P. GATELY.

Steam-Engine Regulator.

No. 217,275. Patented July 8, 1879.

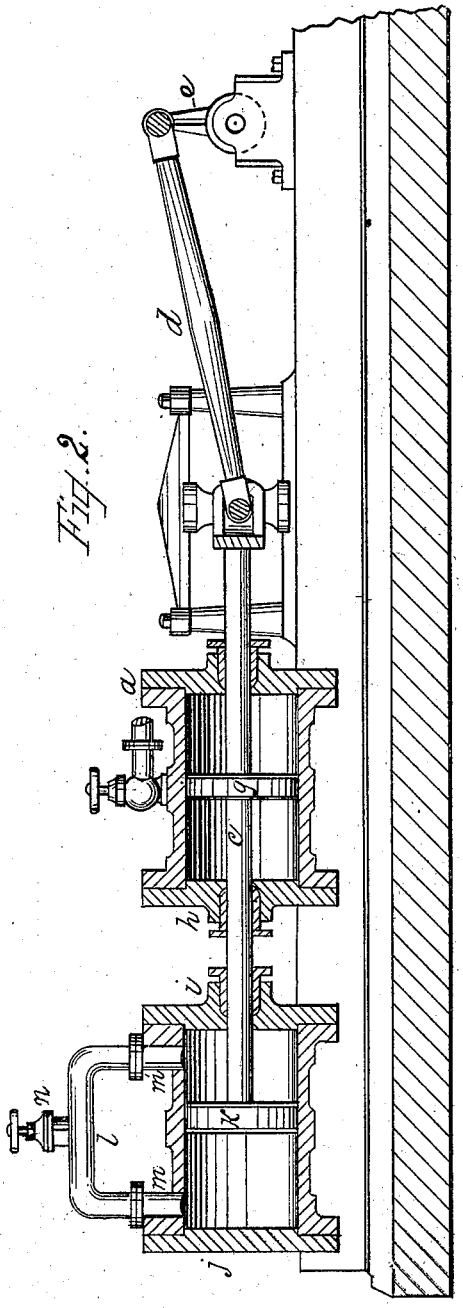


Fig. 2.

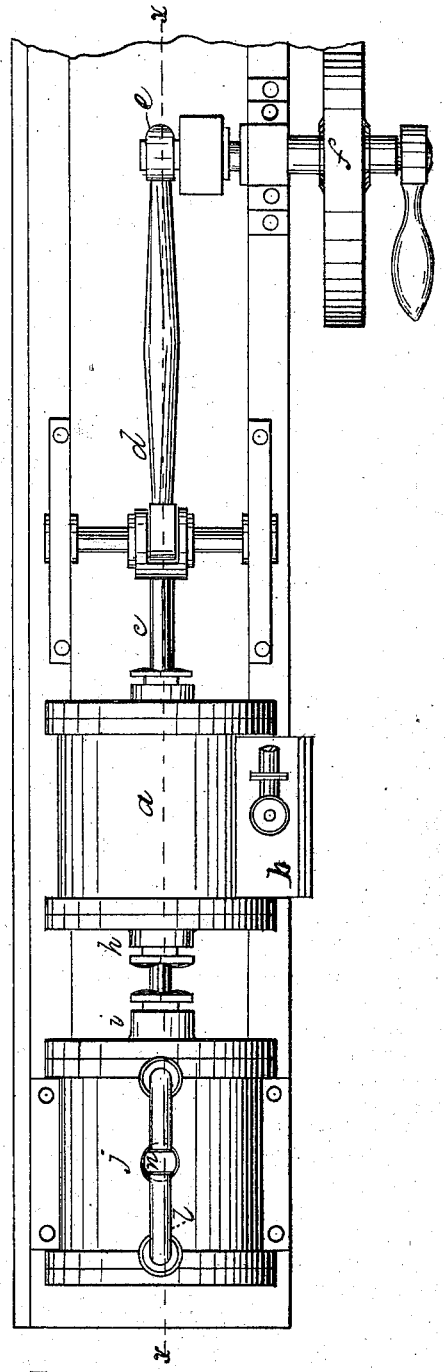


Fig. 1.

Witnesses:
R. Sewell.
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# UNITED STATES PATENT OFFICE.

PATRICK GATELY, OF NEW YORK, N. Y.

## IMPROVEMENT IN STEAM-ENGINE REGULATORS.

Specification forming part of Letters Patent No. **217,275**, dated July 8, 1879; application filed November 21, 1878.

*To all whom it may concern:*

Be it known that I, PATRICK GATELY, of the city of New York, State of New York, have invented a new and useful Improvement in Steam-Engine Regulators; and do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying and forming part of this specification.

This invention has reference to a means for regulating the speed of a steam-engine, and also to arrest its motion entirely by operating directly on the piston and piston-rod instead of indirectly on the steam-valves or apparatus connected therewith.

In the drawings, Figure 1 is a plan view of a steam-engine containing my improvement, and Fig. 2 is a longitudinal vertical section thereof, taken through the line *x x* of Fig. 1.

*a* represents the steam-cylinder; *b*, its steam-chest; *c*, the piston-rod; *d*, the pitman; *e*, the crank; *f*, the fly-wheel; *g*, the piston.

The piston-rod is extended out through the steam-cylinder head *h* and through the head *i* into another cylinder, *j*, and contains at its end a piston, *k*. In each of these heads is a stuffing-box to prevent leakage. This second cylinder has a connection through the pipe *l* from one side of the piston to the other, this pipe *l* being connected to the cylinder, near each head, at *m m'*. In this pipe is a valve, *n*, shown in the drawings as a hand-valve; but such valve may be arranged so as to be operated by a governor, as hereinafter explained.

The operation of this arrangement of mechanism is as follows: The second cylinder, *j*, is filled with water, oil, or other equivalent fluid, and the valve *n* run up, so as to permit of a free circulation of the water or oil in the cylinder *j* and pipe *l* from one side of the piston to the other. Steam is then let onto the steam-cylinder *a*, and in the operation of the piston *k*, which always moves in the same direction as the piston *g* in the steam-cylinder, the water or oil will be pumped from one side of the piston *k* to the other in the cylinder *j* by passing back and forth through the pipe *l*. The pipe *l* is of a diameter large enough so as to offer little or no resistance to the action of the steam-piston unless the valve *n* is more or less closed.

When it is desired to slow up the engine the valve *n* is closed to the necessary extent, the effect of which is to bring a resistance to bear on the end of the piston-rod *c*, and, as it were, brake up the engine to the necessary extent instantly, and without jar or injury. If the valve were entirely closed the effect would be to hold the piston *g* rigid against the action of the steam. This controlling of the piston direct is superior to the mode heretofore practiced of endeavoring to effect the same end by regulating the introduction of the steam to the cylinder *a* by an arrangement attached to and operating the main valve in the steam-chest, because in such former mode the headway of the engine is not interfered with, except so far as the cutting off of the steam to the cylinder *a* accomplishes it. A brake would still be required to take off such headway.

A governor may be attached to the valve *n*, a proper form of valve being then substituted for such hand-valve *n*, and then the flow of the water or other fluid in the pipe *l* is controlled by the movement of the engine, so that such speed is rendered more uniform.

The water or oil cylinder and its piston-rod may be combined with the steam-cylinder by means of intermediate shafts or counter-shafts, for instance, so as to bring the two cylinders parallel instead of in the same line with each other.

The invention may also be applied to water or other engines requiring a regular motion, as well as to steam-engines.

I am aware that a valve actuated by a piston and separate slide-valve, in combination with a cylinder, with a piston to form a water-cushion, has been used in connection with a main cylinder of an engine.

I am also aware that a water-cushion cylinder has been used in connection with the main slide-valve, having a piston attached to it at each end for admitting steam to the cylinder. I do not, therefore, claim such an arrangement, as it is not my invention.

By my invention the water-cushion cylinder performs the function of a cushion to the main piston and forms part of the main engine,

and moreover the pitman and crank also constitute parts of the main engine.

I claim—

The main steam-cylinder, having a piston with rods projecting from opposite sides thereof through stuffing-boxes in the respective heads of the said cylinder, one of said rods being provided at its end with an additional piston playing in a cylinder containing water or equivalent fluid, the opposite ends of which are connected by a pipe supplied with a suitable regulating-valve, and the other end of said rod attached to a pitman or other element, which may be connected with the piston of such main cylinder, constructed and arranged for operation substantially as and for the purpose described.

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Witnesses:
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