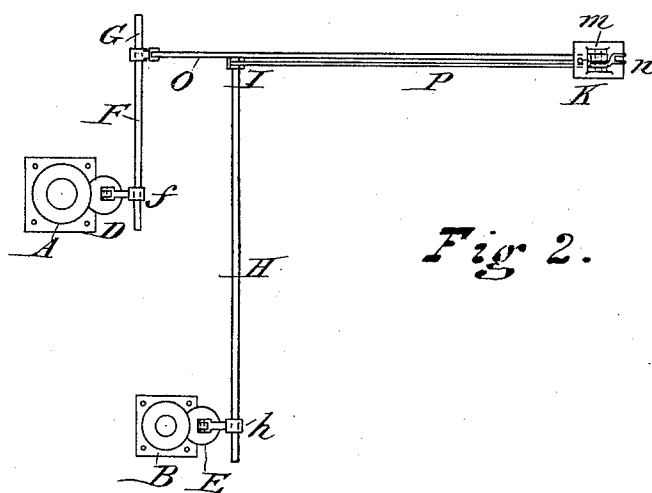
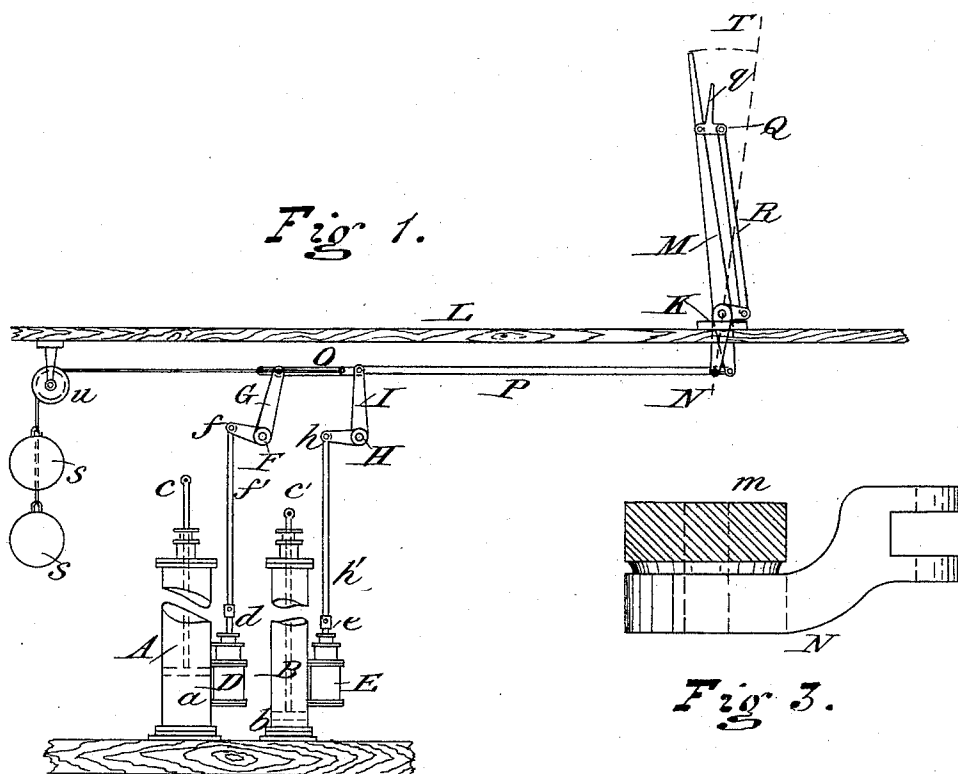


(No Model.)

R. WEIR.  
LEVER FOR STEAM VALVES.

No. 475,908.

Patented May 31, 1892.



Witnesses.  
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# UNITED STATES PATENT OFFICE.

ROBERT WEIR, OF MUSKEGON, MICHIGAN, ASSIGNOR OF ONE-HALF TO  
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## LEVER FOR STEAM-VALVES.

SPECIFICATION forming part of Letters Patent No. 475,908, dated May 31, 1892.

Application filed September 12, 1891. Serial No. 405,564. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT WEIR, a citizen of the United States, residing at Muskegon, in the county of Muskegon and State of Michigan, have invented certain new and useful Improvements in Lever-Movements for Operating Steam-Valves; and I do hereby 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.

This invention relates to an improvement in lever-movements for operating steam-valves, the object of the invention being to provide simple and efficient mechanism whereby two or more steam-valves located at any distance apart may be operated either separately or simultaneously in any desired direction by means of one main lever and suitable and convenient mechanical attachments arranged in connection therewith, said main lever being conveniently situated for manipulation by the operator.

One leading object which I have in view is simplicity of construction, inasmuch as many of the devices now in use for the purpose of operating valves of the description referred to are not only complicated and liable to get out of order, but their movements are of such a character that in order to accomplish the desired results numerous motions of the operating-handle forward, backward, and sideways are necessary in order to bring about the desired ends, thus causing the operator while standing in the same position to exercise a severe strain upon his wrist by reason of the fact that the lever or handle requires at times a motion at right angles to the position which he faces. I aim to avoid and overcome all these difficulties by my improved arrangement; and my invention therefore consists in the construction, arrangement, and combination of the several parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a side elevation of two steam-cylinders with their valves, &c., together with my improved leverage mechanism, arranged in practical operative position for the purpose of operating the said valves.

Fig. 2 is a plan view of the same. Fig. 3 is an enlarged sectional plan of the main lever which is used to operate one of the valves and the adjoining bent lever which is used for actuating the other valve.

Similar letters of reference designate corresponding parts throughout the several figures of the drawings.

A and B designate two upright steam-cylinders, having the pistons *a* and *b*, which are provided with the piston-rods *c* and *c'*. These upright cylinders may be mounted firmly and immovably upon a suitable bed or base, or they may be arranged in any other desired manner. On the side of the steam-cylinder A is securely fastened a steam chest or chamber D, and on the side of the steam-cylinder B is securely fastened a similar steam chest or chamber E. These steam-chests D and E contain valves, preferably of a piston or cylindrical character, which valves are provided with the valve-rods *d* and *e*, which project through the upper ends of the valve-chests, as shown in Fig. 1.

F designates a horizontal shaft, which is supported in suitable bearings at a proper distance above the valve-chest D. The horizontal shaft F is provided at one end with the rigid arm *f* and at the other end with the rigid arm G. To the outer end of the arm *f* is pivoted one end of a connecting-rod *f'*, whose other end is pivoted to the projecting end of the valve-rod *d*.

H designates another horizontal shaft supported in suitable bearings at a proper distance above the valve-chest E. The horizontal shaft H is provided at one end with a rigid arm *h* and at the other end with a rigid arm I. To the end of the arm *h* is pivoted one end of a connecting-rod *h'*, whose other end is pivotally connected to the projecting end of the valve-rod *e*. Thus it will be seen that I have arranged mechanism for operating the valve-rods *d* and *e* separately. It is obvious that a movement of the arm I will operate the valve-rod *e*, and consequently the valve attached thereto, while a movement of the arm G will operate the valve-rod *d* and consequently the valve attached thereto.

L designates any suitable flooring or beam or support arranged at a proper position above

the steam-cylinders which I have been referring to, said flooring L constituting a platform whereon the operator may stand. On this platform at a convenient point is secured  
 5 a bracket-box K, which is rigidly fastened in position. This bracket-box may be of any suitable and desirable construction. It preferably has lugs or parallel flanges thereon, as shown, and between the lugs is pivoted the  
 10 main upright operating handle or lever M, which projects downward through the bracket-box and also through the support L for a short distance below said support; also, the bell-crank lever N is likewise pivoted within  
 15 the bracket K. The bell-crank lever N and the upright lever M are clearly shown in Fig. 1, and in Fig. 2 their relative arrangement is defined. They work loosely on their supporting  
 20 pivotal pin and move independent of each other when desired. To the lower end of the main lever M is pivoted one end of a connecting-rod O, the other end of which is pivoted to the upper end of the arm G; also, to  
 25 the lower end of the depending arm of the bell-crank lever N is pivoted one end of the connecting-rod P, the other end of which is pivotally connected to the upper end of the arm I.

At a suitable distance below the upper end  
 30 of the main lever M a lever Q is pivoted thereto. To the outer end of the lever Q is pivoted one end of a connecting-rod R, the lower end of which is pivoted to the shorter arm of the bell-crank lever N. The end of  
 35 the short arm of the lever N is slotted to permit of this pivotal connection. Both ends of the lever Q are slotted or provided with double jaws, so that said lever Q may be easily pivoted to the main lever M and also  
 40 to the connecting-rod R. Furthermore, it will be noted that the short arm of the lever N is bent horizontally, so that the rod R may be permitted to occupy a position directly at the back of the lever M and parallel closely thereto.  
 45 The form of the short arm of the crank-lever N is shown in Fig. 3. The upper side of the lever Q is provided with a handle projection *q*, which is adapted to be grasped by the operator for the purpose of manipulating  
 50 the connection R, bell-crank lever N, rod P, and consequently the valve within the valve-chest E.

S S designate weights, which are connected by means of suitable cords or ropes to the connecting-rods O and P, respectively. (See  
 55 Fig. 1.) These ropes pass around the pulleys U, which are conveniently supported in brackets secured to the flooring L or to some other rigid part of the main frame-work.  
 60 These weights S S are used for the purpose of drawing back the arms and keeping the valve-rods *d* and *e* normally down when the cylinders are not being operated. The dotted line T (shown in Fig. 1) represents the  
 65 center line of the main handle or lever M when both valves are closed and the cylinders are not operating.

I will now proceed to describe the operation of my improved lever-movement for operating steam-valves.

As already stated, it will be manifest that  
 70 when the valves within the chests D and E are down and the valves are closed the lever-handle M will occupy the position shown in dotted lines at T, Fig. 1. The actual position  
 75 of lever M and its connections, as represented in Fig. 1, is that occupied when the valve in chamber D is at full stroke. The valve-rod *d* has now been lifted, admitting steam to the  
 80 under side of piston *a* within cylinder A, and thereby moving the piston-rod *c* upward. The valve-rod *e* has not yet been lifted. Now if the operator desires to operate the piston  
 within the cylinder B he presses with his thumb upon the handle *q*, which moves the lever Q  
 85 and consequently the bell-crank N so that the latter falls into line with the end portion of the lever M, and through the intermediate connections the valve-rod *e* is lifted, the valve  
 within the valve-chest E opened, and steam  
 90 admitted to the under side of the piston *b*, thereby causing said piston and the piston-rod *c'*, connected thereto, to move upward. When it is desired to reverse the piston-rods,  
 95 the operator will release the handle *q*, whereupon the piston *b* will descend. If he does simply this, of course only one valve will be closed, provided he still retains his hold upon  
 the lever M and keeps it in the position shown  
 100 in full lines in Fig. 1. If he desires to reverse the other piston-rod also, however, he will release the lever M and allow it to take the position shown in dotted lines. Thus it  
 will be seen that the operator has both of the  
 105 valves constantly under his control. He can operate either one or the other singly or both together quickly and without any difficulty  
 or labor. By easy and simple manipulation  
 of his hand upon the end of the lever M and  
 110 by placing the thumb upon the handle *q* the whole combination is kept at all times under his control and the valves are readily operated. Of course the arrangement of levers  
 can be changed, whenever desired, so as to  
 115 connect the lever M with the arm I and the bell-crank N with the arm G. It will also be observed that the leverage devices can be re-  
 arranged to suit a different arrangement of the steam-cylinders; also, various modifica-  
 120 tions may be made in the precise form, location, and arrangement of the several parts without departing from my invention. I therefore reserve the liberty of making such  
 slight changes as experience may prove to be  
 125 requisite for the carrying out of the invention in the best practical manner.

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

1. In a lever-movement for operating steam-  
 130 valves, the combination, with two valves, of a lever and intermediate connections between the ends thereof and the valve-rod belonging to one valve, and an auxiliary handle pivoted

to the first handle near the end thereof, together with suitable connections between said auxiliary handle and the valve-rod belonging to the other valve, substantially as described.

5 2. In a lever-movement for operating steam-valves, the combination, with two steam-valves, of a main lever, suitable connections between it and the valve-rod belonging to one valve, a lever pivoted to the main lever and  
10 having a handle in proximity to the handle of the main lever, a pivoted bell-crank, a connecting-rod between the auxiliary lever and said bell-crank, and suitable connections between the bell-crank and the valve-rod be-  
15 longing to the other valve, substantially as described.

3. The combination, with two steam-valves, of a lever M and the bell-crank N, said lever and bell-crank being suitably pivoted, an auxiliary lever Q, having handle *q* and pivoted to  
20 lever M, a connecting-rod R between the lever Q and the bell-crank N, and the horizontal shafts F and H, each provided with rigid arms, said arms being connected by rods with  
25 the bell-crank N and lever M, respectively, and also with the valve-rods belonging to the valves, substantially as described.

4. In a lever-movement for operating steam-valves, the combination, with the valves hav-  
30 ing valve-rods *d* and *e*, of the shafts F and H,

said shaft F having at one end arm *f* and at the other end arm G, and said shaft H having at one end arm *h* and at the other end arm I, the rod *f'*, connecting arm *f* with valve-rod *d*, the rod *h'*, connecting arm *h* with the  
35 valve-rod *e*, the pivoted lever M, the rod O, connecting said lever with the arm G, the handle-lever Q, pivoted to the lever M, and the pivoted bell-crank N, which is connected with the lever Q by the rod R and with the lever  
40 I by the rod P, all arranged to operate substantially as described.

5. In a lever-movement for operating steam-engine valves, the combination of the valves having valve-rods *d* and *e*, the shafts F and  
45 H, having arms, the main lever M, and bell-crank N, the connecting-rods O and P, connecting the main lever and the bell-crank, respectively, with arms on shafts F and H, the connecting-rods between the arms on shafts  
50 F and H and the valve-rods and the weights S S, and the cords connecting them with the rods O and P, respectively, substantially as described.

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

ROBERT WEIR.

Witnesses:

E. J. FLEMMING,  
A. W. BLURBY.