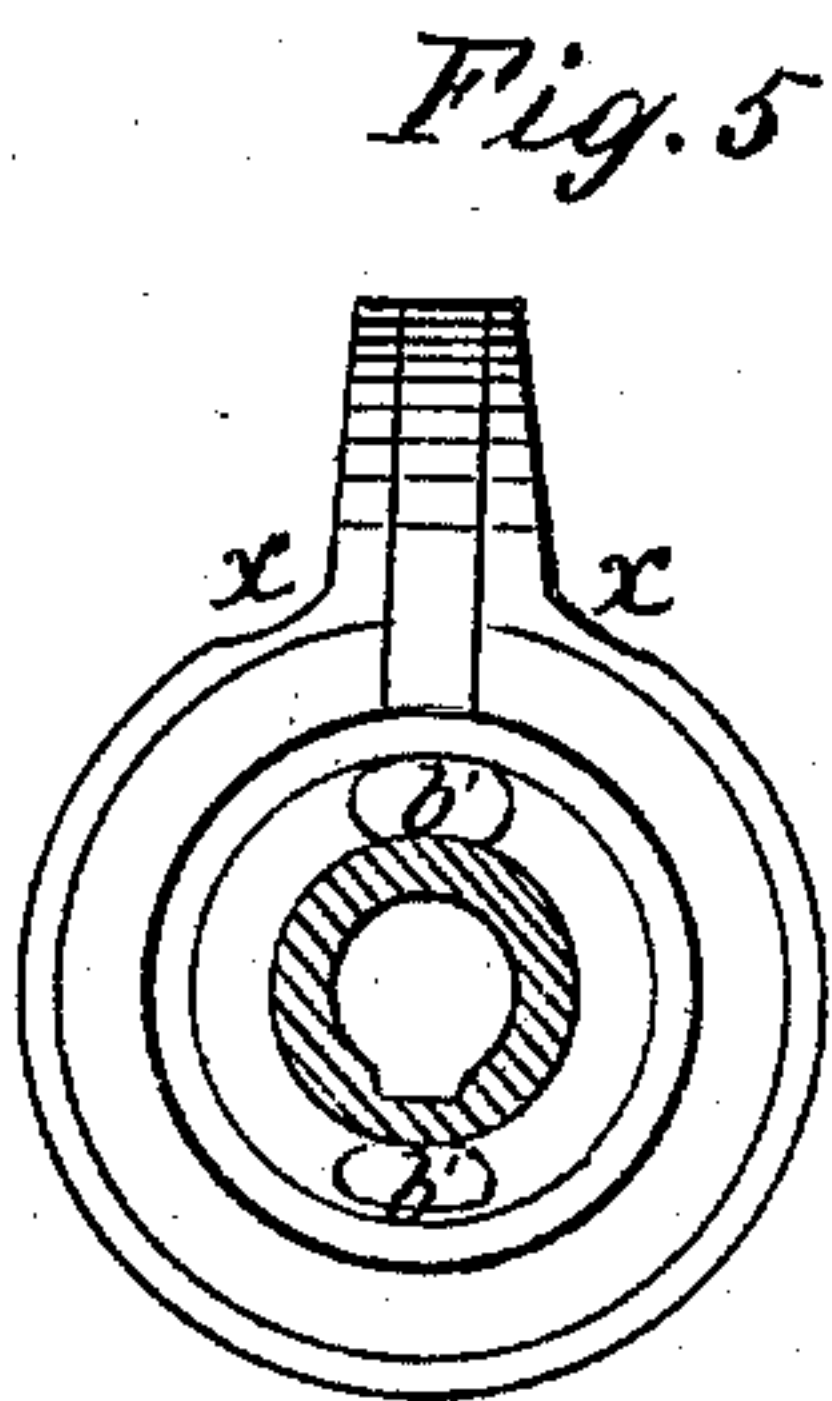
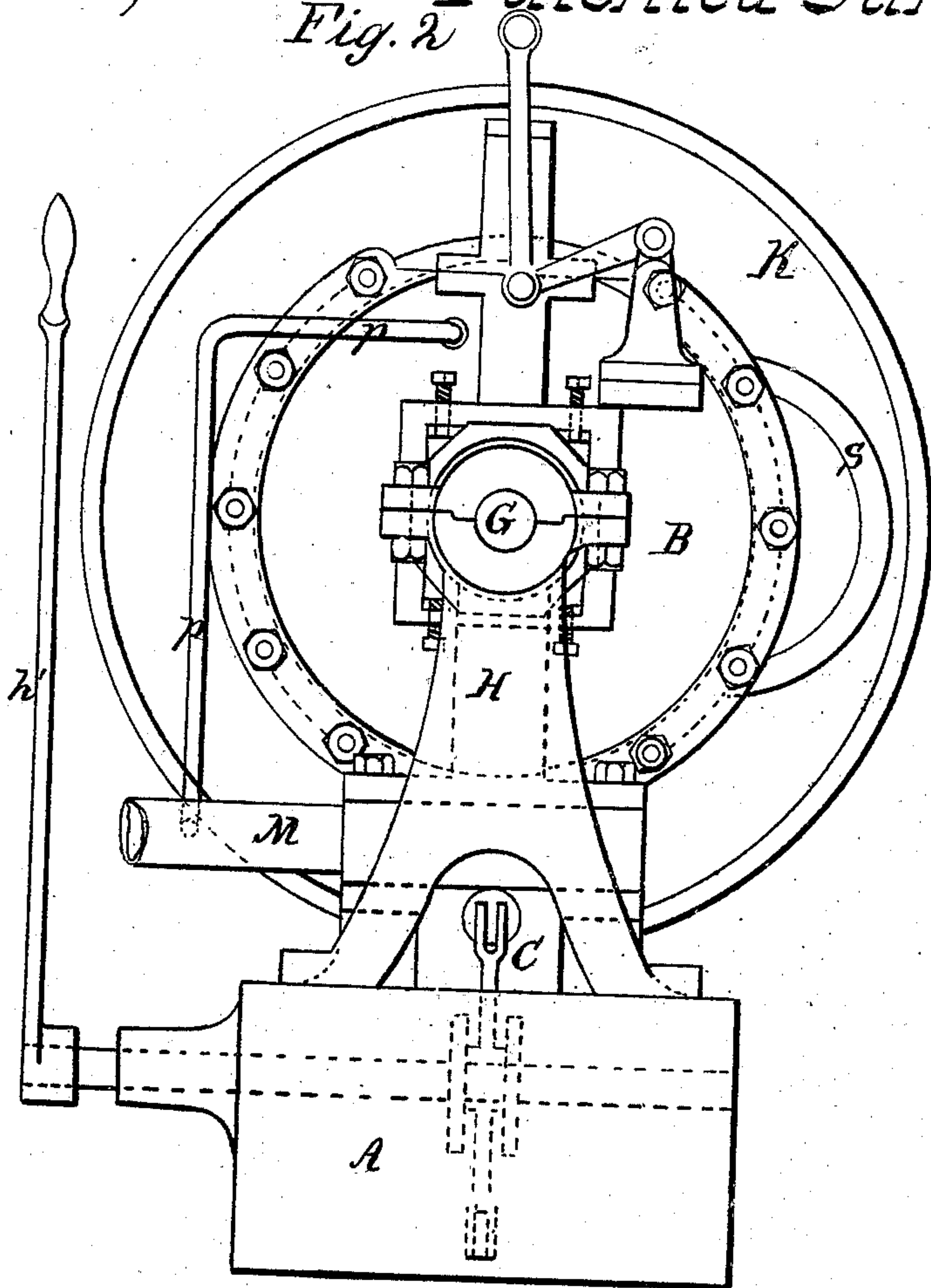
Inventor.
Wm H. Holland.

W. H. Holland,

Rotary Steam Engine

No 66,085,

Patented June 25, 1867.



Witnesses:
J. H. Adams
M. S. G. Wilde.

Inventor.
W. H. Holland.

United States Patent Office.

WILLIAM H. HOLLAND, OF CHELSEA, MASSACHUSETTS.

Letters Patent No. 66,085, dated June 25, 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, WILLIAM H. HOLLAND, of Chelsea, in the county of Suffolk, and State of Massachusetts, have invented a new and useful Improvement in Rotary Steam Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this description, in which—

Figure 1 represents a front elevation of one side of the engine, and a transverse vertical section of the other side of the same.

Figure 2 is an end elevation.

Figure 3 is a transverse section of the journal, and end elevation of the piston of the piston-drum.

Figure 4 is a vertical longitudinal section of the same; and

Figure 5 represents a modification of the same in transverse section.

Similar letters refer to the same parts in the several figures.

My invention consists in a rotary steam engine constructed with two cylinders and their connections, having a fly-wheel, which serves also as a pulley, arranged between them, and on each side of the fly-wheel or pulley is a cam-groove, the two being so arranged in relation to each other as to avoid any dead-point, and cause a constant power to be exerted on the same by the action of the pistons. My invention also consists in the arrangement of the chambered journal of the drums on the outside of the cylinder, so that ready access may be had to the journals or packing. The abutment is packed at its upper part, so that it may be readily got at for repairs or repacking, and also for the purpose of preventing the steam from escaping over the top of the same. On each side of the piston on the drum is a recess or groove extending across the same on a line parallel with the lower edge of the abutment, for the purpose of preventing the abutment from striking against the drum in its descent, and also for packing the same. The cylinders are provided with exhaust valves so arranged as to relieve the abutment of the pressure of the steam before they rise to pass over the piston.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

Referring to the drawings on plates 1 and 2, A, figs. 1 and 2, represents the bed-plate, on each end of which are two standards, H H, which support the main shaft G. B B represent two steam cylinders, and K is a fly-wheel serving also as a pulley. It is secured to the shaft G between the cylinders, and has on each side a cam-groove in which is fitted an arm attached to a rocker-shaft which raises the abutment so as to allow the piston to pass. Within each steam-cylinder is placed a drum, E, which is secured to the shaft G, and carries the piston a, of which it forms a part. The drum is provided with journals, F F', placed outside of the cylinders, and are formed with recesses or chambers, c c', as shown in fig. 4, the latter communicating with passages b b' in the drum. The recesses c c' are so constructed and arranged that at every half revolution steam is conducted to the journals F F' through the passages f f' from the steam-chest C. Within each steam-chest is a valve, k, attached to a rod, i, which is secured to levers e e' at each end of the bed-plate A. These levers are attached to a long connecting-rod, h, which is operated by means of a lever, h', so that the engines may be readily reversed when necessary. D represents the abutment-slide, connected by a rod, g, to the cross-head t, to which motion is imparted through a rocker-shaft, r, and arm, q, working in a cam-groove, s, on each side of the fly-wheel K, by which the abutment is caused to rise in its ways to pass over the piston as the latter revolves. The upper portion of the abutment is provided with a packing of any suitable material, placed between the semicircular top and the segments d d. In the lower edges or ends of the abutment are grooves, in which are fitted small packing pieces, w, and which are arranged in the cylinder so that the space, when the abutment strikes the drum, will always be filled and the abutment be packed. Upon the drum, on each side of the piston, is a groove or depression extending across the same, as shown at x x in fig. 5, for the purpose of preventing the abutment from coming forcibly in contact with the drum, and also acting as a packing for preventing the steam from escaping between the drum and abutment. The chambered journals F F' extend outside of the cylinder B, so as to admit of ready access to the same for repairs or inspection, and also to relieve them of the unequal end pressure and prevent the steam from escaping. Underneath the cross-head t is a spring, o, which serves to pack the abutment and allow it to accommodate itself to the surface of the drum during the revolution of the latter,

thus obviating the use of packing-rings. Attached to the cylinder B, at a point where the piston completes its stroke, is a pipe, *p*, leading directly to the exhaust M, (or it may lead to the atmosphere if desirable,) and is entirely disconnected from the steam-chest. The said pipe *p* being constantly open, serves as an extra exhaust for releasing the abutment. There may be more than one of these pipes to each cylinder, if found desirable. In a marine engine two would be necessary, placed at opposite points from each other.

The operation is as follows: The steam enters the steam-chest C through the steam pipe P, and from there through the passages *f* into the chamber *c* of the journal F; from there it passes through the passage *b* into the cylinder B, just behind the piston *a*, so that after the piston has passed the abutment D the opening of the passage *b* will allow the steam to enter between the piston *a* and the abutment D. In the front part of the piston *a* is the opening to the passage *b'*, which leads to the chamber *c'*, and from there to the passage *f'*, into the valve *k*, and to the exhaust M. After half a revolution of the piston *a* the steam is cut off by the solid part of the journal F, covering the opening to the passage *f*, and the piston *a* is now propelled by the expansion of the steam until it has passed the place where the pipe *p* enters the cylinder, when the steam is allowed to exhaust partially through the pipe *p* for the purpose of releasing the abutment. The cam *q* will then enter the eccentric portion of the guide-curve *s* on fly-wheel K, thus raising the abutment D before the piston *a*, and closing it after the same has passed. By employing two cylinders, and setting the pistons in such a manner that when the one passes the abutment the other is in an opposite position, a regular and steady motion of the engine will be the result, therefore requiring less weight in the fly-wheel or pulley. When it is desired to reverse the motion of the engine, the position of the valve *k* in the steam-chest C is changed so that it will allow the steam to enter the passage *f'*, chamber *c'*, and pass through passage *b'* in the cylinder, while the exhaust steam escapes through the passage *b*, chamber *c*, and passage *f*, into the valve *k*, and thence to the exhaust pipe M. When no reverse motion is required the steam-chest C, valve *k*, and the passages *f f'*, may be omitted, and the steam pipe attached to the bearing of the journal F, so that the steam passes directly into the chamber *c'*, in which case the other journal, F', does not require to be chambered, but, instead of it, is provided with an annular groove, so that the passage from the cylinder to the exhaust is always open. The cylinders are provided with one or more exhaust passages, as shown at *p*, fig. 1, so arranged as to enable the abutment to rise free from the pressure of the steam as the piston passes the exhaust openings. The cock-valves of the exhaust may be opened or closed by means of a hand-lever when it is desired to reverse the motion of the engine, one or the other being always left open, as circumstances require.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The chambered drum E and journals F F', when constructed and operating substantially as described, and for the purpose set forth.
2. I claim the groove or depression *x x* on the drum, on each side of the piston, as and for the purpose described.
3. I claim the arrangement of the packing on the upper portion of the abutment D, as described.
4. I claim the arrangement of the packing-piece *w*, at the bottom of the abutment groove, for the purpose of packing the space between the end of the abutment and the drum E, and also between the drum and the cylinder over the packing-rings, as described.
5. The arrangement of the spring *o* with the abutment D, drum E, and groove or depression *x*, as and for the purpose set forth.
6. The exhaust passage *p*, one or more, placed in the cylinder for the purpose of relieving the abutment of the pressure of the steam just previous to its being raised to allow the piston to pass.
7. I claim the arrangement of the fly-wheel or pulley, provided with cams between the cylinders, as shown.

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

WM. H. HOLLAND.

Witnesses:

J. H. ADAMS,

M. S. G. WILDE.