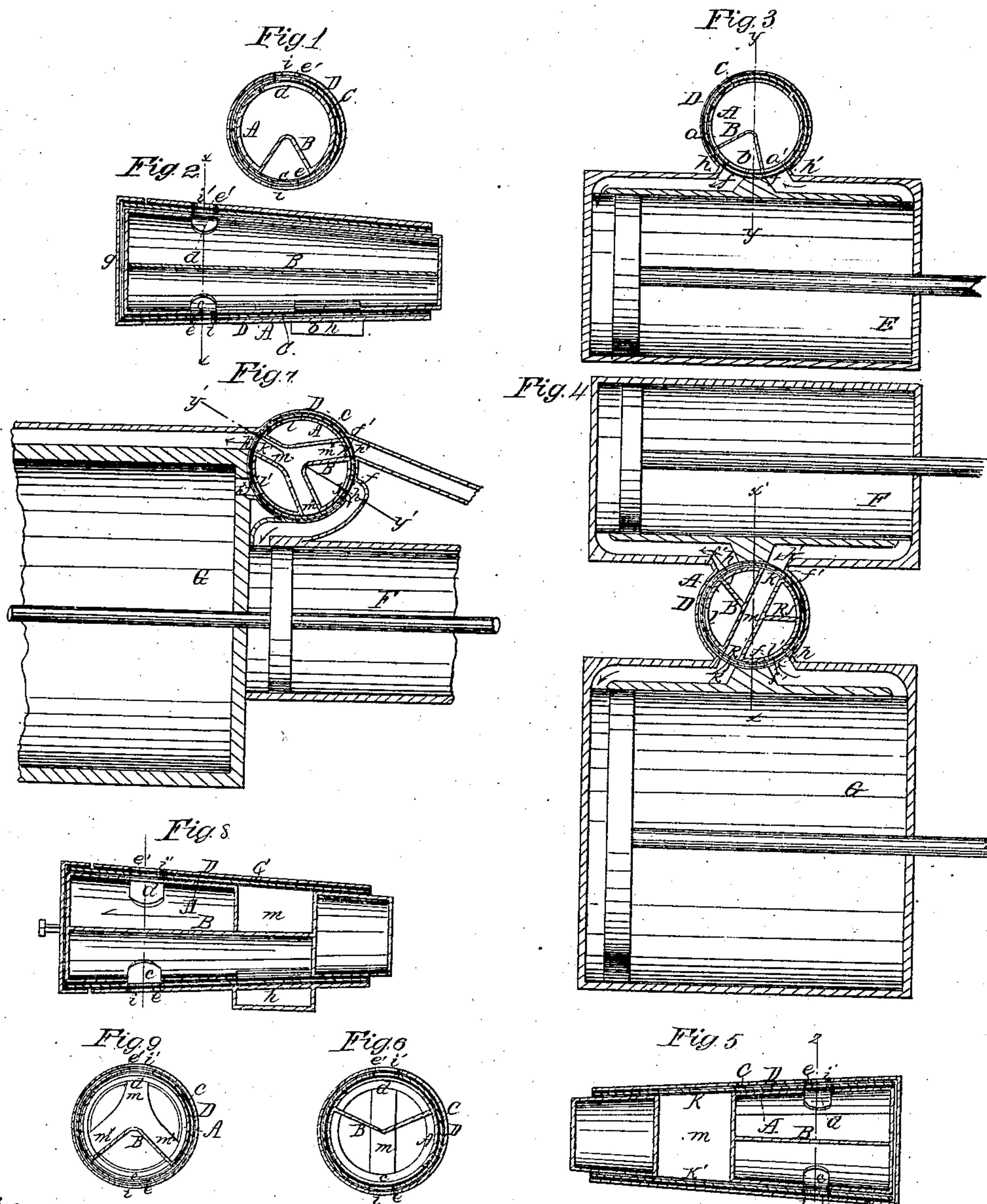


J. L. Mackey,
Rotary Steam Valve.

N^o 60,638.

Patented Dec. 18, 1866.



Witnesses
Gal. A. Service
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United States Patent Office.

IMPROVEMENT IN ROTARY STEAM VALVES.

JAMES L. MACKEY, OF SEYMOUR, INDIANA.

Letters Patent No. 60,638, dated December 18, 1866.

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, JAMES L. MACKEY, of Seymour, in the county of Jackson, and State of Indiana, have invented a new and useful Improvement in Steam Valves; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a transverse section of this invention as applicable to a single cylinder, the plane of section being indicated by the line *x x*, fig. 2.

Figure 2 is a longitudinal central section of the same taken in the plane indicated by the line *y y*, fig. 3.

Figure 3 is a transverse section of the valve, showing its application to a steam cylinder.

Figure 4 is a similar section of my valve when the same is adapted to a double cylinder Woolf engine.

Figure 5 is a longitudinal central section of the same, the line *x x'*, fig. 4, indicating the plane of section.

Figure 6 is a transverse section of the same, the plane of section being indicated by the line *z z*, fig. 5.

Figure 7 is a transverse section of a modification of my valve when applied to a double-cylinder engine.

Figure 8 is a longitudinal central section of the same, the line *y' y'*, fig. 7, indicating the plane of section.

Figure 9 is a transverse section of the same, taken in the plane indicated by the line *z' z'*, fig. 8.

Similar letters of reference indicate corresponding parts.

This invention relates to a balance conical valve which is applicable to a single or double-cylinder engine, and which is composed of a hollow movable plug working in a sleeve which is fitted into a suitable shell, that is cast solid with or otherwise rigidly attached to the steam cylinder, the plug valve, the sleeve, and the shell being provided with suitable steam exhaust ports in such a manner that by giving to the plug valve an oscillating motion, the steam is alternately admitted to either end of the cylinder and the desired reciprocating motion is imparted to the piston.

In its simplest form, when made for a single-cylinder engine, my valve consists of a hollow conical plug, A, with a V-shaped partition, B, and with five ports, *a a' b c d*. This plug is closed at both ends and ground airtight. A sleeve, C, which is provided with four apertures, *e e' f' f*, and with a cap, *g*, through which a set-screw may be introduced, such as shown in fig. 8, to keep the plug in its seat. The sleeve, C, is fitted into the shell, D, which is cast solid with or otherwise, rigidly attached to the steam cylinder, E. From this shell extend channels, *h h'*, to the opposite ends of the cylinder, and it is provided with two other apertures, *i i'*, one of which communicates with the steam supply and the other with the exhaust pipe. The sleeve, C, is so adjusted in the shell, D, that the apertures, *h h'*, correspond with the apertures, *f f'*, as shown in fig. 3, and the apertures, *i i'*, with the apertures, *e e'*, as shown in figs. 1 and 2, and the plug A extends through the thin end of the sleeve and shell, and in practice it must be provided with a lever by means of which it can be turned so as to bring the aperture, *b*, alternately to coincide with the apertures *f h*, in the sleeve and shell, and then with the apertures *f' h'*. At the same time the apertures *c d*, in the plug, cover the apertures *e i e' i'*, in the sleeve and shell, (see figs. 1 and 2,) and said apertures *c d* are made oblong so that the plug can be oscillated without covering either of said apertures. If the aperture, *b*, in the plug coincides with the channel, *h*, (see fig. 3,) the aperture, *a'*, coincides with the channel, *h'*, and steam enters the cylinder and exhausts therefrom, as indicated by the arrows in fig. 3. If the plug is turned so as to bring the aperture, *b*, to coincide with the channel, *h'*, the aperture, *a*, coincides with the channel, *h*, and the steam is reversed. By admitting the steam under the V-shaped partition, B, all unequal or one-sided strain on the plug is avoided, and said plug is made to operate easy under any pressure; and furthermore, by introducing the sleeve, C, between the plug and the shell, the seat of the plug is made movable, so that it can be readily bored out and the valve fitted in, even if the shell, D, should be cast solid with the steam cylinder; and if the plug requires to be refitted the operation is rendered comparatively easy.

If my valve is to be applied to a Woolf engine, with two cylinders of unequal diameters, the steam being first introduced into the small cylinder, and as it exhausts from the same into the large cylinder, it is constructed either in the manner shown in figs. 4, 5, and 6, or in the manner shown in figs. 7, 8, and 9. In the valve shown in figs. 4, 5, and 6, the plug A, V-shaped partition B, sleeve C, and shell D, are like the corresponding parts previously described, but the plug A is provided with eight apertures, *j j' k l l' k' c d*, the apertures *j j' k*, being

on the concave, and the apertures $l k l' c$ on the convex side of the V-shaped partition B. The apertures $k k'$ communicate by a channel, m , which passes through the V-shaped partition B. The sleeve C and shell D are each provided with six apertures, $f f' f'' f''' e e'$, in the shell D, and $h h' h'' h''' i i'$, in the shell. The apertures $i' e'$, connect with the steam supply pipe, and the apertures $e i$ with the exhaust pipe, and the apertures $c d$ in the plug are oblong to allow of imparting to said plug an oscillating motion, without closing the communication with the steam and exhaust pipes. The apertures $h h'$ in the shell communicate with the opposite ends of the small cylinder F, and the channels $h'' h'''$, with the ends of the large cylinder G. If the plug is turned so that the aperture j in the same coincides with the apertures $f h$, in the sleeve and shell, the aperture k will coincide with the apertures $f' h'$, and the steam enters the small cylinder as shown in fig. 4. At the same time the aperture k' coincides with the apertures $f'' h''$, and the aperture l' with the apertures $f''' h'''$, and the steam exhausting from the small cylinder passes through the channels m and $h'' h'''$, and apertures $f'' f''' l'$, as indicated by arrows in fig. 4. If the valve is turned so as to bring the channel k to coincide with the apertures $f h$, the steam is reversed. If the two cylinders F G, instead of being placed side by side, as shown in fig. 4, are placed end to end, as shown in fig. 7, the arrangement of the valve is such as shown in figs. 7, 8, and 9. The channel m , instead of passing through the V-shaped partition, divaricates and straddles the same, and connects through channels h or h' , with the opposite ends of the small cylinder F, and through channels h'' or h''' , with the opposite ends of the large cylinder G. In the position in which the valve is shown in fig. 7, the steam enters the small cylinder through the channel h , and it exhausts from the same through the channels $h' m'' m h''$, into the large cylinder from which it exhausts through the channel h'' , and through the valve into the exhaust channel d . It will be noticed that in all three cases which I have described, the steam enters my valve at the concave side of the partition B, and it exhausts therefrom at the convex side. The additional channels and openings shown in figs. 4 to 9, are necessitated only if the valve is to be used with two cylinders. The sleeve is provided with a cap, so that access can be had to the interior of the valves for the purpose of lubrication.

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

1. The valve A, with a V-shaped partition B, and apertures $c d a a' b$, in combination with the sleeve C, and shell D, constructed and operating substantially as and for the purpose described.
2. The transverse channel m , in combination with the hollow plug-valve A, V-shaped partition B, and with apertures $j j' k k' l l' c d$, substantially as and for the purpose set forth.

Witnesses:

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