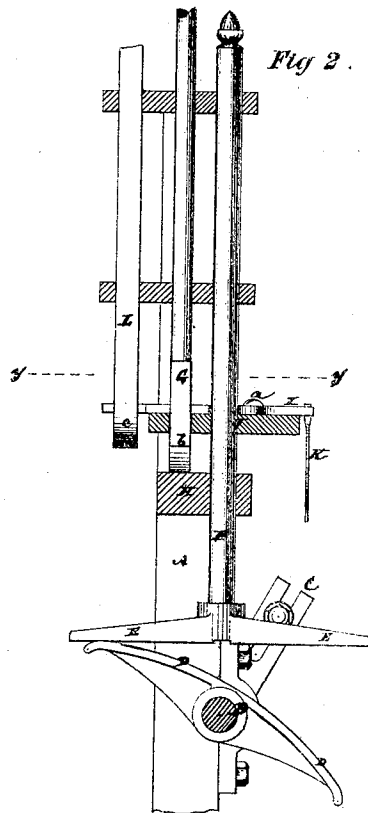
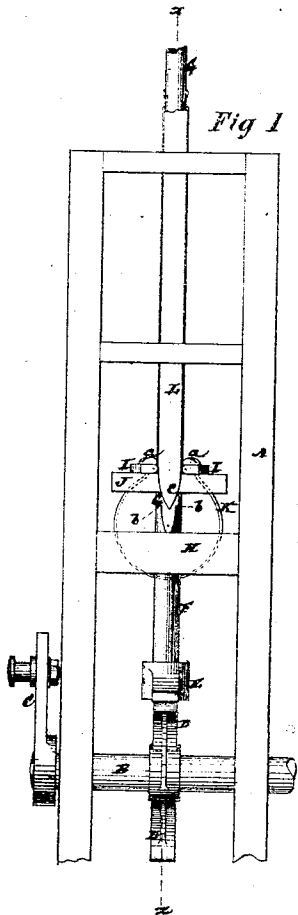


*N. K. Lynch,*

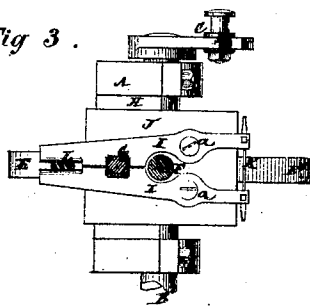
*Cut Off Valve.*

*No. 101,634.*

*Patented Apr. 5, 1870.*



*Fig 3 .*



*Witnesses.*

*Chas. J. Brown  
Fred S. Harris*

*N. K. Lynch*

# United States Patent Office.

NATHANIEL K. LYNCH, OF NEW YORK, N. Y.

Letters Patent No. 101,634, dated April 5, 1870.

## VARIABLE CUT-OFF-VALVE GEAR.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern :

Be it known that I, NATHANIEL K. LYNCH, of the city, county and State of New York, have invented a new and improved Cut-off Gear for Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a front or one-side elevation of my improved cut-off gear.

Figure 2 a vertical section of the same, taken, as indicated, in the line *x x* in fig. 1, and

Figure 3 a horizontal section thereof, taken, as denoted, by the line *y y* in fig. 2.

Similar letters of reference indicate corresponding parts.

The object of this invention is to convert into a variable cut-off, an ordinary throttle-valve, or any valve which, like it, is used outside of the engine to regulate the supply of steam to the steam-chest of the engine.

It consists in certain means, which, under ordinary speeds of the engine, operate to effect a full opening of the governor-valve, and a varied closing of the same during each stroke of the engine, such variation, in closing, being regulated by the speed of the engine through the action of the governor.

When the engine has a tendency to run at an extreme speed, fast or slow, said valve may be wholly closed, or kept wholly or longer open.

Referring to the accompanying drawing—

A represents a frame that is used to carry my improved cut-off gear, and

B a horizontal rock-shaft, supported by said frame, and which may be operated by a slotted crank or arm, C, through an eccentric on the main shaft of the engine.

This shaft B carries toes D D, which serve, as the rock-shaft is vibrated, to act against lifters E E, arranged to project from a vertically-sliding rod, F, that is suitably guided in its play through the frame A, and may have its stroke adjusted to give any required positive set or motion to the cut-off by means of the slotted connection of the driving eccentric with the crank or arm C.

The lift of said rod F takes place in the early part of each stroke of the engine, for the purpose of lifting a rod, G, to open the throttle or governor-valve with which it is connected, said rod in its lift opening said valve to give a full head or supply of steam to the engine early in the stroke, and, when relieved from lift, which occurs at various periods during the stroke, as regulated by the governor, dropping by its own weight, or by weight attached to it, or connected with the valve, to close the latter so as to shut off the

supply of steam to the engine, that thus has its speed regulated by the closing of the governor-valve during the stroke of the engine.

The means for varying the period in the drop of said valve-rod G, to close the governor-valve, will now be described.

Said rod has a fixed or positive limit to the extent of its drop, by falling, when released from lift by the operation of the rod F, onto a table or stop, H, connected with the frame A, to secure the closing of the valve.

Its lift, to open the valve, is effected by jaws or levers I I, pivoted, as at *a a*, to a platform, J, carried by the rod F, and through which the valve-rod G is free to play.

These jaws are closed by a spring, K, applied to their back ends, and serve, during the lift of the platform J by the rod F, to raise the valve-rod G to open the valve, by clipping said rod G under shoulders *b b* formed thereon, and said jaws are opened at different periods in the lift of the rod F to allow of the rod G dropping through them onto the table H to close the valve. The period of opening the jaws, therefore, controls the time of shutting off the supply of steam during the stroke of the engine, and this is regulated by the governor through a vertical bar, L, of a wedge form at its lower end *c*, which fits an opening in or between the jaws, and which, accordingly as it is raised or lowered by the action of the governor, (an increase in the speed of the engine lowering it and a decrease in the speed raising it,) serves to open the jaws I I sooner or later in their upward travel, along with the rod F, by the pressure of said jaws against and over the sides of the wedge *c* of the bar L, and thus cause the valve-rod G to drop sooner or later in the stroke of the engine and close the valve.

The down-stroke of the rod F and jaws I I is such as always to bring the latter, when at the bottom of their stroke, under the shoulders *b b* of the valve-rod G, to secure its lift, although, under a tendency of the engine to run at an extreme quick speed, the bar L is designed to be lowered to an extent that will cause its wedge *c* to keep open the jaws, so that, as the latter are lifted, they will not grip the valve-rod or bite on it under the shoulders *b b*, which causes the valve to remain closed. Likewise, under an extremely slow speed of the engine, it is intended that the governor-bar L should be so raised as to exert no opening action on the jaws, which will give a positive or fixed action to the valve independently of the governor, and exclusively by the operation of the rod F, which action does away with the closing of the valve during the stroke of the engine, or only slowly closes the same toward the end of the stroke thereof.

The bodies of the valve-rod G and governor-bar L,

above the shoulders *b b* and wedge *c*, should be shaped to admit of the jaws, when opened, sliding up along or over them.

Said jaws, or valve-rod-gripping devices, are not necessarily restricted to the form herein shown and described.

What is here claimed, and desired to be secured by Letters Patent, is—

The combination of the jaws or gripping-levers *I I*, arranged to receive a positive up-and-down motion

from the engine, the drop-rod *G* connected with the valve designed to be controlled by the governor, and the bar *L* for operation by the governor, and constructed to have an opening action on the jaws, substantially as specified.

NATHL. K. LYNCH.

Witnesses:

HENRY T. BROWN,  
HENRY PALMER.