(No Model.)

# S. CHAPLIN.

## VALVE GEAR.

No. 487,249. Patented Dec. 6, 1892.

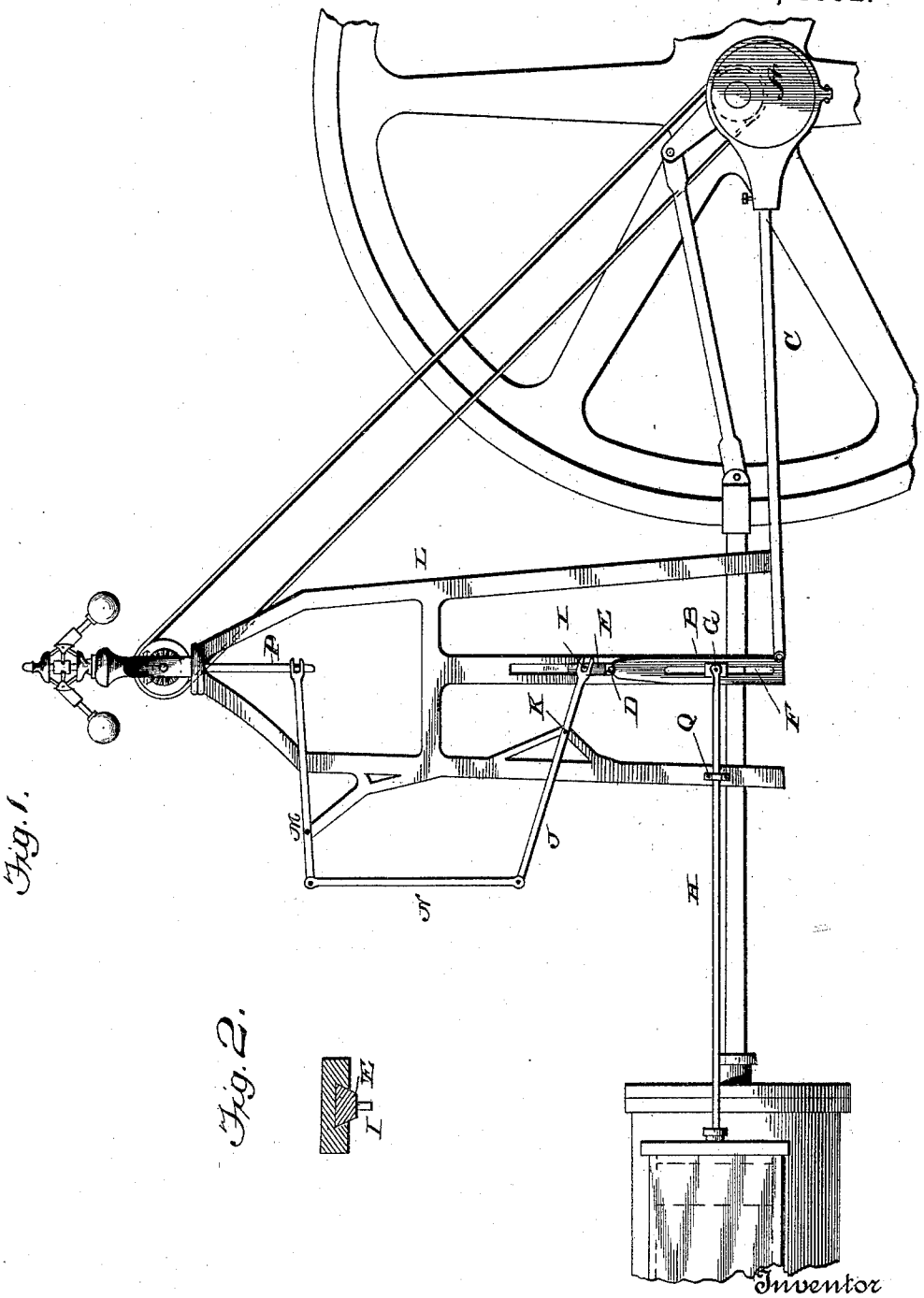

Fig. 1.



Fig. 2.

Witnesses

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# UNITED STATES PATENT OFFICE.

STEPHEN CHAPLIN, OF BUCKLEY, WASHINGTON.

## VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 487,249, dated December 6, 1892.

Application filed July 12, 1892. Serial No. 439,808. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN CHAPLIN, of Buckley, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Valve-Gear; 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.

My invention is an improvement in link-gears for regulating the length of stroke of the valve-rod of a steam-engine, designed for greater simplicity of construction and certainty of operation and which can be applied to any form of engine.

I have set forth fully hereinafter the details of construction and the essential features of my invention and illustrated them in the accompanying drawings, in which—

Figure 1 is an elevation of my invention as connected to an ordinary horizontal steam-engine, and Fig. 2 is a section of the sliding piece E.

A is an eccentric, which is connected to the lower end of an oscillating arm B by means of the connecting-rod C. The upper end of the lever B is pivoted at D to a vertically-sliding piece E, while its lower part F is slotted to carry a sliding bearing G, to which the valve-rod H is pivoted. The sliding piece E carries a projecting piece I, which works in the slotted end of a lever J, pivoted at K. At the upper part of the governor-frame L is pivoted a lever M, one end of which is connected to the lever J by means of the connecting-rod N, and its other end O is slotted to receive the end of the governor-stem P. The valve-rod H is kept in a horizontal position by the guide Q on the governor-frame L.

The operation of my invention is as follows: When the speed of the engine becomes too great, the governor-balls rise, forcing down the governor-stem P, whose power is transmitted through the levers M J, and the connecting-rod N to the sliding bearing E, on which is pivoted the lever B, thereby causing the lower end of B, to which is pivoted the eccentric-rod C, to move farther away from the end G of the valve-rod H. As the sliding piece E approaches G the stroke or travel of the valve-rod H is diminished, thus diminishing the amount of steam allowed into the cylinder, and consequently lessening the speed of the engine. On the other hand, when the speed of the engine becomes too slow the governor-balls fall, raising the governor-stem P and causing the sliding piece E to move upward and farther from the end of the valve-rod H, giving the valve-rod a longer stroke, and thereby allowing more steam into the cylinder, and consequently increasing the speed of the engine.

The mechanical principle on which my invention rests is that if in a pendulum or swinging lever the end most remote from the fulcrum or pivot has a constant distance through which it travels the nearer we approach that end the greater will be the motion or stroke, and the nearer we approach the pivot or fulcrum on which the lever swings the shorter will be the stroke. In the case of my invention the slide G has no vertical motion, while the lower end of the lever B respectively approaches and moves away from it as the governor-balls fall and rise.

The great advantage of my invention is that steam-joints necessary in the old form of governor are absolutely done away with. The mechanism is so simple and the means of connection between the governor and valve-rod so direct that it can be easily applied to any form of steam-engine. The leverage is so great and the number of joints comparatively so few that weights used in other devices to make the valve more sensitive to the action of the governor are entirely dispensed with.

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

1. In an automatic cut-off, the oscillating link B, pivoted at its upper end to a sliding piece E and connected at its lower end to the rod C of an eccentric A and rod H of a valve, substantially as and for the purpose set forth.

2. In an automatic cut-off, the oscillating link B, slotted at its lower end, its upper end

pivoted to a sliding piece E, said sliding piece being connected to the governor-stem P by means of a series of levers and connections, and said slotted part of the link B carrying a sliding piece G, to which is connected the valve-rod H, and the lower end of B connected to the eccentric-rod C, substantially as and for the purpose set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

STEPHEN CHAPLIN.

Witnesses:
H. S. EWING,
R. J. MILLER.