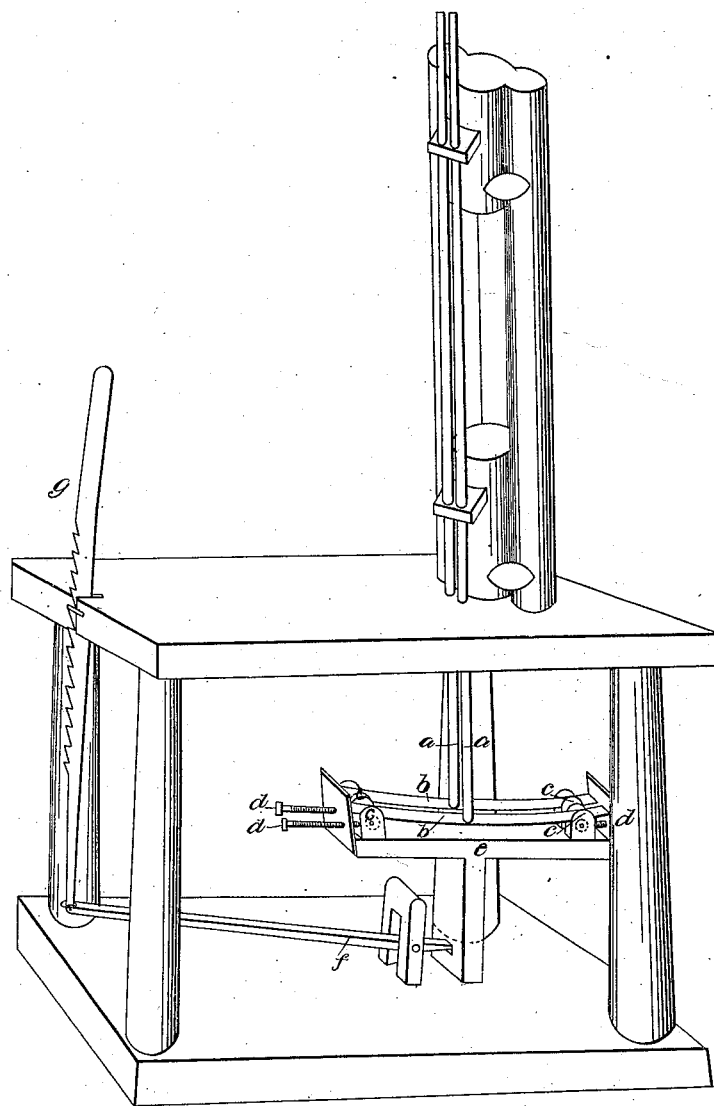


*J. Kirkpatrick,*  
*Steam Cut-Off.*  
*N<sup>o</sup> 400.* *Patented Sep. 25, 1837.*



# UNITED STATES PATENT OFFICE.

JOHN KIRKPATRICK, OF BALTIMORE, MARYLAND.

## MODE OF CAUSING PUPPET VALVES TO WORK LIGHTS.

Specification of Letters Patent No. 400, dated September 25, 1837.

*To all whom it may concern:*

Be it known that I, JOHN KIRKPATRICK, of Baltimore, in the State of Maryland, have invented a new and Improved Method of Causing Puppet-Valves to Work Light; and I do hereby declare that the following is a full and exact description.

The nature of my invention consists in causing the unequal action of springs to counteract the unequal action of puppet valves in opening and shutting, as the valves press much harder when nearly shut, the springs being forced down by the valves in shutting offer the greatest resistance at that time, and in rising they cease to act as the valves cease to require that action.

The accompanying drawing represents an application of springs to the lifting rods of a condensing engine.

The letters *a* represent the lifting rods; *b*, the spring; *c*, the pillow blocks having rollers under the ends of each spring; *d*, the screw by which the pillow blocks are moved to make the springs longer or shorter; *e*, the frame upon which the springs are set, *f* the lever to raise them up or down, and *g*, the handle by means of which the degree of force is regulated, having ratchets to hold it at any required place.

Springs that are very stiff, if set right when the valves are shut, will fail to follow them sufficiently in rising; while those that are very limber will act through too great a space; it is only necessary therefore to find the greatest weight which the springs should bear when the valves are shut, and the distance they should act in rising, to give the necessary proportions to valves of any kind for that purpose; but by altering the length of the spring which may be done as shown in the drawing, or in case of spring levers by a sliding fixture on the outer end, which may be secured at any particular place, (with set screws) by which the lever is regulated; or by altering the fulcrum the action may in a great degree be suited to the force, and distance of lift required. Springs being calculated for the greatest force exerted against the valves, any less action can be regulated

by the lever, the distance the springs act upon the valves being in direct proportion to the force applied by the lever.

To take off more than half the pressure to which valves are exposed, the spring should act alike on each of the valves that move together and are attached to the same rod, which will prevent one from being lifted because the other was not acted upon as may be the case when the application is made to the lifting rods; the means of doing this are so obvious as not to require explanation. This arrangement I make self regulating by causing two pistons of the proper size to bend the springs upward, which in that case will cease acting as the valves shut, permitting the whole force of the piston to press against them at that time, as the valves rise the spring takes the force of the piston. Any alteration in the pressure or vacuum of the engine is thus made to press more or less against the valves which require no attention; in case of using only one piston, the force must be equally divided between the two springs by a chain and pulley, or a lever.

Different kinds of springs and engines require certain portions of the plan to be reversed, or altered, which any competent engineer can do, the principle of action continuing the same. It is scarcely necessary to add that the one end of the cylinder in which the piston is used should be connected to the steam, and the other to the exhaust part of the sidepipes of the engine; as the arrangement may require.

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

The application of springs as herein described, either with or without the piston, to cause puppet valves to work light; using for that purpose any kind of spring best suited to the particular arrangement of engine to which it is applied.

JOHN KIRKPATRICK.

Witnesses:

J. L. MORGAN,  
SAMUEL GLADDIN.