

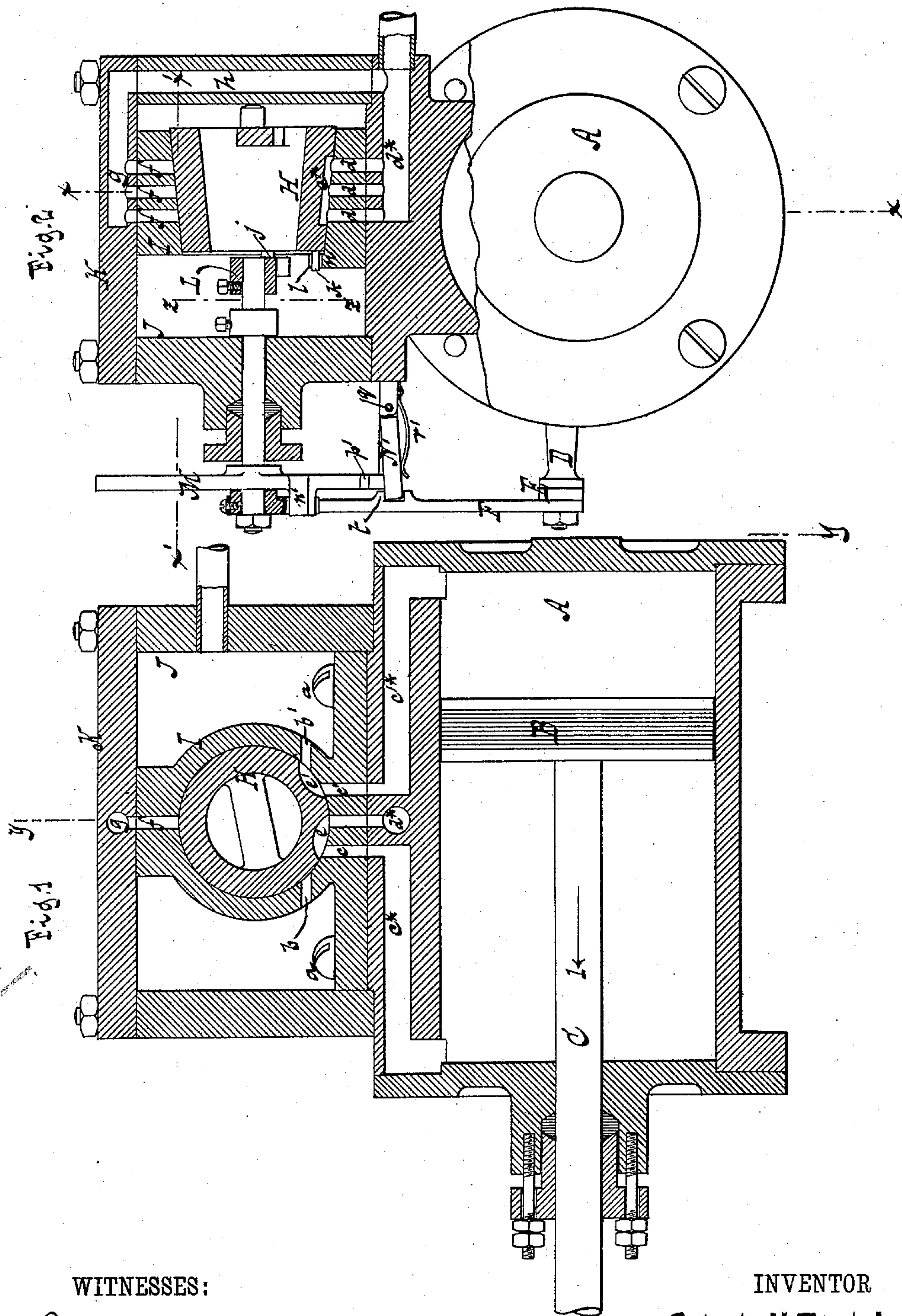
(No Model.)

2 Sheets—Sheet 1.

R. H. FLETCHER.
VALVE GEAR.

No. 286,803.

Patented Oct. 16, 1883.



WITNESSES:

Edw. Hufeland
William Miller

INVENTOR

Robert H. Fletcher

BY *Van Santvoord & Hauck*
ATTORNEYS

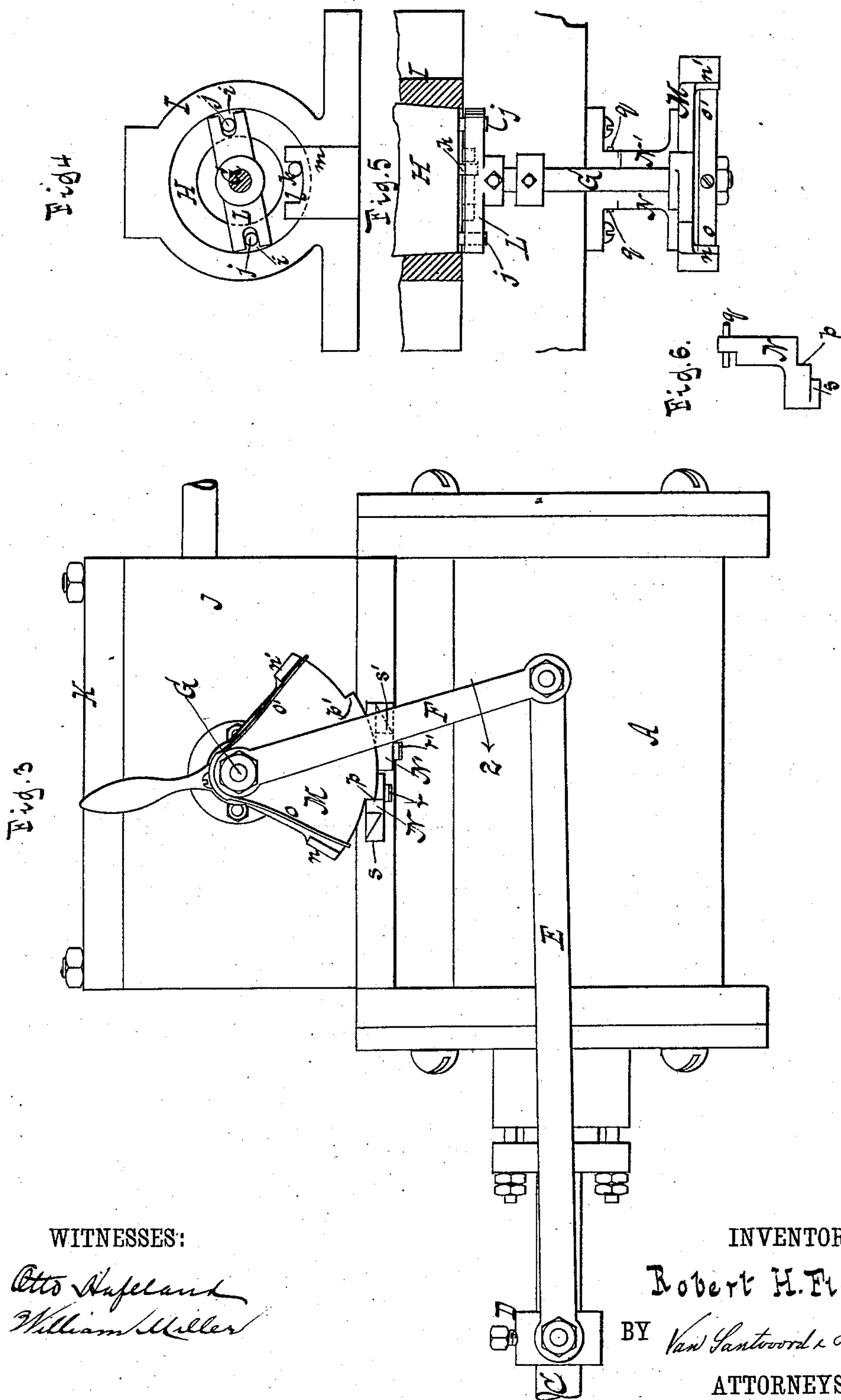
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UNITED STATES PATENT OFFICE.

ROBERT H. FLETCHER, OF BROOKLYN, NEW YORK.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 286,803, dated October 16, 1883.

Application filed April 12, 1883. (No model.)

To all whom it may concern:

Be it known that I, ROBERT H. FLETCHER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Valve-Gears, of which the following is a specification.

This invention relates to a valve-gear which is intended particularly for direct-acting steam-engines or steam-pumps. The peculiar and novel construction of my valve-gear is pointed out in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal central section in the plane $x x$, Fig. 2. Fig. 2 is a transverse vertical section in the plane $y y$, Fig. 1. Fig. 3 is a side elevation. Fig. 4 is a vertical section in the plane $z z$, Fig. 2. Fig. 5 is a horizontal section in the plane $x' x'$, Fig. 2. Fig. 6 is a plan of one of the latches described.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates a steam-cylinder, in which works the piston B. C is the piston-rod, on which is firmly secured an arm, D, which connects by a rod, E, with a lever, F, that swings loosely upon the spindle G, which serves to transmit motion to the valve H. This valve is made in the shape of a hollow conical plug, and it works in a shell, I, situated in the steam-chest J, and fastened on the bottom of this steam-chest by screws a or other suitable means. In the side of the shell I are ports $b b'$, Fig. 1, and in its bottom are ports $c c' d$, which correspond with and form continuations of the steam-ports $c^* c'^*$, and the exhaust-port d^* in the bottom of the steam-chest. The shell I is provided with two cavities, $e e'$, each of such an extent that it can cover two of the ports $b b' c c' d$, respectively. In the position which the valve occupies in Fig. 1—for instance, the cavity e covers the ports $c d$, and the cavity e' the ports $c' d'$ —steam is admitted behind the piston B, which moves in the direction of arrow 1, and the steam before the piston exhausts. If the valve H is changed, so that the cavity e covers the ports $b e$, and the cavity e' the ports $c' d$, the motion is reversed. If desired, the ports $b b' c c' d$ may be so located in relation to each other that it requires three cavities in the valve to produce the desired change of steam, and

in that case the two outside cavities control the admission of steam to the steam-cylinder, and the central cavity controls the exhaust. 55

By referring to Figs. 1 and 2 of the drawings it will be seen that the valve H is balanced, as far as the pressure of the live steam is concerned; but I have balanced my valve also in regard to the pressure of the exhaust by the following means: The shell I, which forms the seat of the valve, bears close against the inner surface of the cover K of the steam-chest, and it is provided with one or more openings, f , which communicate by means of a channel, g , in the cover K with a channel, h , in the side of the steam-chest, which leads into the exhaust-channel d^* . The combined area of the opening or openings f in the top of the shell J is equal to the combined area of the opening or openings d in the bottom of said shell, so that the upward pressure exerted by the exhaust-steam upon the valve is counterbalanced by the downward pressure through the channels $h g$ and openings f . 60 65 70 75

The spindle G has its bearing in the side of the steam-chest, and on its inner end is mounted a double-armed lever, L, provided in its ends with recesses i , which engage with pins j , projecting from the valve. (See Fig. 4.) In the valve is also secured a pin, k , which engages with a recess, l , formed in a lug, m , extending upward from the shell I, so that the valve cannot be turned beyond the desired limits. As already stated, the lever F swings loosely on the spindle G, and inside of this lever is situated a segment, M, which is firmly secured on the spindle. This segment is provided with two ears, $n n'$, which are exposed to the action of a double-armed spring, $o o'$, which is firmly secured to the lever F. If desired, two separate springs may be used without deviating from my invention. On the bottom edge of the segment M are formed two shoulders, $p p'$, which co-operate with latches N N', swinging on pivots q , Fig. 2, and exposed to the action of springs $r r'$, which have a tendency to force the same upward. On the outer ends of these latches are formed inclined planes $s s'$, which are acted upon by a toe, t , projecting from the inner surface of the lever F, Fig. 2. In the position which the parts occupy in the drawings, the latch N' is depressed by the toe of lever F, and the shoulder p of the segment 80 85 90 95 100

M bears against the inner edge of the latch N, so that the valve H is retained in the position shown in Fig. 1. As the piston moves in the direction of arrow 1, the lever F swings in the direction of arrow 2, Fig. 3, causing the spring *o* to bear upon the ear *n* of the segment, and when the piston approaches the front end of its stroke, the toe *t* of the lever F rides up on the incline *s* of the latch N, this latch is depressed, the segment M is free to follow the action of the spring *o*, and the valve H is suddenly turned, so as to change the steam and to reverse the motion of the piston. When the segment M turns by the action of the spring *o*, the latch N' has been released by the toe *t* of the lever F, and it is free to follow the action of its spring, so that it rises behind the shoulder *p'* of the segment and retains the valve in position, until, on the reverse stroke of the piston, the latch N' is again depressed by the toe *t*, and the valve is changed by the action of the spring *o'* on the ear *n'* of the segment. In order to produce these changes of the valve by the action of the springs *o o'*, it is essential that the valve shall turn freely in its socket, and it is therefore important to balance the valve not only in relation to the live steam, but also in relation to the exhaust. My valve-gear may, however, be applied to any suitable steam-valve, provided such valve moves with the requisite freedom.

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

1. The combination, substantially as hereinbefore described, of the steam-valve, the spindle G, for transmitting motion to this valve, the segment M, mounted on this spindle, the ears *n n'* and shoulders *p p'*, formed on this seg-

ment, the lever F, swinging loosely on the spindle and connected to the piston-rod, the spring or springs *o o'*, secured to this lever, the toe *t*, formed on the lever, and the latches N N'.

2. The combination, substantially as hereinbefore described, of the plug-valve H, the pin or pins *j*, projecting from said valve, the spindle G, the lever L, mounted firmly on the inner end of said spindle and engaging with the pin or pins *j*, the segment M, mounted firmly on the spindle near its outer end, the ears *n n'* and shoulders *p p'*, formed on said segment, the lever F, swinging loosely on the spindle and connected to the piston-rod, the spring or springs *o o'*, connected to this lever, the toe *t*, formed on said lever, and the latches N N'.

3. The combination, substantially as hereinbefore described, of the hollow plug-valve H, working in a shell situated in the interior of the steam-chest, the pin or pins *j* and the pin *k*, projecting from said valve, the recess *l* engaging with the pin *k*, the spindle G, the lever L, mounted firmly on the inner end of said spindle and engaging with the pin or pins *j*, the segment M, mounted firmly on the spindle near its outer end, the ears *n n'* and shoulders *p p'*, formed on said segment, the lever F, swinging loosely on the spindle and connected to the piston-rod, the spring or springs *o o'*, connected to this lever, the toe *t*, formed on said lever, and the latches N N'.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

ROBERT H. FLETCHER. [L. S.]

Witnesses:

W. HAUFF,

JOHN DERUNDEON.