

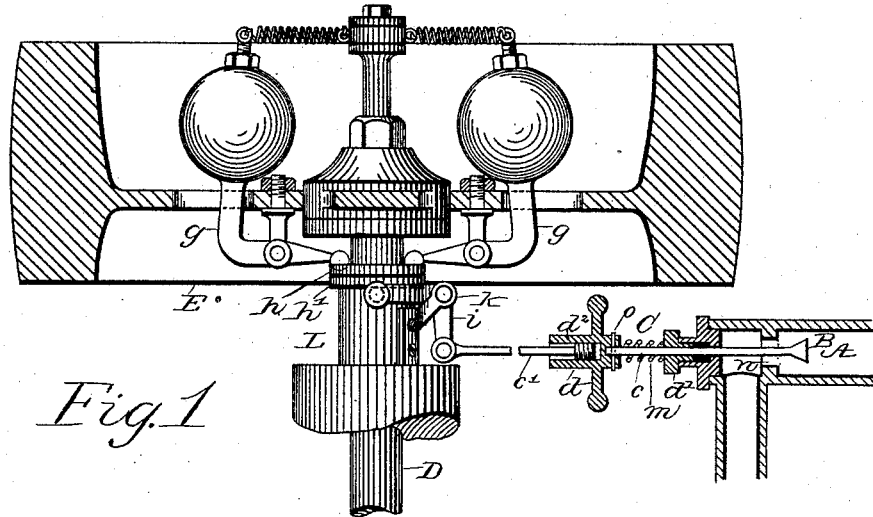
(No Model.)

L. D. COPELAND.

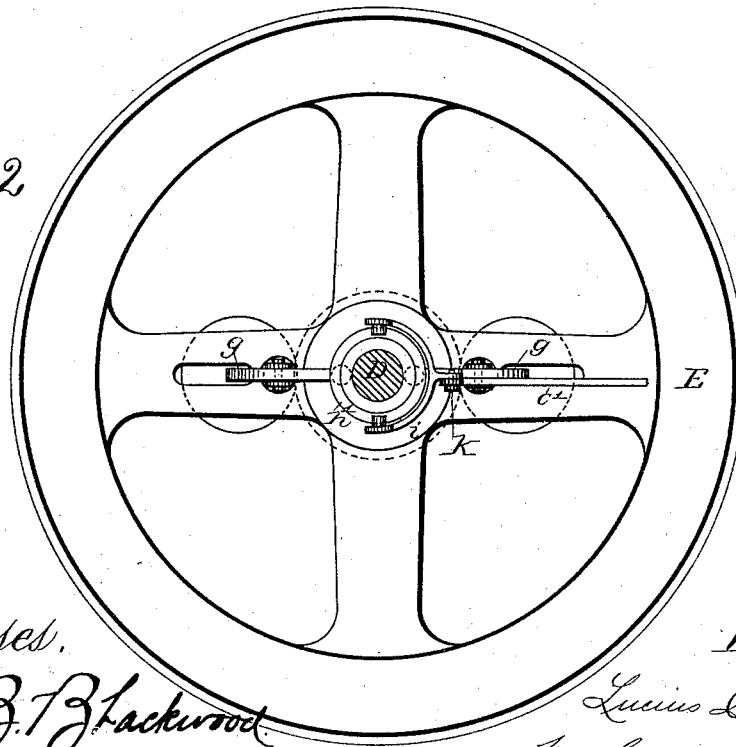
FLY WHEEL GOVERNOR FOR STEAM ENGINES.

No. 383,044.

Patented May 15, 1888.



*Fig. 1*



*Fig. 2*

Witnesses.

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# UNITED STATES PATENT OFFICE.

LUCIUS D. COPELAND, OF CAMDEN, NEW JERSEY.

## FLY-WHEEL GOVERNOR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 383,044, dated May 15, 1883.

Application filed November 19, 1887. Serial No. 255,633. (No model.)

*To all whom it may concern:*

Be it known that I, LUCIUS D. COPELAND, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Fly-Wheel Governors for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

This invention has relation to fly-wheel governors for steam-engines, and has for its object the provision of novel means for automatically operating the throttle-valve of an engine from the governor, so as to regulate the supply of steam to the cylinder according as the speed of the engine increases or decreases; also, for adjusting the throttle-valve so as to render it automatically operative within different speed limits, and doing away with a separate valve.

My invention consists in the novel construction and combination of parts hereinafter described.

In the accompanying drawings Figure 1 is a sectional view of so much of an engine as is necessary to illustrate my improvements. Fig. 2 is a plan view of the same.

My invention is designed for application to high-pressure engines wherein a throttle-valve is employed in regulating the supply of steam to the cylinder.

A designates the valve-chamber, B the throttle-valve, and C the valve-rod. For the purposes of my invention the latter is made in sections *c* and *c'*, connected together by a take-up nut, *d*, which allows the rod to be lengthened or shortened.

D designates the main shaft of the engine, and E the fly-wheel or main pulley. To the latter is fitted a governor of any approved pattern. In the drawings the governor-balls are attached to levers *g*, which are fulcrumed to the spokes of the wheel and at their inner ends, or formed with small spherical heads *h'*, which rest in recesses formed in the face of a collar, *h*, which slides upon the main shaft. A separate collar, *h'*, loose upon the shaft, is coupled by means of a bell-crank, *i*, to the

lower sectional part, *c'*, of the valve-rod, the crank being pivoted to a suitable bracket, *k*, secured to the shaft bearing or box L. The collar *h'* is formed with two sockets in its face at diametrically-opposite points, while the bell-crank *i*, which is constructed in the form of a fork, terminates at its forked ends in inwardly-projecting studs which rest in said sockets. When the throttle is opened and the engine running, the governor operates in the usual way, the balls diverging as the speed increases and converging as the speed diminishes, while the throttle-valve is correspondingly lowered or raised, the collars *h* *h'* sliding lengthwise of the shaft. Between the take-up nut *d* and the stuffing box or gland *d'* of the valve-chamber a spiral spring, *m*, is located for the purpose of drawing the valve downward and closing or diminishing the steam-port *n* when the balls of the governor diverge and separate the collars *h* *h'*.

The take-up nut *d* is in the form of a hand-wheel, having a tubular and internally-screw-threaded and elongated hub, *d'*, and the upper end of the sections *c'* of the valve-rod is formed with a threaded enlargement to correspond with the bore of the hub. The upper section, *c*, of the valve-rod fits in a socket in the upper end of the hub, and is secured by a suitable wrist-pin or key, *o*.

By means of the take-up nut the valve may be adjusted so as to admit a greater or less supply of steam to the cylinder and to diminish or cut off the supply only upon the attainment of a high speed in the engine; or it may be reversely adjusted so as to control the speed within low limits.

Having described my invention, what I claim is—

1. In a governor for steam-engines, the combination, with the rotary shaft D and the governor-balls and levers, of a collar, *h*, revolving with said balls and sliding upon said shaft, a collar, *h'*, loose upon the shaft, a bell-crank, *k*, and a valve-rod attached thereto, and a spiral spring, *m*, attached to said rod and adapted to close the valve, substantially as described.

2. In a steam-engine governor, the combination, with the collar *h*, revolving with the

shaft D and sliding thereon, of the governor-balls having levers *g g*, which bear against the face of said collar, and are connected each to the main shaft by a separate spring, substantially as described.

3. In a steam-engine governor, the combination, with the rotary shaft D, the governor-balls and levers, and the valve-rod, of the separate and independent collars *h h'*, the collar *h* being arranged to revolve with the shaft and

the collar *h'* being loose thereon, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 14th day of November, 1887.

LUCIUS D. COPELAND.

Witnesses:

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