

UNITED STATES PATENT OFFICE.

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VALVE-GEAR FOR DIRECT-ACTING STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 476,148, dated May 31, 1892.

Application filed September 3, 1891. Serial No. 404,627. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. KELLEY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Valve-Gear for Direct-Acting Steam-Pumps; and I do hereby declare that the following specification, taken in connection with the accompanying drawings, which form a part thereof, is a full, clear, and exact description of my improvements, such as will enable those skilled in the art to make and use the same.

My invention relates to that class of steam-pumping engines in which the plunger of the pump is attached directly to the piston-rod, and the slide-valve for admitting steam into the cylinder is moved by a rocker-lever actuated by a collar or tappet upon the piston-rod. As now commonly constructed this class of pumping-engines is provided with a rocker-lever of a certain length having, preferably, anti-friction blocks on its opposite ends and a collar or tappet on the piston-rod adapted to engage said blocks alternately for rocking the rocking lever and moving the slide-valve for admitting steam alternately in the opposite ends of the cylinder. In experimenting with this class of pumping-engines for pumping deep wells I have found that it failed to perform its work properly and was subjected to a hard knocking at the end of its downward stroke, owing to the weight of the plunger, and this fact lead to the discovery of my invention, which wholly obviates the trouble.

My invention consists, essentially, in providing the rock-lever with adjustable tripping devices which can be independently adjusted in the direction of the length of the rocker-lever, whereby the oscillation of the rocker-lever for shifting the slide-valve can be regulated to suit the up-and-down stroke of the piston to the length and weight of plunger, which vary with the depth of the well, it being obvious that there should be a greater cushioning action of the piston, and consequently that the valve should be shifted more in the lead of the piston when it is on its downward stroke than when on its upward stroke.

In order that my invention may be fully understood, I will first describe the same with reference to the accompanying drawings, and

then more particularly point out in the claims what I deem as new therein.

In said drawings, Figure I is a side elevation of a simple form of steam-pumping engine, part of the supporting-standards being broken away to show the arrangement of parts. Fig. II is an enlarged view of the rocker-lever with my improvements attached. Fig. III is a sectional view taken on the line 111 111, Fig. II.

A is a suitable base, and B are standards extending up from said base. C is the steam-cylinder supported on said standards and having a piston of any desired construction working therein.

D is the valve-casing, in which operates the ordinary slide-valve for controlling the entry of steam into the opposite ends of the steam-cylinder.

E is the piston-rod attached to the steam-piston at its upper end, suitably connected at *e* to the pump-plunger F.

G is the valve-rod attached at one end to the slide-valve.

H is the rocker-lever pivoted at *h* upon the offset *b* of the standards and provided with the central bell-crank arm H', to which the other end of the valve-rod G is attached.

I is a collar or tappet mounted on the upper end of the pump-plunger F for operating the rocker-lever in a manner well understood.

At each of the opposite ends of the rocker-lever H, I provide one of my improved adjustable tripping devices, the ends of the rocker-lever being rounded for this purpose.

K is a clamping-arm having its opposite ends *k k'* bifurcated for the purposes presently to be explained, and an enlarged opening *k²* adjacent to the bifurcated end *k*, through which enlarged opening one of the rounded ends H passes.

L is a clamping-bolt passing through a suitable perforation in the bifurcated end *k*, and L' is a screw-nut working on the screw-threaded end of said bolt, whereby the arm is clamped to the rocker-lever. In the bifurcated end *k'* of said clamping-arm an anti-friction roller M is suitably journaled, as illustrated. N is a supporting-plate secured to the end of the rocker-lever H by a screw-bolt N', passing through a suitable perforation in said plate and seated in a suitable longitudinal screw-

threaded perforation in said lever H. O is an adjusting-screw passing loosely through a perforation near the outer end of said plate N and held from longitudinal movement there-
 5 in by annular collars o on said screw on each side of the plate. Between the ends of the clamping-arm K is a screw-threaded perforation into which the screw O engages, so that
 10 by turning the screw the arm can be moved up or down on the lever H and regulate the part of the stroke on which the valve is moved. I provide one of my improved tripping devices at each end of the rocker-lever, and as they are independently adjustable the shift-
 15 ing of the valve can be regulated to suit the up or down stroke and the weight of the pump plunger.

It is obvious that when it is desired to adjust the tripping device on the rocker-lever
 20 the clamping-bolt is loosened sufficiently to allow the device to be shifted by the adjusting-screw, and after it is shifted to the proper position again tightened to hold the device securely in place.

25 Other forms of valves for controlling the admission of steam into the cylinder could obviously be employed without departing from the spirit of my invention.

By this arrangement the engine can be ad-
 30 justed to pump any well with ease of movement and without the injurious knocking which is incident to an engine in which the movement of the slide-valve is not properly timed to afford the necessary cushioning of
 35 the piston.

Having thus fully described my invention and the manner of carrying the same into practice, the following is what I claim as new
 40 therein and desire to secure by Letters Patent:

1. The combination of a steam-cylinder, the piston, the piston-rod, the collar or tappet, the valve controlling the entry of steam into the cylinder, the rocker-lever controlling said
 45 valve, and the longitudinally-adjustable tripping-arms mounted on said rocker-lever, substantially as set forth.

2. The combination of a steam-cylinder, the piston, the piston-rod, the collar or tappet,
 50 the valve controlling the entry of steam into

the cylinder, the rocker-lever controlling said valve, and the independently-adjustable tripping devices mounted on the said rocker-lever, each of said devices consisting, essentially, of an adjustable arm mounted on the
 55 rocker-lever, and means for adjusting said arm longitudinally on the lever, substantially as set forth.

3. The combination of a steam-cylinder, the piston, the piston-rod, the collar or tappet,
 60 the valve controlling the entry of steam into the cylinder, the rocker-lever controlling said valve, and the independently-adjustable tripping devices mounted on the said lever, each of said devices consisting of a longitudinally-
 65 adjustable arm mounted on the rocker-lever, and an adjusting-screw for regulating the position of said arm, as set forth.

4. The combination of a steam-cylinder, the piston, the piston-rod, the collar or tappet,
 70 the valve controlling the entry of steam to the cylinder, the rocker-lever controlling said valve, and the independently-adjustable tripping devices carried by said rocker-lever, each of said devices consisting of an arm mounted
 75 upon said lever and carrying an anti-friction roller in its outer end, a supporting-plate secured to the outer end of the rocker-lever, and an adjusting-screw supported in said plate and engaging a suitable perforation in said
 80 arm, as set forth.

5. The combination of a steam-cylinder, the piston, the piston-rod, the collar or tappet, the valve controlling the entry of steam to the cylinder, the rocking lever controlling said
 85 valve, and the independently-adjustable tripping devices carried by said rocker-lever, each of said devices consisting of an arm K, mounted on the rocker-lever and bifurcated at its opposite ends and provided with a
 90 clamping-screw at one end and a friction-roller at the other end, a plate M, secured to the outer end of the rocker-lever, and an adjusting-screw O, supported in said plate and engaging said arm K for regulating its posi-
 95 tion, substantially as set forth and shown.

JNO. E. KELLEY.

Witnesses:

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 JAMES MCCAREY.