(No Model.)

G. A. KELLY.

STEAM CYLINDER VALVE.

No. 475,321. Patented May 24, 1892.

Fig. 2.

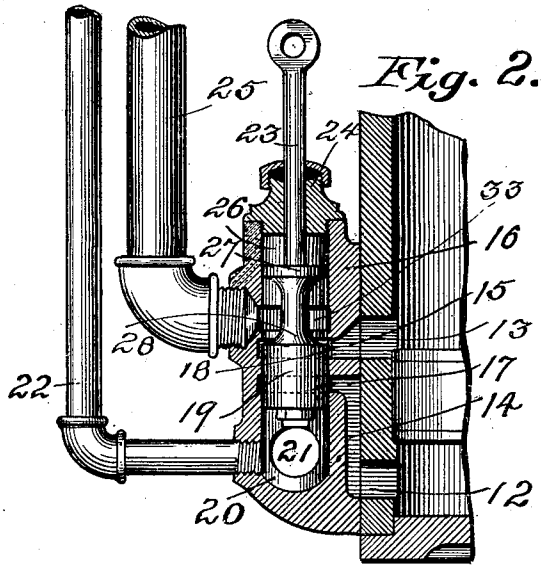


Fig. 1.

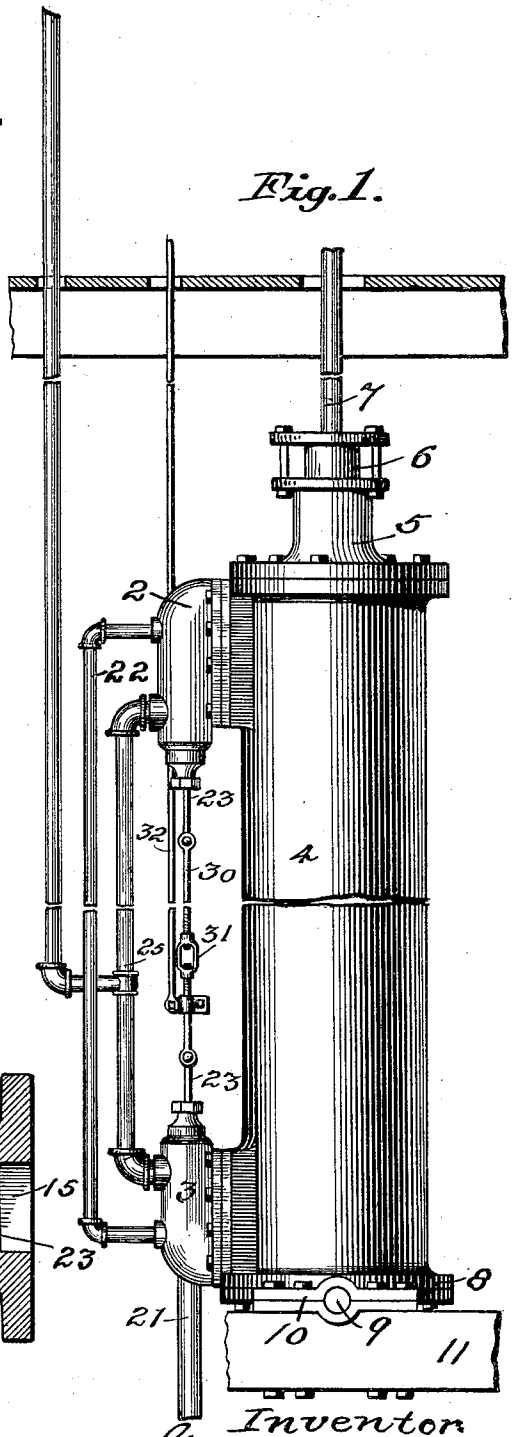


Fig. 3.

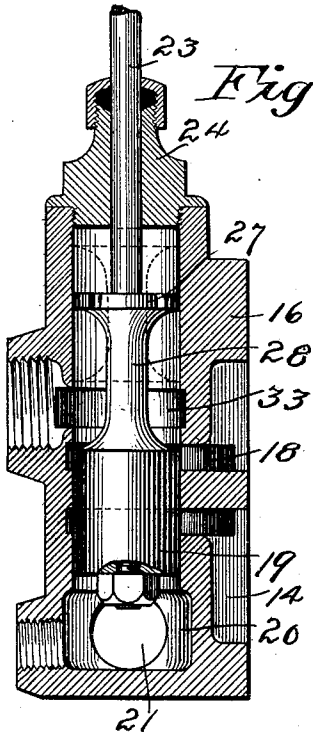
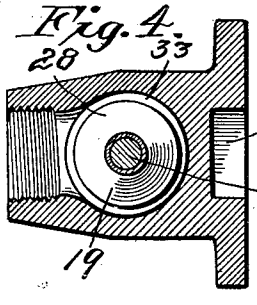


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE A. KELLY, OF STILLWATER, MINNESOTA.

STEAM-CYLINDER VALVE.

SPECIFICATION forming part of Letters Patent No. 475,321, dated May 24, 1892.

Application filed July 16, 1891. Serial No. 399,757. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. KELLY, of Stillwater, in the county of Washington and State of Minnesota, have invented certain Improvements in Steam-Cylinder Valves, of which the following is a specification.

My invention relates to valves especially adapted for use with the cylinders of steam log-turners; and the object of the invention is to provide balanced valves for such use.

To this end my invention consists in the constructions and combinations hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a vertical elevation of a cylinder provided with valves embodying my invention. Fig. 2 is an enlarged sectional view showing one of the valves. Fig. 3 is a similar view, on a still larger scale, showing the slide-valve or stem removed. Fig. 4 is a horizontal section on the line *x x* of Fig. 3.

In use the cylinder in connection with which I have shown my valves is coupled with a twin cylinder to operate a steam log-turner, commonly called a "steam-nigger." The arrangement of the valves is such that the valve-rod of the cylinders may be operated by a single person. Inasmuch as the valves on the two cylinders are alike I have shown but one cylinder and one set of valves. The valve boxes or cylinders 2 and 3 are provided on the extreme ends of the vertical cylinder 4. This large cylinder 4 is provided with the head 5, through the stuffing-box 6 of which the piston 7 is adapted to operate. The lower head 8 of the cylinder is provided with trunnions 9, secured in bearings 10, provided on the cross-beams or foundation 11, whereby the whole cylinder is pivoted on the same. The twin cylinder is placed directly at the side of the other, so that the two will operate in parallel positions. The valves and valve-boxes at the top and bottom of the cylinder are just alike, except that they occupy opposite positions, and they are placed over the inlet and exhaust ports 12 and 13 in their respective ends. The ways 14 and 15, provided in the inner wall 16 of each valve, lead into the ports 17 and 18, respectively. These ports, as shown, pass into enlarged channels or annular grooves cut in the walls of the valve-cylinder, whereby the steam is admitted to all sides of the slide-valve or piston 19 to balance the same. The live steam is admitted to the lower chamber 20 of the valve-cylinder through the inlet 21 of the lower device. From thence the live steam passes freely through the pipe 22 to the corresponding chamber located in the top of the valve-cylinder 21. Thus it will be seen that the live steam is supplied through the head of each head of the slide-valve cylinder. Hence when the same is drawn back from its chamber 20 the steam passes freely into the main cylinder through the inlet-port 17. The arrangement is such that, as shown in Fig. 3, when the inlet-port is open the outlet-port is closed by the head 19. The valve-stem 23 forms a continuation of the head 19 and passes through the stuffing-box 24, provided on the end of the valve-cylinder. The outlet-pipe 25 leads from the chamber 26 to the open air or steam-condenser, it being in this chamber that the steam passes when the exhaust-port is open. The chamber 26 is extended to admit the disk 27, provided on the stem 23. The exhaust-steam, acting against this disk, balances the action of the steam against the opposing space 28 of the head 19. Small holes or perforations are preferably provided in the disk, through which enough steam may pass to and fro to prevent the forming of a cushion behind the disk 27. The valve-stems 23 of the two valves are connected by the rod 30, divided into two parts, having threaded ends connected by the turnbuckle, whereby the length of the rod 30, and consequently the throw of the slide-valves, may be adjusted. The operating-rod 32 extends from a connection with the valve-rod 30. In connection with the chamber 26 I provide the annular groove 33, in which the steam may circulate about the head 19 when drawn back into the dotted position, Fig. 3. It will be seen that the exhaust-steam will pass through the connecting-pipe 25 not only to the outlet, but back to the other valve 2 to balance the same while in the exhaust-chamber end of its valve-box. The live steam being always present at the extreme ends of the valves 19, one of the valves is balanced against the other.

Thus, it will be observed, I provide valves which are suspended in their cylinders. All lateral pressure which would cause friction with the valve-boxes being practically absent, the valves may therefore be operated most conveniently and easily.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the cylinder, of the valve-casing thereon, the annular ports 17 and 18 for the admission and discharge of steam, respectively, the solid cylindrical valve or plug 19, arranged in said casing and provided with the stem 28 and the balancing-disk 27, provided with openings for the free passage of steam into the closed end of the valve-casing, thereby preventing a vacuum, the chamber 20, the live-steam-pipe connection therewith, the exhaust-pipe connection and the annular groove 33, and a piston or valve-rod 23, by means of which said valve is operated, said stem 28 being of small diameter, whereby a large balancing-surface is gained on the inner side of the disk 27, substantially as and for the purpose specified.

2. The combination, with the upright cylinder 4, of the valve-casings 2 and 3, each provided with ports 17 and 18 for the admission and exhaust of steam, respectively, the live-steam pipe 21, the pipe 22, connecting the lower chamber 20 of the casing 3 with a similar chamber in the top of the chamber 2, whereby an equalized steam-pressure exists at both points, reciprocating valves or plugs arranged in said casings, packing-boxes for said casings, valve-rods passing through the same and connected with a shifting-rod 32, the exhaust-pipe connecting with the other ends of said casings, the plugs 19, arranged between the inlet and exhaust of each casing, the stem 28 in the exhaust-chamber, and the balancing-disk 27, the inlet and exhaust ports and the port 33 being extended to form annular grooves about the walls of the casings, whereby said valves are exactly and at all times balanced, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand this 9th day of July, A. D. 1891.

GEORGE A. KELLY.

In presence of—

LEVI C. PROCTOR,

W. W. BALDWIN.