

W. J. STEVENS.
STEAM VALVE.

No. 21,155.

Patented Aug. 10, 1858.

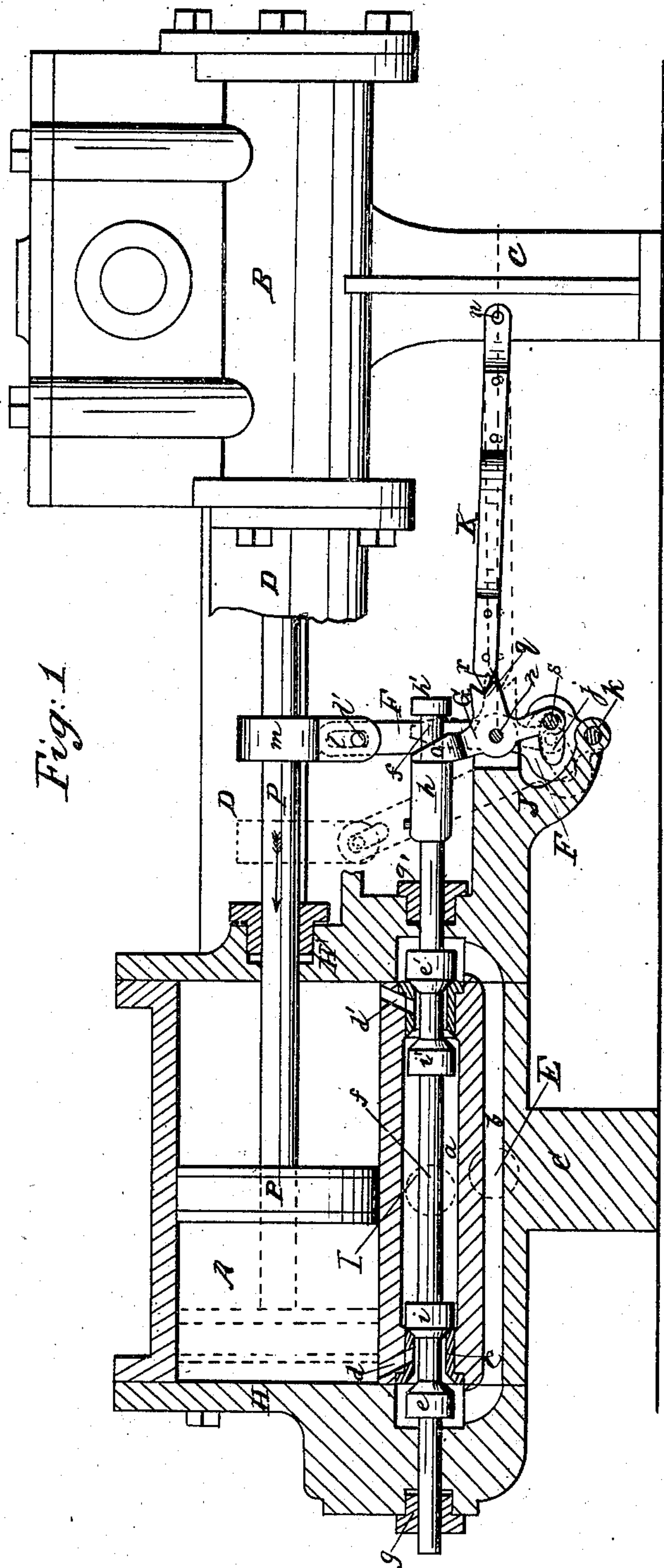


Fig: 1

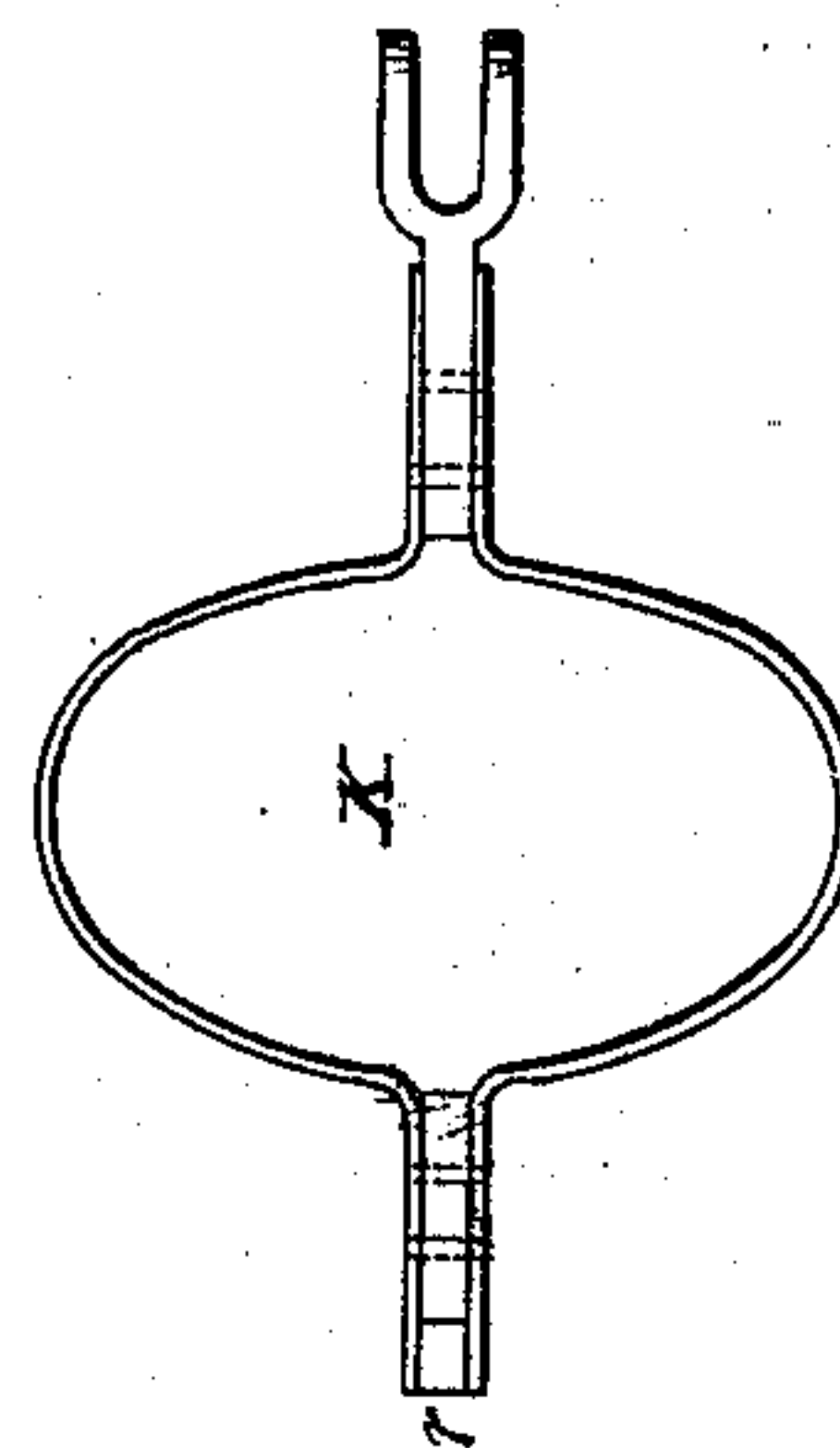


Fig. 2.

UNITED STATES PATENT OFFICE.

W. J. STEVENS, OF NEW YORK, N. Y.

STEAM-VALVE.

Specification of Letters Patent No. 21,155, dated August 10, 1858.

To all whom it may concern:

Be it known that I, WILLIAM J. STEVENS, of the city, county, and State of New York, have invented a new and Improved Valve-Motion for Direct-Action Steam-Engines for Pumping and other Purposes; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a longitudinal elevation, partly in section of a pumping engine having my improved valve motion applied. Fig. 2, is a plan of the spring for throwing the valves.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists in a certain arrangement of a spring and levers for giving a sudden movement to the valves to change the direction of the induction and eduction of the steam to and from the steam cylinder as the piston of the engine arrives at the end of its stroke.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

A, is the steam cylinder and B, the pump cylinder each cast with a foot C, and the two connected together by a stay D, whose transverse section is of the form of an inverted arch, the said feet and stay constituting the framing of the engine. P, is the steam piston and P*, the piston rod connecting said piston with the pump piston.

a, is the induction passage and b, the eduction passage of the steam cylinder, the former having the induction steam pipe connected with it at I, and the latter the exhaust pipe at E. The ends of the induction passage in the cylinder casting are bored cylindrically to receive two bushes c, c', the inner ends of which are turned out conically to constitute seats for the two induction valves i, i', and the outer ends are similarly turned out to constitute seats for the eduction valves e, e'. The eduction passages lead to the outer ends of the bushes c, c', and the induction passage is included between the said bushes.

d, d', are ports leading from the interiors of the bushes c, c', into the steam cylinder near the ends of the latter for the induction and eduction of the steam. The valves i, i', and e, e', are of the puppet kind and all

attached to the same rod or stem f, which works through stuffing boxes g, g', in the cylinder heads H, H', and the said valves are arranged at such distances as to limit the longitudinal movement of the valve stem to just sufficient to open the valves, and that the induction valve i, and eduction valve e', close together and the eduction valve i', and eduction valve e, close together. The pressure of the steam on the valves thus applied makes the pair at one end of the cylinder balance those on the other end. The valve stem f, protrudes some distance from the stuffing box g', at the end of the cylinder next the pump and the said protruding portion is furnished with two tappets h, and h'.

F, is a lever attached by a fulcrum pin k, to an arm J, cast on the cylinder head H', below the valve stem f, passing up clear of the said stem to connect by a slot l, and pin l', with a collar m, on the piston rod P*, the said lever containing a slot j, not far from its fulcrum k.

G, is a T shaped lever attached by a fulcrum pin n, to the arm J, above the slot j, of the lever F. This lever carries at the extremity of its lower arm a pin s, which works in the slot j, of the lever F, and has at the extremity of its upper arm a fork o, which embraces the valve stem f, between the two tappets h, h', and at the extremity of its third arm a V shaped recess q, to receive the V shaped or knife edged end r, of the elliptical spring K, which is jointed by a pin p, to the foot C, of the pump cylinder at a point directly opposite the fulcrum n, of the lever G, and which exerts a constant pressure between p and q.

The operation of the valve motion is as follows. As the piston moves in either direction it moves the lever F, whose slot j, plays on the pin s, of the lever G, till the piston has moved some distance, when one end of the said slot strikes the pin s, and moves the fork o, of the latter lever from one of the tappets h, h', toward the other, and moves the spring K, up or down; and just as the piston arrives near the end of its stroke the fork o, touches the tappet and this occurs just as the edge r, of the spring K, passes the line of culmination between the pins n, and q, and the spring by its pressure upon the lever G, then gives the said lever a sudden movement by which the fork o, is caused to act upon the tappet, and move the valve stem so as to open the

induction and eduction valves which have been closed, and close the induction and eduction valves which have been open. In illustration of this, let it be supposed that the valves *i*, and *e'*, are closed and those *i'*, and *e*, open, as shown in Fig. 1, the steam enters the cylinder by the port *d'*, and exhausts by the port *d*, and the piston moves in the direction of the arrow shown upon its rod. The lever F, is represented as having been moved by the piston rod far enough for the right hand end of the slot *j*, to strike the pin *s*, and the lever G, is about to commence moving from the tappet *h*, to that *h'*, and when it reaches the tappet *h'*, the spring K, will just have passed its aforesaid line of culmination, which condition is represented in red outline on Fig. 1, and the line of culmination in black dots, and the pressure of the spring on the lever G, will throw the said lever against the tappet *h*, and thus move the valve stem to close the valves *i'*, and *e*, and open *i*, and *e'*, thus admitting

steam from the induction passage *a*, to the cylinder by the port *d*, and causing it the steam, previously in the cylinder to exhaust by the port *d'*, and causing the movement of the piston to be reversed. As the piston moves in the opposite direction the operation of the levers F, and G, and valves is precisely the reverse.

I do not claim broadly the use of springs to move the valves, and I do not confine myself to the application of my invention to a system of valves like those described, but

What I claim as my invention and desire to secure by Letters Patent, is—

The slotted lever F, the T shaped lever G, and the spring K, arranged in relation with each other and with the piston rod and the valve stem to operate substantially as herein set forth.

WM. J. STEVENS.

Witnesses:

W. TUSCH,
W. HAUFF.