2 Sheets—Sheet 1.

J. FISH.

VARIABLE CUT-OFF VALVES FOR STEAM-ENGINES.

No. 186,240. Patented Jan. 16, 1877.

Fig. 1.

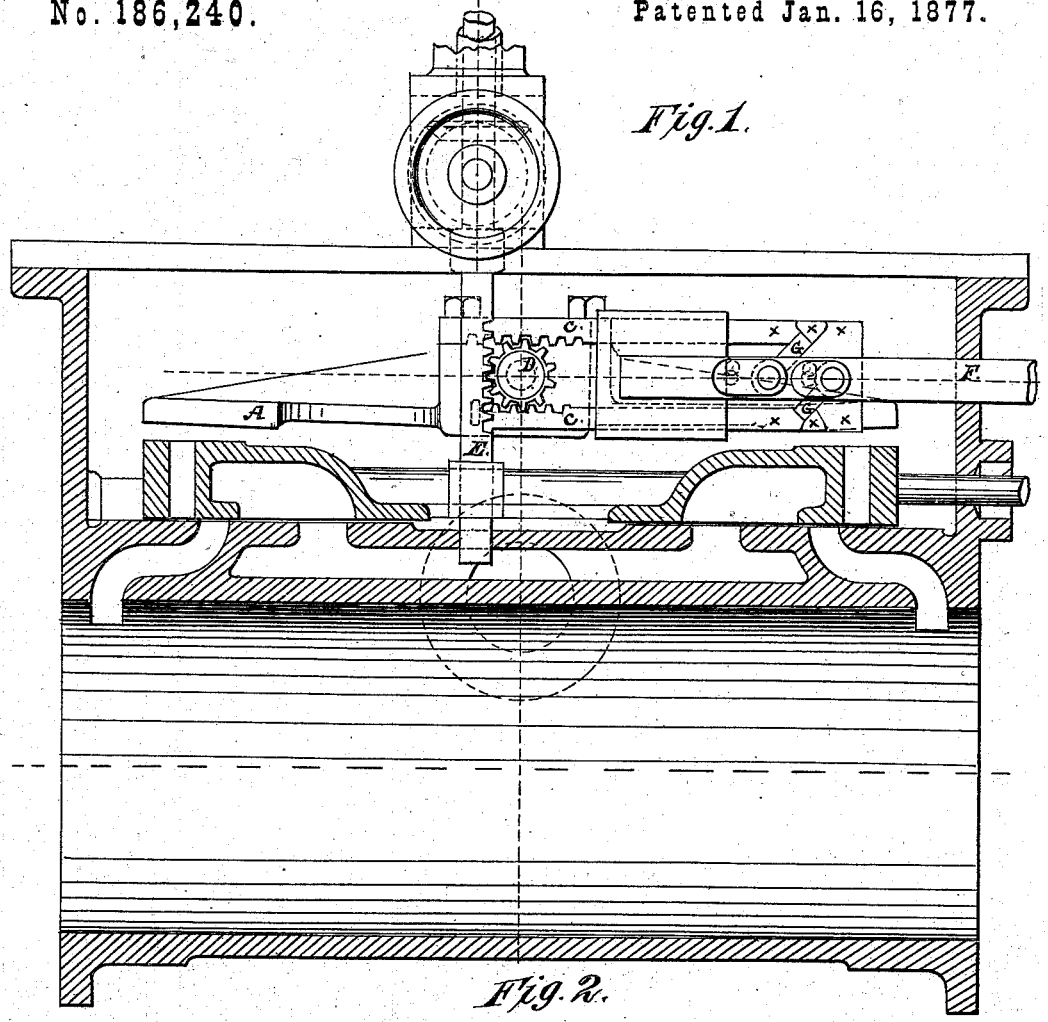
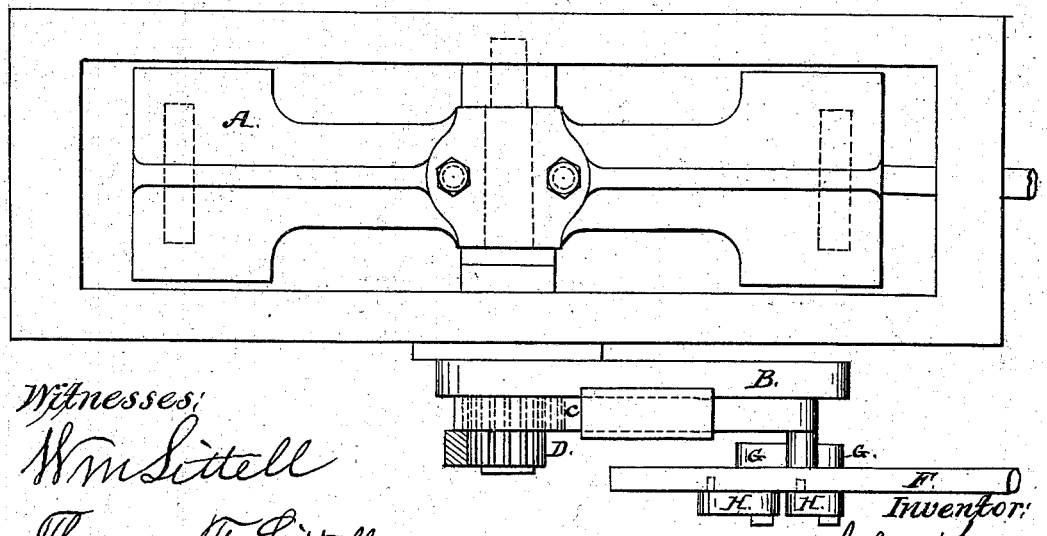


Fig. 2.



Witnesses:

Wm Littell

Theodore F. Littell

Inventor:

John Fish

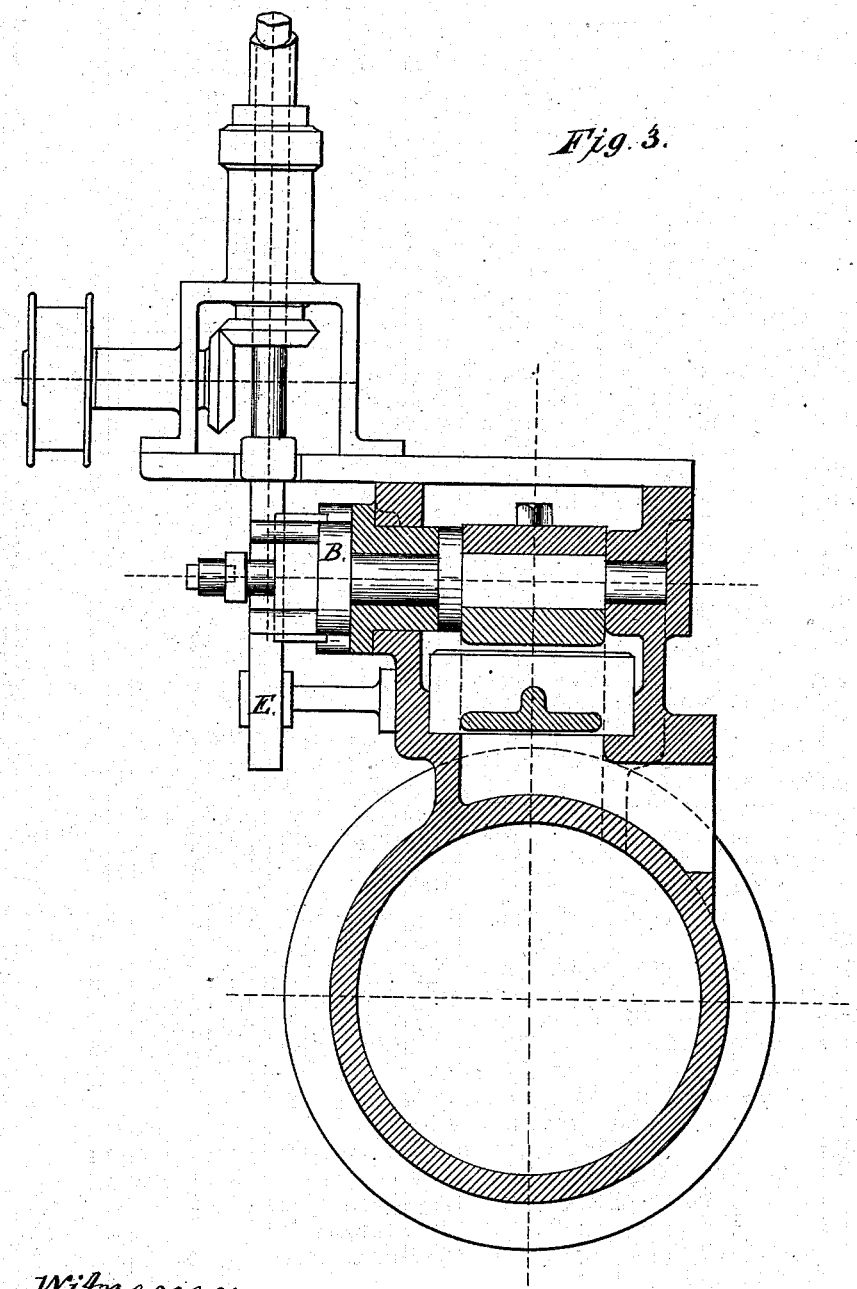
2 Sheets—Sheet 2.

J. FISH.

VARIABLE CUT-OFF VALVES FOR STEAM-ENGINES.

No. 186,240. Patented Jan. 16, 1877.

Fig. 3.



Witnesses:
Wm Littell
Theodore F Littell

Inventor:
John Fish

UNITED STATES PATENT OFFICE.

JOHN FISH, OF SUMMIT, NEW JERSEY.

IMPROVEMENT IN VARIABLE CUT-OFF VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **186,240**, dated January 16, 1877; application filed October 20, 1876.

To all whom it may concern:

Be it known that I, JOHN FISH, of Summit, in the county of Union and State of New Jersey, have invented a Variable Cut-Off Valve for Steam-Engines, of which the following is a specification:

The first part of my invention relates to a vibrating cut-off valve, working on the back of a main slide-valve, with its shaft or journals working in bearings attached to the cylinder or steam-chest. When either end of the cut-off valve is down on the main slide-valve the steam is shut off from that end, the main slide working freely under the cover of the cut-off valve.

In order to be able to keep the valves the same distance apart in case of wear or refitting, I make that part of the rock-shaft which passes through the cut-off valve square or rectangular, with a cap and bolts on the valve, so that by placing liners under the shaft the proper distance can be maintained between the valves.

The second part of my invention relates to the rock-shaft lever, and the arrangement for controlling the adjustable stops upon it. Attached to the rock-arm lever are guides, so arranged as to give the same angular movement to the lever whether the adjustable stops are at the outer or inner end of their travel. On the rock-shaft is a loose gear-wheel, into one part of which gear the rack-rods of the adjustable stops, and into the other part the rack connected to the governor-spindle, which controls the movement of the loose gear, and, consequently, the adjustable stops. Any angular movement of the lever causes the stop-racks to roll round the loose gear.

The third part of my invention relates to the tripping-toes in the sliding bar for giving motion to the rock-shaft lever. There are two toes held upon center-pins at fixed distances apart. When the point of the toe is brought in contact with its stop the movement of the sliding bar, continued, causes the toe to move the lever sufficiently for it to pass clear; but in the return motion, when the valve is cutting off in the earlier part of the piston-stroke, the toe has got to trip under its stop, which, in this arrangement, it does, the amount of depression being regulated by a slot in the sliding bar, into which a pin fixed in the balance-weight lever (marked H) works. This balance-weight lever always brings the toe into its positive position when clear of the stop.

Figure 1 is a longitudinal section of the cylinder, valve, and steam-chest, in which the vibrating valve is marked A, rock-shaft lever B, stop-racks C, loose pinion D, governor-rack E, sliding bar F, tripping-toes G, and balance-weight lever H. Fig. 2 is a plan of the above. Fig. 3 is a cross-section of the same.

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

1. A vibrating cut-off valve with parts so arranged as to close the ports of a slide-valve, when the bearings are attached to the cylinder or steam-chest, substantially as specified, and as herein set forth.

2. The combination of the sliding bars and stops on rock-shaft lever with the loose gear-wheel on rock-shaft, the loose gear-wheel being connected to the governor, by means of which the position of the adjustable stops is regulated by the governor, substantially as specified, and as herein set forth.

3. The sliding bar with its tripping-toes, in combination with the adjustable stops in the rock-shaft lever, to give motion to the vibrating cut-off valve, substantially as specified, and for the purpose as herein set forth.

4. The combination of a vibrating cut-off valve, having a rock-shaft and rock-shaft lever, with a sliding bar and its tripping-toes, to move it, together with the sliding rack-bars and stops on the rock-shaft lever, connected to a loose gear-wheel on rock-shaft, the motion of the loose gear-wheel being regulated by the governor, substantially as specified, and for the purpose as herein set forth.

JOHN FISH.

Witnesses:

WM. LITTELL,

THEODORE F. LITTELL.