(No Model.)

J. B. BRAND.

CUT-OFF VALVE.

No. 458,311. Patented Aug. 25, 1891.

Fig. 2.

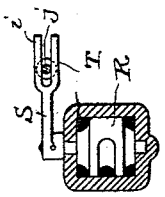
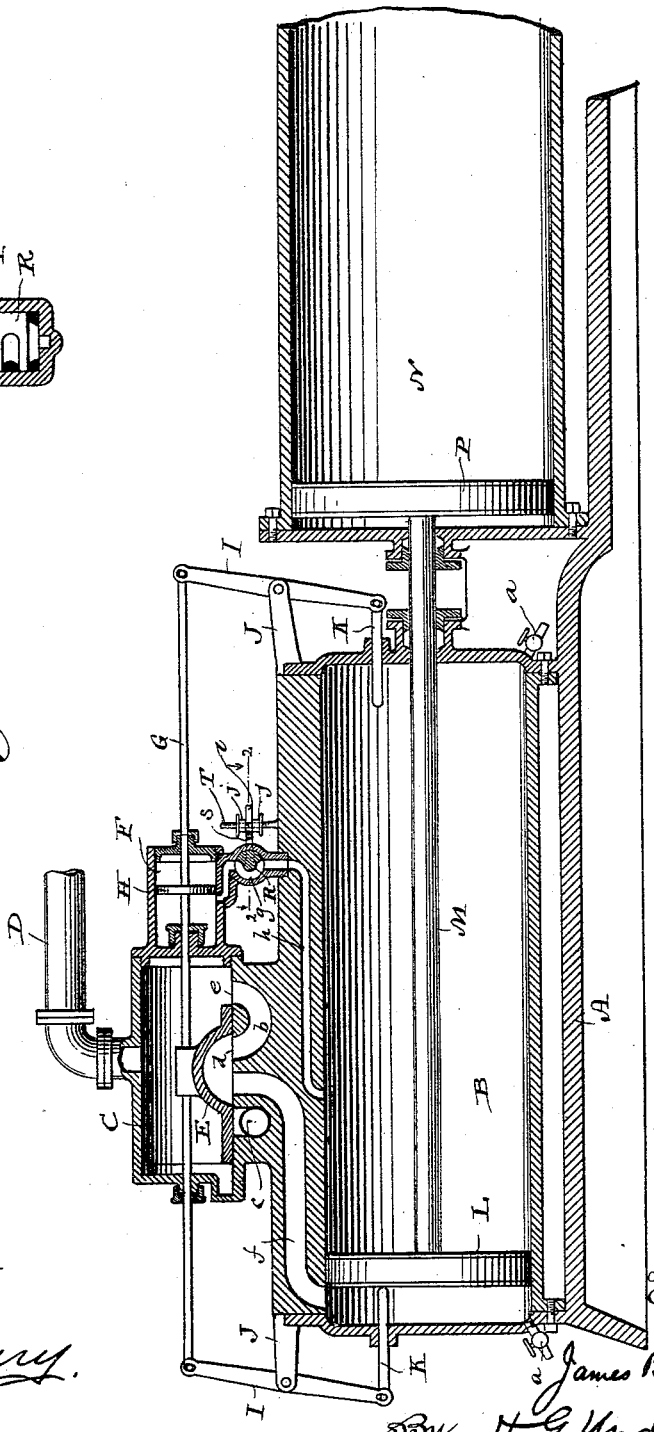


Fig. 1.



Witnesses
Geo. W. Young.
N. E. Oliphant

Inventor
James B. Brand
By H. G. Underwood
Attorneys

UNITED STATES PATENT OFFICE.

JAMES B. BRAND, OF MILWAUKEE, WISCONSIN.

CUT-OFF VALVE.

SPECIFICATION forming part of Letters Patent No. 458,311, dated August 25, 1891.

Application filed October 29, 1890. Serial No. 369,718. (No model.)

To all whom it may concern:

Be it known that I, JAMES B. BRAND, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Cut-Off Valves; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention consists in certain peculiarities of construction and combination of parts whereby I have improved the means for utilizing steam or other expansive fluid, and more particularly in connection with the mechanism shown and described in my application, Serial No. 366,466, for patent for improvements in marine propulsion, filed September 29, 1890, as will be hereinafter more fully described with reference to the accompanying drawings, and subsequently claimed.

In the drawings, Figure 1 represents a vertical longitudinal section through certain parts of the mechanism employed in carrying out my present invention, the remainder of said parts being shown in side elevation; and Fig. 2, a horizontal section on line 2 2 of the preceding figure.

Referring by letter to the drawings, A represents a base, on which is supported a horizontal cylinder B, having leak-cocks *a* in its heads, and this cylinder is provided with a chest C, having a pipe D, that communicates with a steam-boiler (not shown) or other source of expansive fluid-supply. Arranged in the chest C is an arched slide-valve E, that controls two ports *b c*, the first of these ports having both its ends *d e* in communication with said chest on one side of a channel *f*, the latter leading to the cylinder B of the engine, and the other of said ports on the opposite side of the channel serves as an outlet for the exhaust from said cylinder, whereby it will be seen that the engine (illustrated in the drawings and to be hereinafter more fully described) is of the class generally termed "single-acting," this being the type of engine best adapted for use in connection with the mechanism set forth in my previous application above named.

Leading from a chamber F, at one end of chest C, is a passage *g*, that communicates with a horizontal channel *h* in the cylinder B, and the rod G of the slide-valve E extends through said chamber and chest. Fast on the valve-rod G within the chamber F is a piston H, that is normally on that side of the passage *g* leading to the channel *h* in the cylinder B, and the ends of said valve-rod connect with links I, pivoted to brackets J at the extremities of said cylinder. Attached to the links I are pins K, that extend through the heads of the cylinder B to come in the path of a piston L therein, this piston being provided with a rod M, that passes through the rear head of said cylinder and enters the closed inner end of a reservoir N, the latter being in line with the aforesaid cylinder and having its outer end extended through the hull of a marine vessel (as shown in my previous application) into the surrounding sea. That end of the rod I within the reservoir N carries a piston P, and thus when the expansive fluid is acting against the piston L in the cylinder B the piston P is pushing against the resistance of the volume of water in said reservoir as well as against the resistance of the sea and surrounding atmosphere to propel the vessel provided with the mechanism herein described.

Trunnioned in the passage *g* that leads from the chamber F to the channel *h* in the cylinder B is a circular valve R, the latter being best illustrated by Fig. 2, and to one of the valve-trunnions I rigidly secure a lever S, having a forked outer end *i* engaging a screw-threaded stem T, that projects up from the cylinder B, and is provided with check-nuts *j*, opposed to the upper and lower sides of said forked end of the lever. By adjusting the check-nuts *j* on the stem T the lever S is raised or lowered, and thus the valve R is actuated to regulate the admission of expansive fluid to the chamber F, above described.

The normal position of all the parts are shown in Fig. 1, and consequently expansive fluid passes from the chest C through the port *b* under the arch of the slide-valve E and through the channel *f* into the cylinder B behind the piston L, the exhaust-port *c* of said cylinder being closed by the adjacent portion of said slide-valve. The piston L on its forward stroke passes that end of the channel *h* that opens into the bore of the cylinder, and thus some of the expansive fluid in rear

of said piston finds its way through said channel and the passage *g* into the chamber F to exert force against the piston H therein, whereby the rod G is moved forward and the slide-valve E thereon is brought into position to close the end *e* of the port *b* in the chest C, the dimensions of said valve being such that the exhaust-port *c* of the aforesaid chest is not uncovered by the operation just described. The forward stroke of the piston L in the cylinder B is continued by the expansion of the fluid in rear thereof, the amount of this fluid necessary to this operation being determined by the position of the rotary adjustable valve R in the passage *g*, it being obvious that the movement of the slide-valve E will take place sooner or later in proportion as the expansive fluid is admitted to the chamber F, that incloses the piston H on the rod G of said slide-valve. As the piston L is completing its forward stroke, it strikes the pin K, extended through the front head of the cylinder B, and thus the link J, attached to said pin, is swung on its pivot to throw the rod G to the rear, and thereby cause the slide-valve E to uncover the exhaust-port *c* of the chest C to the cylinder-channel *f* and to also close the end *d* of the port *b* in said chest.

In that application of my invention herein described the flow of water into the reservoir N against the piston P is depended upon to drive the piston H on its back-stroke or recover, and in its movement the latter piston comes against the pin K, extended through the rear head of the cylinder B, whereby the pivoted link J, connected to said pin, is actuated and the slide-valve rod G and its connections returned to their normal position.

As is common with single-acting engines of various kinds, the main piston may be moved on its recover by any suitable means, and while I have described my invention as being preferably employed in connection with the mechanism shown and described in my previous application, I do not wish to be understood as limiting myself thereto.

So far as concerns the showing and description of a marine vessel, combined with a reservoir longitudinally arranged therein to extend into the surrounding sea, a piston arranged within the reservoir, a single-acting engine in line with the reservoir and connected to a source of expansive fluid, the engine-piston having a rod connection with the reservoir-piston, links connected to the valve-rod of the engine, and pins extended from the links to come in the path of said engine-piston on opposite sides of the latter, the same combination is shown, described, and claimed in my said previous application now pending, and hence a claim covering exactly the same ground is not made herein.

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

1. In an engine operated by expansive fluid, the combination of a cylinder, its piston and chest, a chamber in line with the chest and communicating with the bore of the cylinder, a slide-valve arranged in said chest to control the inlet and exhaust of said cylinder, a rod fast to the valve and extended through the aforesaid chest and chamber, a piston on the rod within the chamber, pins extended through the cylinder-heads to come in the path of the main piston, and pivotal links connecting the pins and valve-rod, substantially as set forth.

2. In an engine operated by expansive fluid, the combination of a cylinder, its piston and chest, a chamber in line with the chest, a channel leading from the bore of the cylinder, a passage connecting the channel and bore of the chamber, a valve adjustable in the passage, a slide-valve arranged in said chest to control the inlet and exhaust of said cylinder, a rod fast to the valve and extended through the aforesaid chest and chamber, a piston on the rod within said chamber, pins extended through the cylinder-heads to come in the path of the main piston, and pivotal links connecting the pins and valve-rod, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand, at Milwaukee, in the county of Milwaukee and State of Wisconsin, in the presence of two witnesses.

JAMES B. BRAND.

Witnesses:
N. E. OLIPHANT,
ARTHUR L. PETICOLAS.