

No. 651,863.

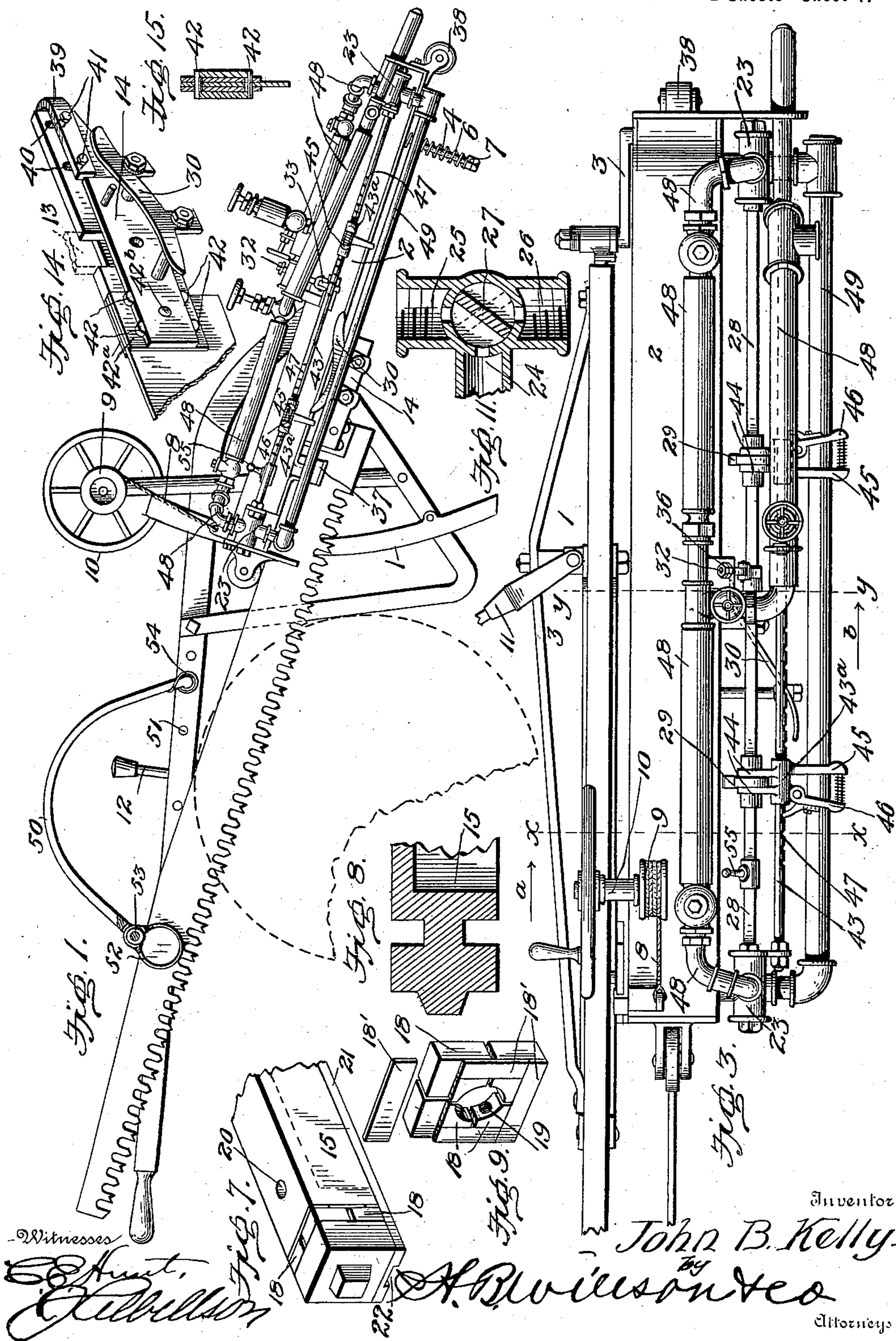
Patented June 19, 1900.

J. B. KELLY.
VALVE GEAR FOR STEAM ENGINES.

(Application filed Nov. 9, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Inventor

John B. Kelly.

Attorneys

UNITED STATES PATENT OFFICE.

JOHN B. KELLY, OF PORTLAND, OREGON, ASSIGNOR OF ONE-HALF TO
CHARLES L. VAN BUSKIRK, OF LODI, CALIFORNIA.

VALVE-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 651,863, dated June 19, 1900.

Application filed November 9, 1899. Serial No. 736,345. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. KELLY, a citizen of the United States, residing at Portland, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Valve-Gear 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.

The invention relates to steam-engines, and more particularly to those for operating cross-cut-saws.

15 The object of the invention is to improve the construction shown and described in Letters Patent granted to me August 22, 1893, No. 503,665, whereby the engine is rendered more effective.

20 With this object in view the invention consists in certain features of construction and combination of parts, which will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of the improved saw-engine, showing it applied to a crosscut-saw. Fig. 2 is a view taken from the other side. Fig. 3 is a top plan view. Fig. 4 is a longitudinal sectional view through the cylinder and its piston, showing in full lines a portion of the saw-blade and its head. Fig. 5 is a cross-sectional view on the line *x x* of Fig. 3 looking in the direction of the arrow *a*. Fig. 6 is a similar view on line *y y* of Fig. 3 looking in the direction of the arrow *b*. Fig. 7 is a detail perspective view of a portion of the piston. Fig. 8 is a sectional view of the same with the packing removed. Fig. 9 is a detail perspective view of the packing. Fig. 10 is a vertical sectional view of one of the valve-chests. Fig. 11 is a similar view taken at right angles to Fig. 10. Fig. 12 is a detail perspective view of the rock-shaft with the trip-arms and valve-heads in place thereon. Fig. 13 is an enlarged detail sectional view through one of the valves, showing the manner of connecting the rock-shaft thereto. Fig. 14 is a detail perspective view of one of the saw-blade heads and the trip secured thereto. Fig. 15 is a sectional view through the saw-blade and the head, showing the manner of connecting the

head to the blade. Fig. 16 is a detail perspective view of the cylinder-head sections and their interposed packing-strip.

The engine may be used for any purpose, 55 but, as hereinbefore stated, is especially designed for operating crosscut-saws.

As many of the parts shown in the present drawings are identical with or substantially the same as the corresponding parts shown 60 in the Letters Patent above referred to, I will not enter into a detail description of their construction and operation, but will refer to them simply in conjunction with the other parts which form the subject-matter of the 65 present application.

1 denotes the supporting-frame, and 2 the cylinder. One end of the cylinder is provided with a crank-arm 3, which is pivotally connected to one end of the supporting-frame, 70 and said crank-arm is provided with a guide-pin 4, operating in a guide-eye 5, carried by the cylinder and provided with a tension-spring 6, held in place by an adjusting-nut 7, for the same purpose as stated in the Letters 75 Patent before referred to. The forward end of the cylinder is connected to the frame by a rope 8, which is rove about a drum 9 of a windlass 10.

11 denotes a dog universally fulcrumed to 80 the frame and adapted to engage the log.

12 denotes a securing-spike carried by the forward end of the supporting-frame and adapted to be driven into the top of the log.

The cylinder 2 is provided with a longitudinal slot in its bottom to receive the arm 13 85 of the head 14, to which the saw or other tool or device to be driven is adapted to be secured. Each head of the cylinder is formed of an inner and outer metallic plate *a' b'* and an interposed rubber sheet or packing *c'*, clamped 90 between said plates. The arm 13 is pivoted at its upper end to the piston 15 and is provided with a transversely-curved eye or aperture 16 to receive a flexible steel band or strap 95 17, which closes the slot in the bottom of the cylinder throughout its entire length except at that point where it passes through the arm 13.

The piston has deep annular grooves 100 formed in its ends, in which are placed angular packing-blocks 18. Packing-strips 18' are

arranged to break joint with the angular blocks, as shown more clearly in Figs. 7 and 9. Coil-springs 19 are provided and exert their energy to force the packing-blocks outward against the sides of the cylinder, and thereby prevent any leakage of steam past the ends of the cylinder. While these packing-blocks are designed for this purpose, it is possible that steam may pass between the ends of the piston and be confined between the packing-blocks, the upper side of the piston, and the upper side of the cylinder, thus exerting a load upon the piston. In order to prevent the accumulation of steam at this point, I form a hole 20 in the upper wall of the piston to allow of the escape of steam should it work past the packing-blocks.

The lower side of the piston may, if desired, be provided with a wearing-shoe 21, grooved at 22, so as to straddle the band or tape and prevent wear of the same.

No claim is made in the present case to the novel form of piston herein shown and described, as the same forms the subject-matter of a divisional application for patent filed February 8, 1900, Serial No. 4,491.

23 denotes valve-chests arranged at each end of the cylinder on its side. These valve-chests have each a port 24, communicating with the cylinder, an inlet-port 25, and an exhaust-port 26. 27 denotes rotary valve-heads arranged within said valve-chests and adapted to establish communication between the inlet-ports 24 25 and to cut off communication between the inlet-ports 24 25 and to establish communication between the ports 24 26.

28 denotes a rock-shaft connecting the two valve-heads. This rock-shaft is provided with a key at each end, which fits into a slot in one end of each valve-head. This construction admits of a slight longitudinal movement of the shaft to compensate for any bending or distortion of said shaft.

29 denotes two trip-arms longitudinally adjustably secured upon said shaft to rock therewith. These arms project from said shaft inwardly toward the cylinder, one slightly more than the other, and are adapted to be alternately engaged by the trip-head 30, carried on the saw-blade head, whereby the shaft will be alternately rocked in opposite directions and the valves actuated and thereby be opened and closed to admit steam alternately at the opposite ends of the cylinder and to exhaust it therefrom. When the trip-head engages one of the trip-arms, owing to the shape of the head, the arm will be gradually moved to one side, and the instant it passes its dead-center it is suddenly thrown to its extreme limit by a coil-spring 31, mounted upon a rod 32, the lower end of which is pivoted to a lug 33, fixed to the rock-shaft, and the upper end of which projects through the arm 34 of a bracket 35, secured to the side of the cylinder, and is provided with nuts 36. The energy of the spring is exerted downward.

37 denotes a stop secured to the under side of the cylinder near its forward end on opposite sides of the slot in said cylinder, and 38 denotes a roller-stop secured to the under side of the cylinder at its rear end. These stops may be formed of rubber, leather, or any analogous or suitable material and are adapted to receive the jar of the saw-blade head in the event that too much steam is admitted to the cylinder or should the attendant fail to close off steam after the blade has sawed through the log.

39 denotes a shoe secured to the rear end of the head 14 and made vertically adjustable in slots 40 by bolts 41. This shoe is adapted to slide along the under side of the cylinder and by means of its adjustment enables the saw-blade or other tool or device to be set at proper position with respect to said cylinder.

43 denotes a rod fixed to the valve-chests and parallel with the rock-shaft.

43^a denotes sliding sleeves having arms 44 to engage the trips and a handle 45. 46 denotes a spring-dog pivoted to said sleeves and adapted to engage notches 47 formed in the rod. By grasping the handle and the dog and pressing one toward the other the dog will be disengaged from the notches and permit of the adjustment of the trips to regulate the stroke of the piston. The toes of these dogs are made adjustable by a slot-and-bolt connection to compensate for wear.

48 denotes inlet-pipes extending to and communicating with the inlet-ports 25 of the valve-casing. Each of these pipes is provided with a check-valve, which form an air-cushion between the piston and the cylinder-heads at each stroke of the piston, and thereby prevent the latter striking said heads.

49 denotes an exhaust-pipe communicating with the exhaust-ports 26 of the valve-chests.

To steady the forward end of the saw-blade in its strokes, I provide a guide which consists of a curved rod 50, having one end pivoted in one of a series of holes 51 in the handle end of the frame 1 and its other end pivoted to a forked head 52, which straddles the saw-blade. A sheave 53 is journaled upon the pivot and engages the back of the blade. The guide is held to its work by a spring 54.

In the starting of the engine should the valves be in such a position as not to admit the steam to the proper end of the cylinder the shaft 28 may be turned by the handle 55 to properly adjust the valves.

It will of course be understood that various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. The combination with the cylinder; of the piston, valve-chests communicating with said

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cylinder, valves arranged within said chests to admit steam to and exhaust it from said cylinder, a rock-shaft connecting said valves, trip-arms secured upon said shaft to rotate therewith and slide longitudinally thereupon, a fixed rod parallel with said shaft, sleeves mounted upon said rod and connected with said arms, and means for locking said sleeves in longitudinal adjustment on said rod, substantially as and for the purpose set forth.

2. The combination with the longitudinally-slotted cylinder, and a piston arranged therein and provided with an attaching-arm projecting through the slot in the cylinder, and stops carried by said cylinder; of the flexible strap arranged within the cylinder to cover said slot and passing through a guide in the piston, a head secured to said attaching-arm, and a shoe vertically adjustably secured to

the head, substantially as and for the purpose set forth.

3. The combination with the longitudinally-slotted cylinder, each head of which is composed of three sections, an inner and outer metallic section and an interposed elastic or cushion section of greater area than the inner section, of a piston arranged therein and provided with an attaching-arm, and valves for alternately admitting steam to the opposite ends of the cylinder, substantially as and for the purpose set forth.

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

JOHN B. KELLY.

Witnesses:

BENJ. G. COWL,
JAMES KOEHL.