

H. L. PERRINE.
ADJUSTABLE OUT-OFF GEAR FOR STEAM ENGINES.
APPLICATION FILED SEPT. 23, 1908.

915,213.

Patented Mar. 16, 1909.
2 SHEETS—SHEET 1.

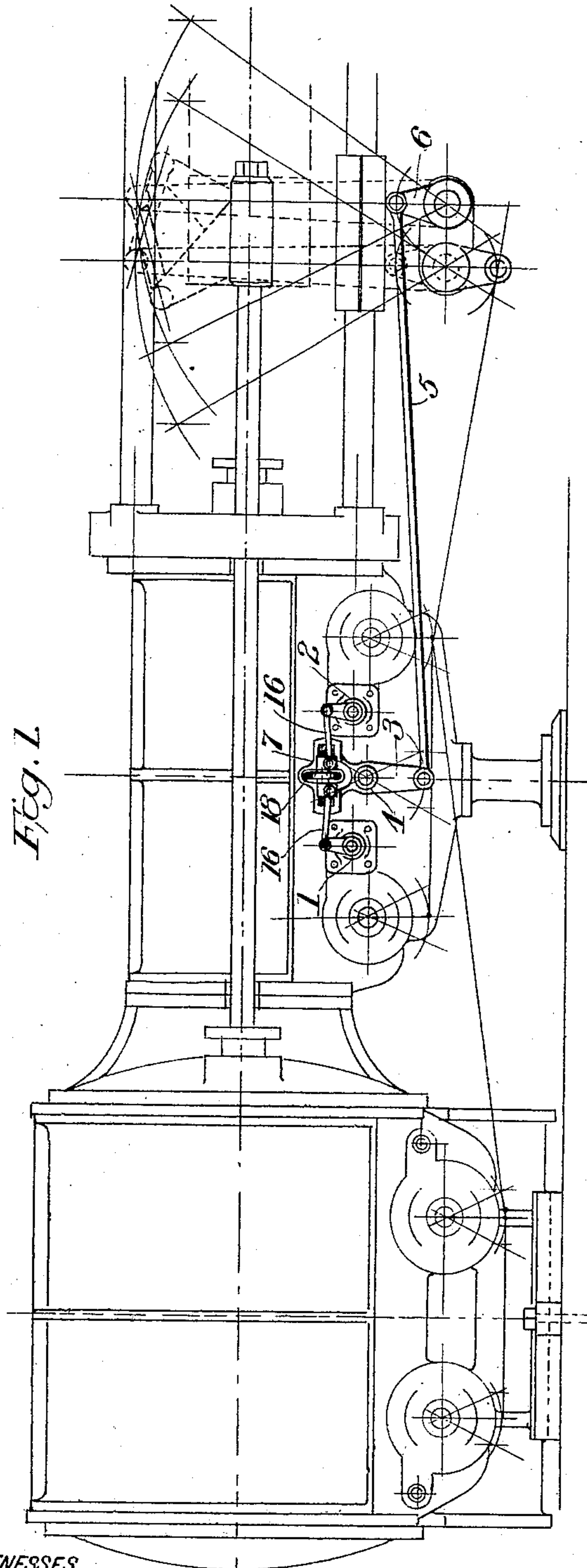


Fig. 1.

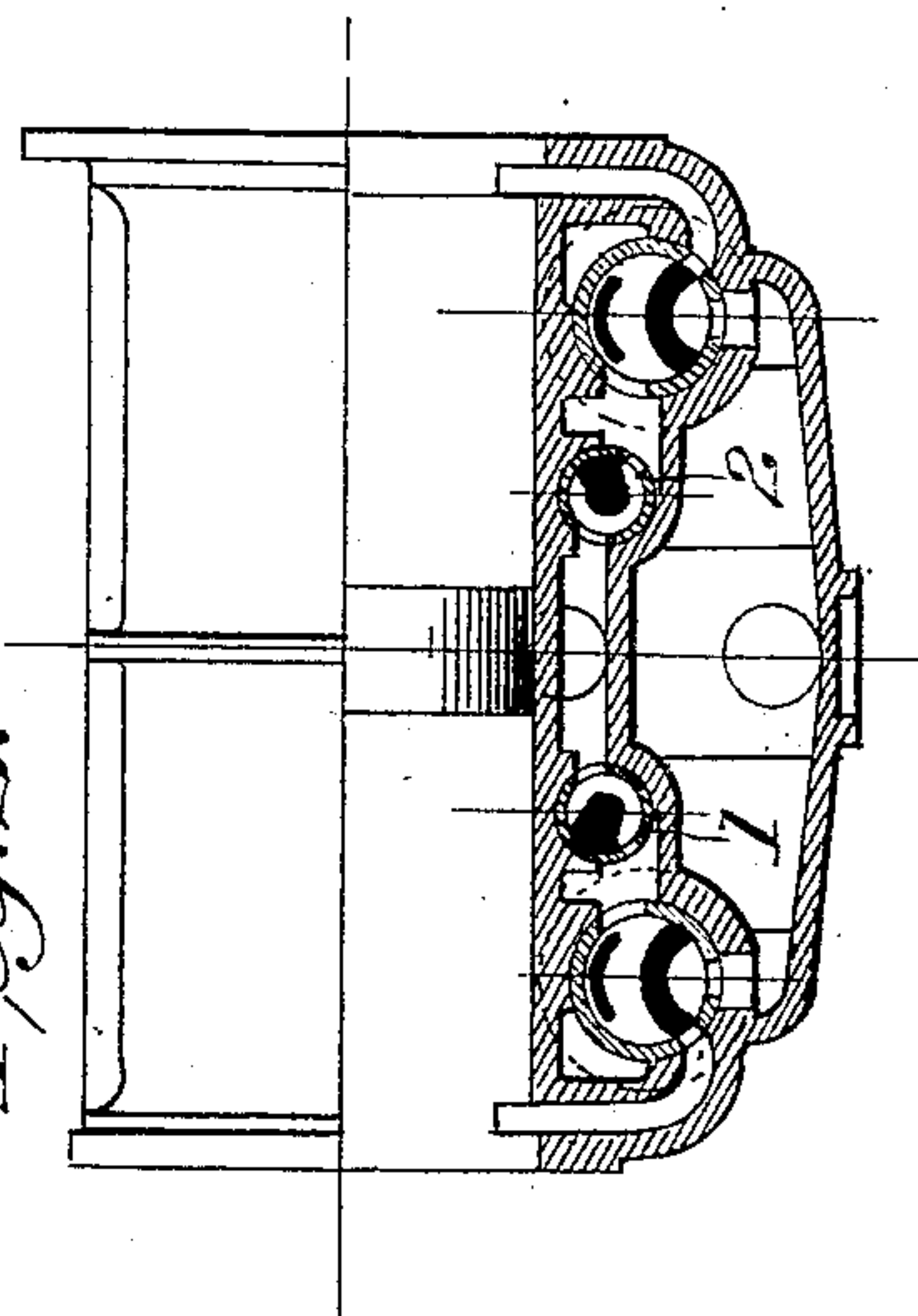


Fig. 2.

WITNESSES.

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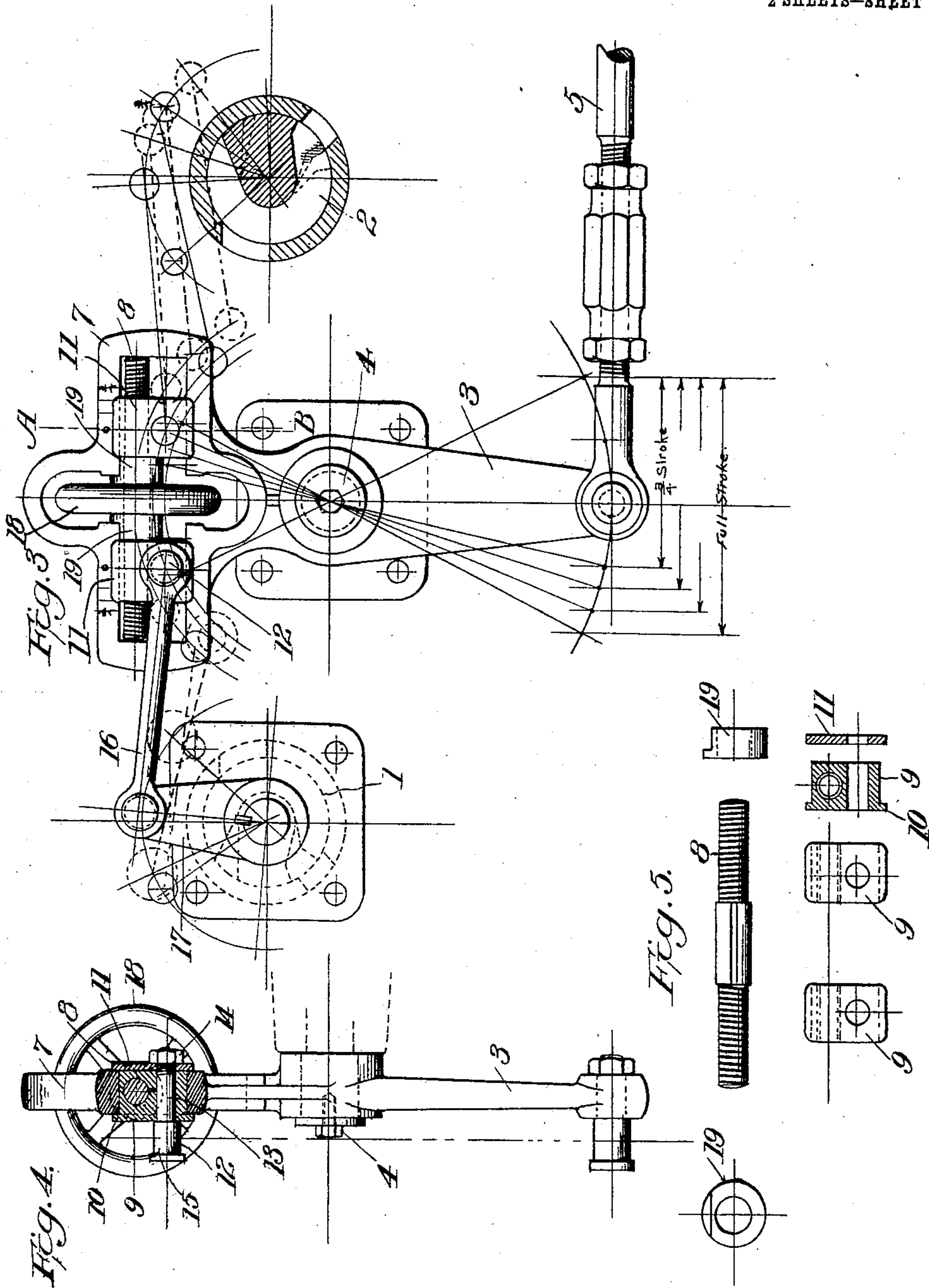
INVENTOR.

Harmanus Lansing Perrine,
by W. H. Tucker Atty.

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ADJUSTABLE CUT-OFF GEAR FOR STEAM ENGINES.
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WITNESSES:

Lillie M. Perry
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INVENTOR

Harmanus Lansing Perrine
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UNITED STATES PATENT OFFICE.

HARMANUS LANSING PERRINE, OF ALLENHURST, NEW JERSEY.

ADJUSTABLE CUT-OFF GEAR FOR STEAM-ENGINES.

No. 915,213.

Specification of Letters Patent.

Patented March 16, 1909.

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To all whom it may concern:

Be it known that I, HARMANUS LANSING PERRINE, a citizen of the United States, residing at Allenhurst, in the county of Monmouth and State of New Jersey, have invented a certain new and useful Improvement in Adjustable Cut-Off Gear for Steam-Engines, of which the following is a full, clear, and exact description.

10 The object of this invention is to provide a throttling cut-off valve gear for use on the steam end of high-pressure, compound and triple-expansion direct-acting duplex pumping engines. In the operation of such large
15 engines for mining purposes, the commonly employed turn-buckles for adjusting the cut-off valves leave the unskilled pump-runner or operator in the dark as to the exact point in the stroke where the valves will cut
20 off steam. The momentum developed by the operation of the heavy pistons and plungers helps to overcome the pressure against which the pistons and plungers are driving, and this momentum varies with their speed
25 in feet per minute. It is desirable, therefore, when running at high speed to utilize this momentum so that the cut-off valves may be operated to close the ports earlier in the stroke, and thus cut off steam pressure
30 and so avoid high steam pressure at the end of the stroke.

The present invention is designed to provide means whereby the cut-off valves may be accurately adjusted while the pump is
35 running.

The invention consists of a valve-operating lever whose throw relatively to the cut-off valves is adjustable by means of a right and left hand threaded screw, which is connected
40 with the valves by links, as I will proceed to describe and then particularly point out in the claims.

In the accompanying drawings, illustrating the invention, in the several figures of which like parts are similarly designated, Figure 1 is a side elevation of a compound pumping engine with the novel features of this invention shown in shaded lines. Fig. 2
45 is a sectional elevation showing an arrangement of the cut-off valves when located in steam cylinders of thirty-six and forty-eight inch stroke, where two main steam valves are used. Fig. 3 is an elevation and partial
50 section of the cut-off lever adjusting device

and steam valves. Fig. 4 is a cross-section 55 drawn on the line A B, Fig. 3. Fig. 5 shows the details of the adjusting device.

The invention is shown as applied to an engine having semi-rotating cut-off valves 1 and 2, and these valves and other parts of 60 the engine as shown being well-known, it is supposed that no additional description is necessary to enable those skilled in the art to make and use the invention.

The lever 3 is pivoted at 4 to any suitable 65 part of the engine, and between the two valves 1 and 2, and this lever is connected by a rod 5 with the rock-shaft 6. The upper portion of this lever is made as a yoke 7, and this yoke carries a right and left hand screw 70 8, on the opposite ends of which are threaded the blocks 9, each provided with an integral flange 10 on the side which overlaps the yoke and having a face-plate 11 on the other side which overlaps the yoke on the opposite side 75 from the flange 10, so that these blocks not only are secured in the frame against lateral escape, and further, serve to secure the right and left hand screw in the yoke, but also may be moved longitudinally on the screw in said 80 yoke. The link-pins 12 are shouldered to provide a portion 13 to pass through the blocks and receive nuts 14, whereby the face-plates may be clamped to the blocks, and said link-pins are also provided with 85 flanged portions 15 on which are secured the valve-links 16 which are pinned to the cut-off valve cranks or arms 17. Between these blocks and on the right and left hand screw 8 is secured a hand-wheel 18 in such way as 90 to rotate the screw, and this hand-wheel is spaced apart from the blocks by means of collars 19, mounted upon the screw. In assembling these last-described parts in the yoke of the lever, the hand-wheel is first 95 placed in position, with the collars 19 on opposite sides thereof, and then the blocks screwed on, and then the parts inserted in the yoke, and then the face-plates secured in place and the valve-links applied with their 100 link-pins, and thus the gear made ready for operation.

By placing suitable gage marks or graduated scales on the yoke opposite each block, as shown in Fig. 3, the operator may know 105 exactly the extent of cut-off he is effecting by rotation of the hand-wheel in either direction, no matter what the speed of the engine

may be at the time. Hence, the operator is able to control the cut-off at any point and thus regulate his engine to a nicety.

The lever 3 takes its motion from a crank on the rock-shaft and this motion is coincident with the piston from which the steam is cut off. As the blocks are moved farther apart or out to the limit of adjustment, the cut-off valves are forced ahead, insuring earlier closing of the steam ports, and vice versa.

While I have shown and described and claimed my invention in connection with a compound steam end for direct-acting duplex pumps, I do not mean thereby to limit my invention to that one class of pumps or steam-actuated machinery, and hence wish to be understood as laying claim to the invention wherever it may be capable of being utilized.

What I claim is:—

1. In an adjustable cut-off gear for steam engines, the combination of cut-off valves, with a lever arranged between said cut-off valves and having a yoke, a right and left hand screw mounted in said yoke and provided with a hand-wheel for rotating it, blocks mounted on said screw and within the yoke and movable toward and from each other by the rotation of said screw and serving to support the screw within the yoke and guided by said yoke, and means connecting the said blocks with the cut-off valves, whereby the stroke of said valves may be varied at pleasure independently of the throw of the lever.

2. In an adjustable cut-off gear for steam engines, the combination of cut-off valves, with an adjusting lever arranged between said cut-off valves and having a yoke, a right and left hand screw provided with a hand-wheel for rotating it, flanged blocks mounted on said screw and movable toward and from

each other by the rotation of said screw, face-plates secured to said blocks on the side opposite the flanges on the blocks, said blocks and their face-plates serving also to secure the screw within the yoke, and means connecting the said blocks with the cut-off valves, whereby the stroke of said valves may be varied at pleasure independently of the throw of the lever.

3. In an adjustable cut-off gear for steam engines, the combination of cut-off valves, with a lever arranged between said valves and having a yoke, a right and left hand screw provided with means to rotate it, flanged blocks on said screw and face-plates for said blocks which engage the yoke and serve to hold the screw in said yoke, connections between said blocks and said cut-off valves, said blocks being adjustable longitudinally on the screw within and guided by the yoke, and the yoke and blocks having complementary indicating devices for visibly indicating the extent of the adjustment.

4. The combination of a lever having a yoke at one end, a right and left hand screw, a hand-wheel fixed to said screw, collars on opposite sides of said hand-wheel, screw-threaded blocks movably mounted upon said screw next to the collars and having flanges engaging one side of the yoke, face-plates secured to the blocks and engaging the other side of said yoke, said blocks and their face-plates also serving to secure the screw in the yoke, valves whose stroke is to be varied, and means connecting said valves and blocks.

In testimony whereof I have hereunto set my hand this 21st day of September A. D. 1908.

HARMANUS LANSING PERRINE.

Witnesses:

J. P. HEIDENNICH,
L. A. KOHL.