

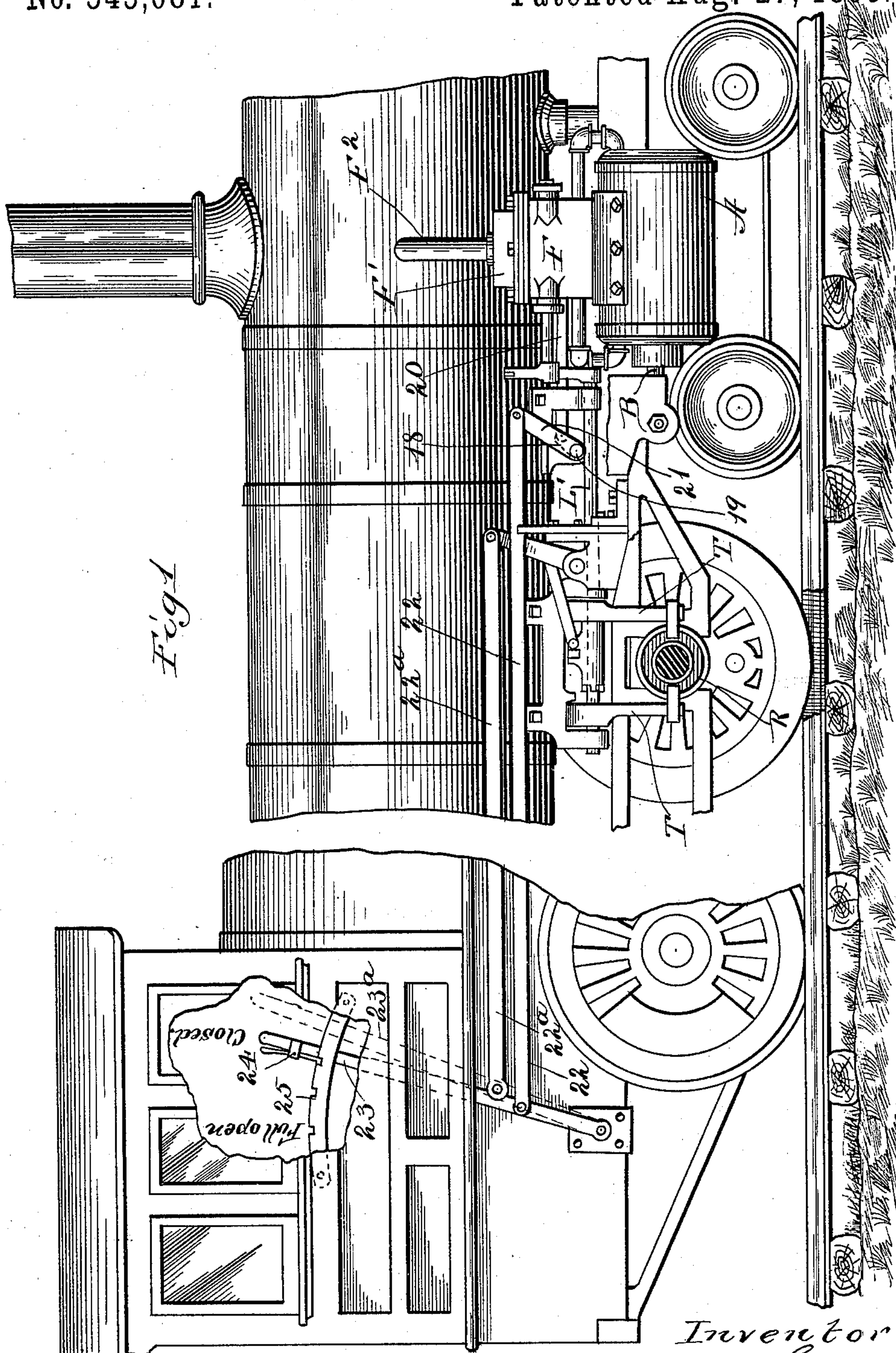
(No Model.)

3 Sheets—Sheet 1.

F. LESTER.
PORT REGULATING VALVE.

No. 545,081.

Patented Aug. 27, 1895.



Witnesses
W. C. Corlies
Jno. A. Christianson

Inventor
Frank Lester
By Louis H. Gillson
Attorney

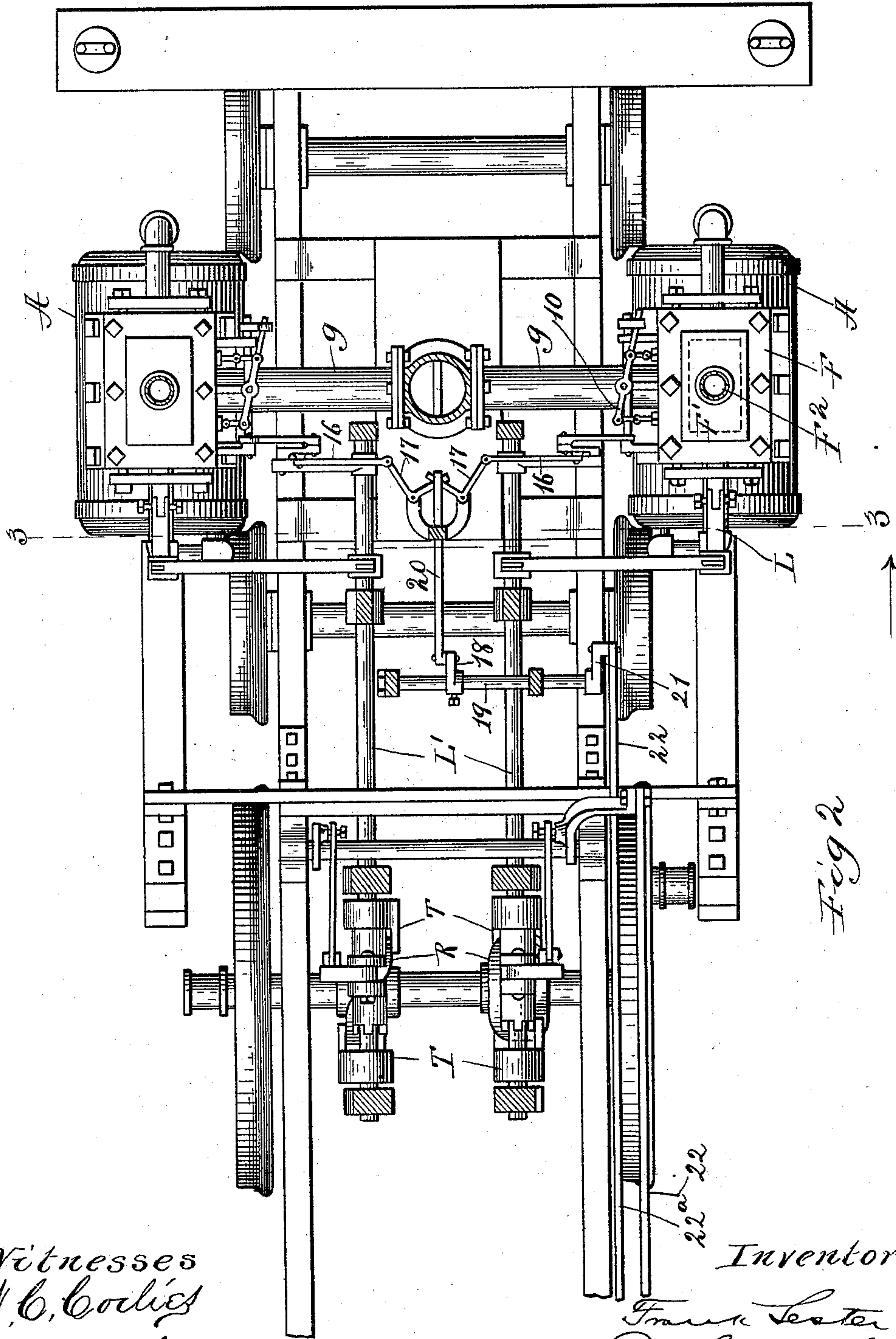
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3 Sheets—Sheet 2.

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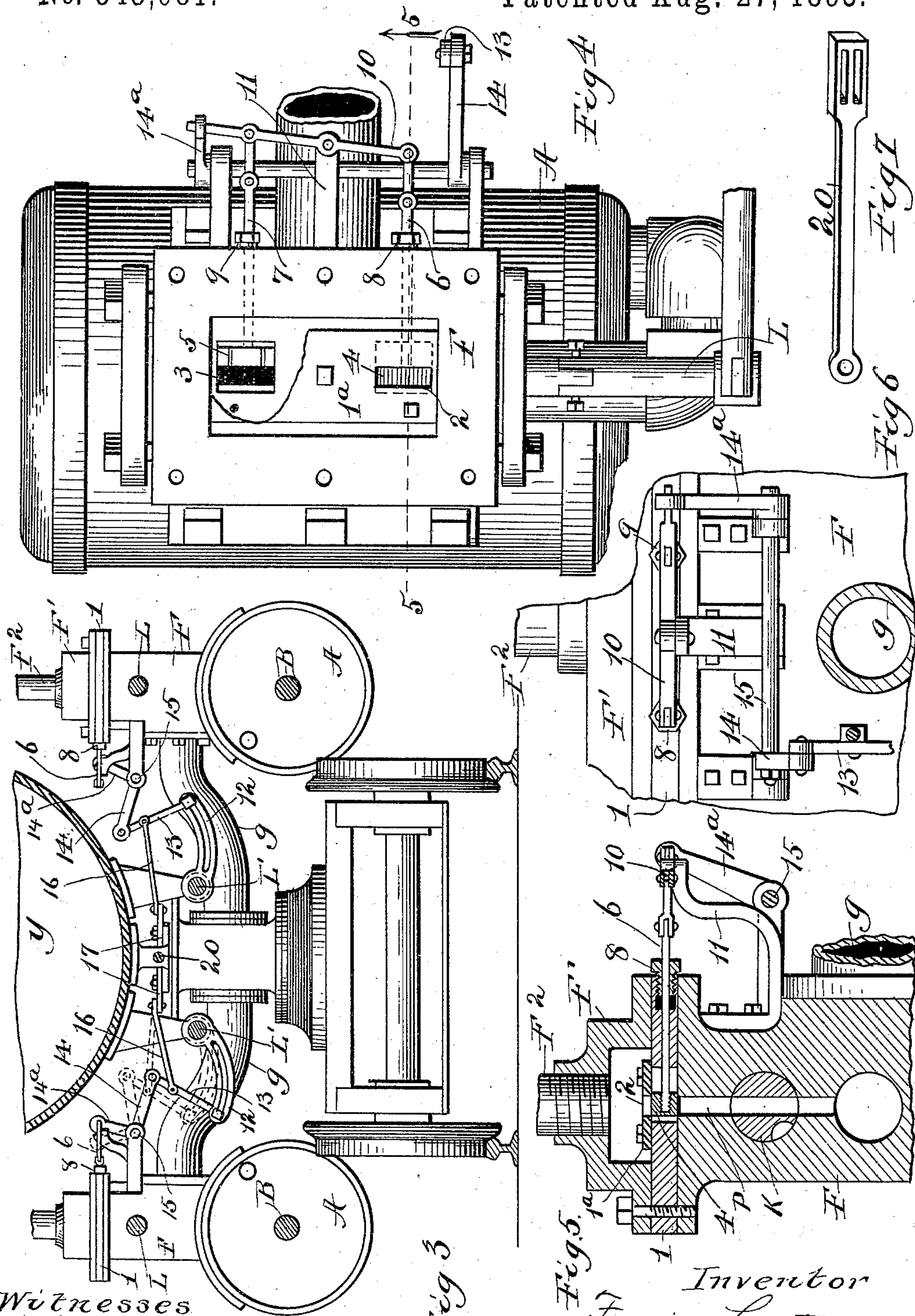
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per A. Christianson.

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Frank Lester
By Louis H. Gilman
Attorney

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By Louis K. Gibson
Attorney

UNITED STATES PATENT OFFICE.

FRANK LESTER, OF PANHANDLE, TEXAS.

PORT-REGULATING VALVE.

SPECIFICATION forming part of Letters Patent No. 545,081, dated August 27, 1895.

Application filed November 14, 1894. Serial No. 528,809. (No model.)

To all whom it may concern:

Be it known that I, FRANK LESTER, a citizen of the United States, residing at Panhandle, in the county of Carson and State of Texas, have invented certain new and useful Improvements in Port-Regulating Valves for Steam-Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to variable valve movements for steam-engines, its object being to provide for the automatic control of the steam in connection with the engines forming the subject of Letters Patent No. 523,360, issued to me July 24, 1894.

The invention consists of a slide-valve for covering each port leading from the steam-chest to the rock-valve, with means for operating such slide-valves from the shaft controlling the rock-valve, and a link movement for adjusting the throw of the slide-valves and which is under the control of the engineer.

In the accompanying drawings, Figure 1 is a side elevation of a locomotive, partly in section. Fig. 2 is a plan of running and valve gear. Fig. 3 is a vertical cross-section back of the cylinders. Fig. 4 is a plan view of a cylinder, partly in section. Fig. 5 is a sectional view on the line 5 5 of Fig. 4. Fig. 6 is a detail of the valve-gear. Fig. 7 is a view of a link-bar forming a part of the shifting mechanism.

In the drawings the cylinder is represented at A, the piston-rod at B, the valve-chest at F, the steam-chest at F', the service-pipe at F², the stem of the rock-valve at L, the rock-shaft for actuating the valve-stem at L', the cam for rocking the shaft L' at R, and the arms carried by the rock-shaft and engaging the cam at I. The exhaust-pipes leading from the cylinders are shown at g.

All of the parts appear in the same form as they are now shown in my patent No. 523,360, except that I now interpose between the steam-chest F' and valve-chest F a chambered plate 1, having a panel 1^a, within which are ports

2 3, corresponding in size and position with the ports P, leading through the upper plate of the valve-chest to the seat of the valve K. Within the chamber of the plate 1 are located a pair of slide-valves 4 5, sliding between the panel 1^a and the top plate of the valve-chest and adapted to reciprocate across the ports 2 3. The stems 6 7 of the valves 4 5 project through stuffing-boxes 8 9 at one edge of the plate 1, and are pivotally attached to a rock-lever 10, fulcrumed on a bracket 11 between the valve-stems. The lever 10 is rocked by means of the rock-shaft L', which actuates the valve K, being connected therewith by means of a curved crank-arm 12, carried by the shaft L', a link bar 13 leading from the crank-arm 12 to a crank-arm 14, carried by a shaft 15, which also carries a crank-arm 14^a, pivotally connected with the rock-lever 10 by means of a link-bar 15. The link-bar 13 is adjustable upon the crank-arm 12 and is controlled by the engineer.

The means shown for bringing the adjustment of the link-bar 13 under control of the engineer consists of a link-bar 16, leading from the link 13 to an arm of a bell-crank 17, the outer arm of which is connected to a crank-arm 18, carried by a rock-shaft 19 by a link-bar 20, the shaft 19 having a second crank-arm 21, connected by a rod 22 with a hand-lever 23 in the engine-cab, and which has the ordinary pawl-and-ratchet attachment 24 25. The link-rod 22^a, co-operating with the hand-lever 23^a, forms no part of the present invention, but is for the purpose of reversing the engine. By means of this shifting mechanism the link-bar 13 may be longitudinally adjusted upon the crank-arm 12, thereby changing the throw of the crank 14 and consequently of the rock-lever 10 and of the valves 4 5. The greatest travel of the valves 4 5 is considerably more than the width of the ports 2 3, the middle point of their travel being at one side of the ports. When adjusted to their smallest movement, the valves do not encroach upon the ports. Between the two extremes of their movement they may be adjusted to any intermediate degree of travel, thereby adapting them to admit a full head of steam, none whatever, or any quantity between these extremes. The valves 4 5, being actuated by the same shaft as the valve K,

move with it. The device admits of the opening of the throttle-valve of the engine to throw a full head of steam into the steam-chest while controlling the admission of steam to the ports of the main valve, thereby getting with a small service of steam to the main valve the full benefit of the expansion of a chest full of steam. The valves 4 5 move in alternation with the ports of the valve K—that is to say, each is advanced when the valve-port is open to the port with which it co-operates.

I claim as my invention—

1. The combination, in a locomotive having a rock valve for controlling the induction and eduction ports of its cylinder, of a steam chest, a chest for carrying the valve and having ports leading from the steam chest to the valve, of slide valves 4, 5, for closing such ports, a rock lever for actuating such valves and having its opposite ends connected with them respectively, a crank shaft, crank arms 14, 14^a, carried by the crank shaft, connection between the crank arm 14^a, and the rock lever, a rock shaft, a cam carried by the axle of the drivers of the locomotive for rocking the shaft, a crank arm 12, carried by the rock shaft and a link bar 13, uniting the crank arm 12, with the crank arm 14.

2. The combination in a locomotive having a rock valve for controlling the induction and eduction ports of its cylinder, of a steam chest, a chest for carrying the valve and having ports leading from the steam chest to the valve, of slide valves 4, 5, for closing such ports, a rock lever for actuating such valves and having its opposite ends connected with

them respectively, a crank shaft, crank arms 14, 14^a, carried by the crank shaft, connection between the crank arm 14^a, and the rock lever, a rock shaft, a cam carried by the axle of the drivers of the locomotive for rocking the shaft, a crank arm 12, carried by the rock shaft, a link bar 13, uniting the crank arm 12, with the crank arm 14, and means for shifting the link bar 13, longitudinally upon the crank arm 12.

3. The combination in a locomotive having a rock valve for controlling the induction and eduction ports of its cylinder, of a steam chest, a chest for carrying the valve and having ports leading from the steam chest to the valve, of slide valves 4, 5, for closing such ports, a rock lever for actuating such valves and having its opposite ends connected with them respectively, a crank shaft, crank arms 14, 14^a, carried by the crank shaft, connection between the crank arm 14^a, and the rock lever, a rock shaft, a cam carried by the axle of the drivers of the locomotive for rocking the shaft, a crank arm 12, carried by the rock shaft, a link bar 13, uniting the crank arm 12, with the crank arm 14, and being longitudinally adjustable upon the crank arm 12, a bell crank 17, a link connecting one arm of this bell crank with the link bar 13, the other arm of the bell crank 17, being under control from the cab of the engine.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK LESTER.

Witnesses:

LOUIS K. GILLSON,
SPENCER WARD.