

(No Model.)

J. R. FRIKART.
VALVE GEAR.

No. 482,007.

Patented Sept. 6, 1892.

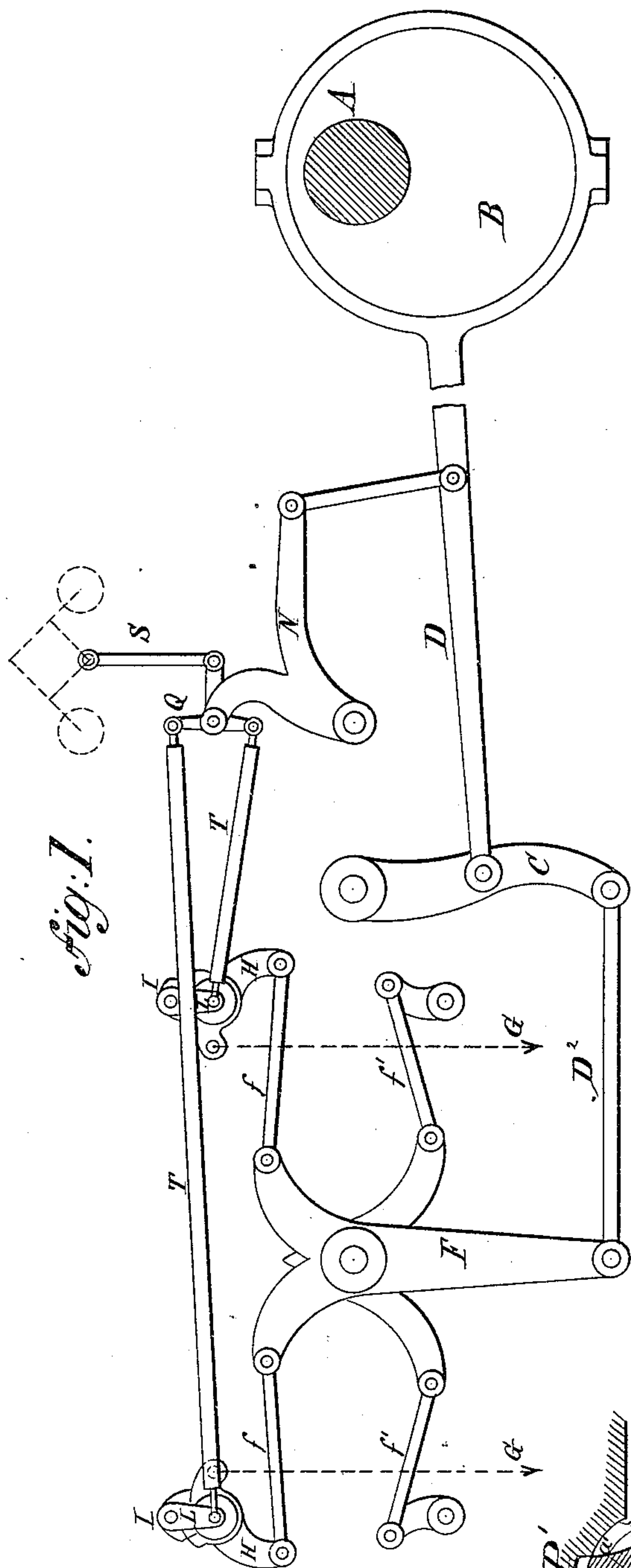


Fig. 1.

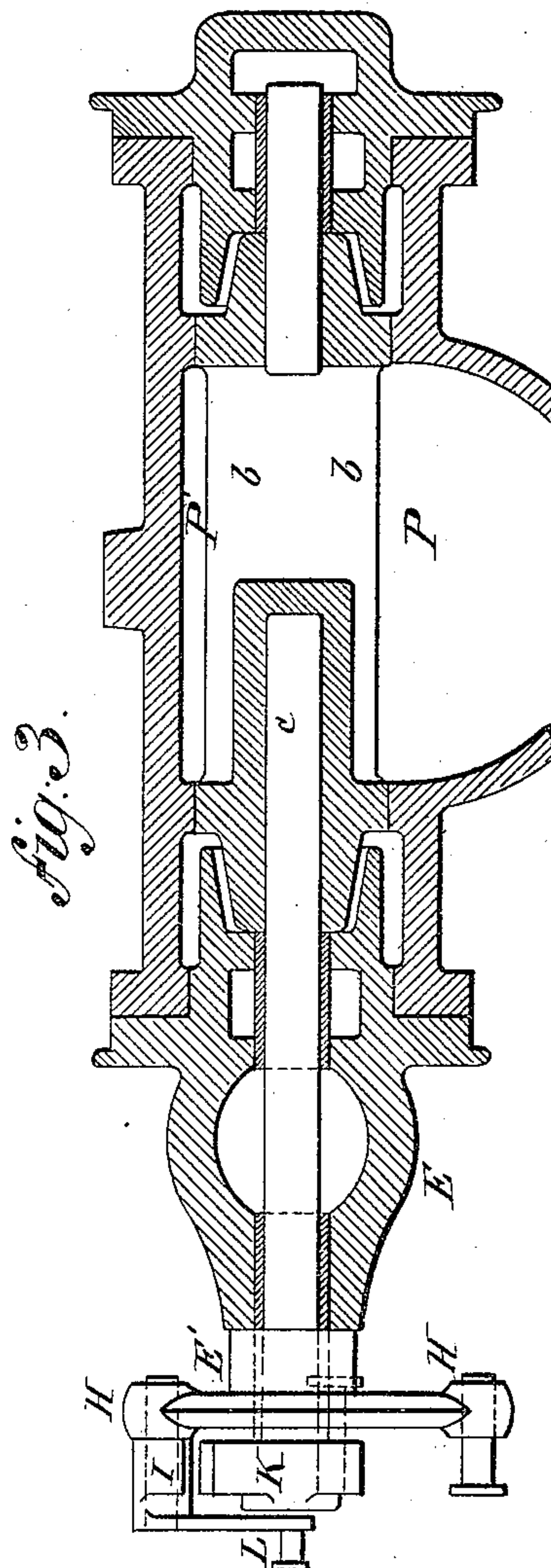
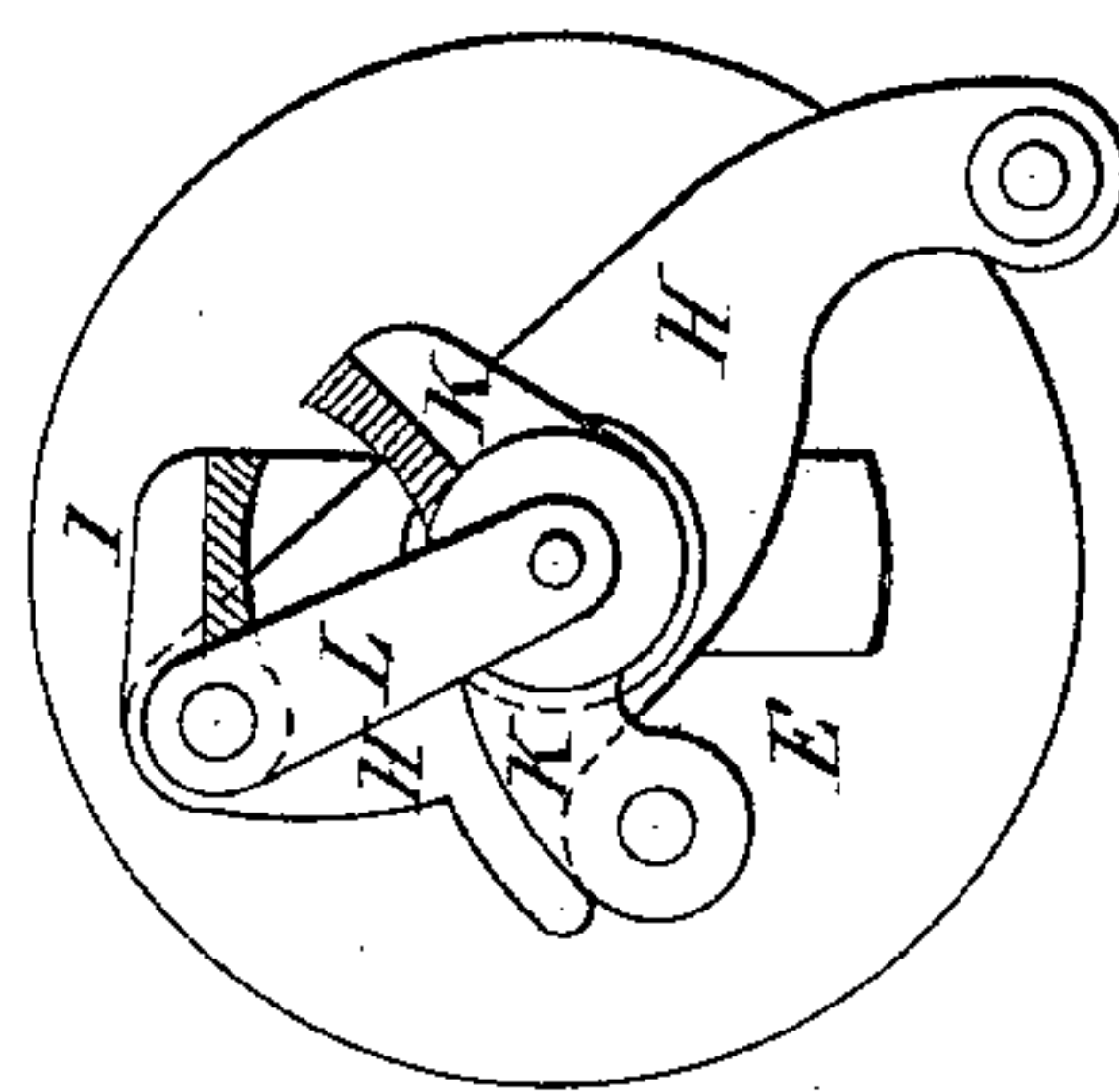


Fig. 3.

Fig. 2.



INVENTOR

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ATTORNEYS.

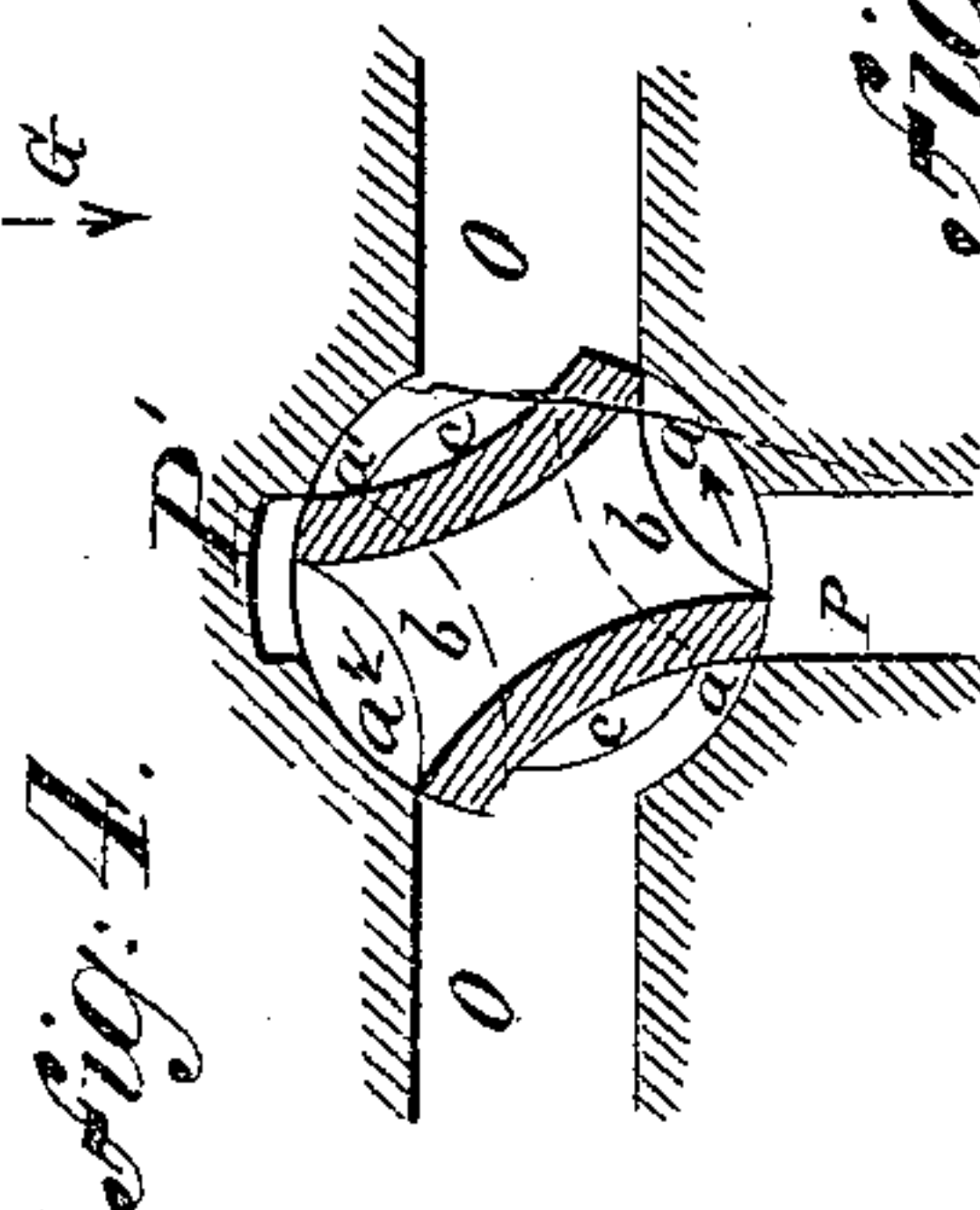


Fig. 4.

WITNESSES:

A. Schehl.
Wm. Schulz.

UNITED STATES PATENT OFFICE.

JOHANN R. FRIKART, OF MUNICH, GERMANY.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 482,007, dated September 6, 1892.

Application filed March 3, 1891. Serial No. 383,649. (No model.) Patented in France July 20, 1883, No. 156,647, and July 20, 1887, No. 184,903; in Belgium September 17, 1884, No. 66,332, and November 3, 1887, No. 79,398; in Germany September 26, 1884, No. 31,242, and May 16, 1888, No. 47,351; in England April 27, 1887, No. 6,151, and May 3, 1889, No. 7,377; in Austria-Hungary August 22, 1887, No. 13,114 and No. 35,366, and February 28, 1888, No. 36,582 and No. 3,851; in Italy August 28, 1888, No. 443; in Switzerland September 20, 1889, No. 1,505, and in Spain August 7, 1890, No. 10,901.

To all whom it may concern:

Be it known that I, JOHANN R. FRIKART, a resident of Munich, Bavaria, Germany, have invented certain new and useful Improvements in Distributing Valve-Gear Mechanism for Expansion-Engines, (for which I have obtained Letters Patent in France, No. 156,647, dated July 20, 1883, and No. 184,903, dated July 20, 1887; in Belgium, No. 66,332, dated September 17, 1884, and No. 79,398, dated November 3, 1887; in Germany, No. 31,242, dated September 26, 1884, and No. 47,351, dated May 16, 1888; in Austria-Hungary, No. 13,114 and No. 35,366, dated August 22, 1887, and No. 36,582 and No. 3,851, dated February 28, 1888; in England, No. 6,151, dated April 27, 1887, and No. 7,377, dated May 3, 1889; in Switzerland, No. 1,505, dated September 20, 1889; in Spain No. 10,901, dated August 7, 1890, and in Italy, No. 443, dated August 28, 1888,) of which the following is a specification.

This invention relates to that class of valve-gear mechanism for expansion-engines in which each cylinder is provided with four valves. My valve mechanism permits the cylinder to be filled up to 0.75 of the piston-stroke in lieu of 0.33, as heretofore, which is of special importance in expansion-engines having a number of cylinders.

The invention consists in the various features of improvements more fully pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan of my improved valve mechanism; Fig. 2, an end view thereof; Fig. 3, a longitudinal section through the valve, and Fig. 4 a transverse section through the valve.

The four rotary valves are operated by means of the distributing-disk F, that receives its oscillating motion directly or indirectly by lever C and rod D² from the eccentric B, mounted on shaft A. The two lower or outlet valves are rigidly connected to disk F by means of rods or cranks, while the two upper or inlet valves are operated by the following mechanism: Upon the spindle of each inlet-valve is keyed a crank K, which by means of a weight, spring, or air-piston G is always drawn down

in the direction of the arrow, and when drawn down will hold the valve closed. The disk F is connected by rod *f* to one arm of a double lever H, revolving upon box E', Fig. 3. The other arm of lever H is connected to a catch I, having a steel nose. The catch is in contact with a lever L, the pivot of which oscillates at about the center of the valve-spindle. The crank K, keyed to this spindle, carries likewise a steel nose, which at the proper times is engaged by the nose of catch I to open the valve. The position of the catch I is controlled by two independent motions: First, the catch is oscillated at regular intervals by lever H and disk F, and, secondly, the steel nose approaches or recedes by means of the lever L and a rod T.

A system of levers serves to automatically regulate the connection of the catch I with the governor of the machine. This system comprises a lever N, that receives its motion from eccentric rod D or otherwise. The lever N is connected to a three-arm regulating-lever Q, which in turn is connected to the governor by rod S and to the levers L L by rods T T.

The operation of the device is as follows: The eccentric B oscillates levers H by means of disk F. The lever N, on the other hand, causes oscillation of catch I through lever Q, rods T T, and levers L L. In consequence of these two motions acting at different times upon the catch I the nose on such catch will describe a curve. This curve, according to the inclination of lever Q, (influenced by the governor,) will approach or recede from the center of the valve-spindle, and thus the nose will glide off the crank K sooner or later to cause a smaller or greater admission of steam.

The form of the valve is shown in Figs. 3 and 4. The ports O O are connected to the steam-inlet, while the port P is connected to the cylinder. Diametrically opposite to the port P there is a chamber P'. As the valve rotates in the direction of the arrow openings are simultaneously produced at *a a'*. The steam enters the port P either directly through these openings or it enters by means of a channel *b* that traverses the

valve, or by means of the chamber P'. The channel *b*, however, extends only through half the length of the valve, Fig. 3, while within the other half the fresh steam from
5 ports O O communicates continually by means of a horizontal valve-channel *c*. In this way the rotary valve is not only entirely relieved, but the distance traversed by it produces a quadruple effect. Thus if the valve travels
10 a distance of one centimeter the openings offered to the steam amount to four centimeters.

What I claim is—

1. The combination of disk F and rods *f*
15 with lever H, connected thereto, a lever L, pivoted to lever H and having catch I, a crank

K, keyed to the valve-spindle and adapted to be engaged by catch I, rod T, connected to lever L, and a governor-controlling rod T, substantially as specified. 20

2. The combination of lever N with lever Q, operated by the governor, rods T T, levers L L, and with the lever H, catch I, and crank K, substantially as specified.

In testimony that I claim the foregoing as
my invention I have signed my name in pres-
ence of two subscribing witnesses. 25

J. R. FRIKART.

Witnesses:

WILH. VOSS,

Ingenieur.

ARNOLD KIENART.