

L. Torne,
Steam-Engine Valve-Gear,
N^o 51,496, Patented Dec. 12, 1865.

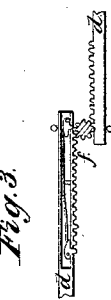
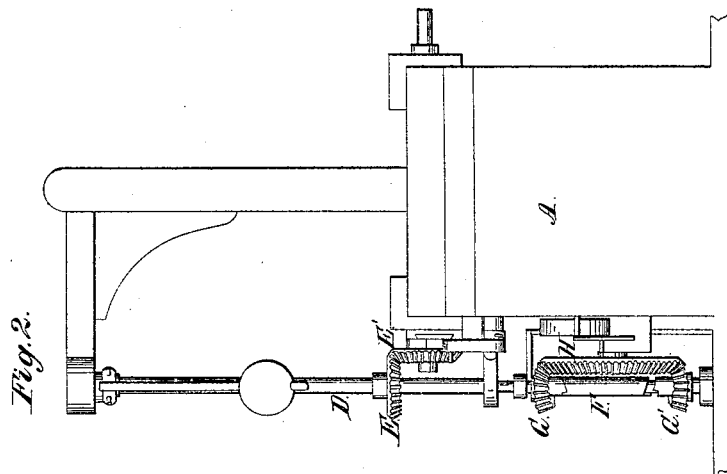


Fig. 1.

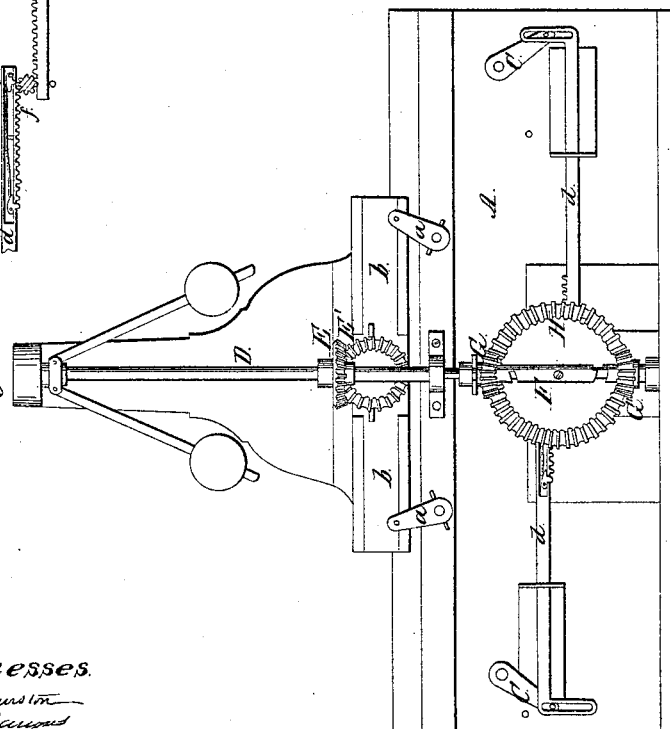
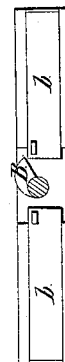


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

LAURISTON TOWNE, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 51,496, dated December 12, 1865.

To all whom it may concern:

Be it known that I, LAURISTON TOWNE, of the city and county of Providence, in the State of Rhode Island, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare that the following specification, taken in connection with the drawings making a part of the same, is a full, clear, and exact description thereof.

Figure 1 is a front elevation. Fig. 2 is a side elevation. Figs. 3 and 4 are detailed parts, to be referred to hereinafter.

My invention has reference to that class of engines in which it is designed to work the steam expansively, and to regulate the speed at which they shall run by the amount of steam to be admitted to the cylinder through the steam-port for each stroke of the piston; and it consists in a liberating valve-gear having a fixed point of cut-off, in combination with steam-ports of variable areas of opening, depending upon the velocity of the engine.

In the accompanying drawings, A represents the cylinder of the engine, which is supposed to be provided with slide-valves, for which other valves may be substituted, covering the steam-ports. These valves are connected with rocking levers *a a* by any suitable mode of connection, which levers are themselves connected with slides *b b*, working in convenient guides, so that the said rocking levers, and consequently the valves, shall be operated in one direction by a revolving cam, B, Fig. 4, to open the ports, and in the opposite direction to rapidly cover the ports by springs or weights, or by other means in common use. The valve-gear which operates these valves is of the variety known as "liberating" valve-gear—that is to say, a mechanism which embodies two forces for operating the steam-valves, which forces are independent of each other, and one of which is derived from the engine itself, and the other from gravity or the force of weights or springs. By the use of this variety of valve-gear in the combination herein claimed I am enabled to open the ports with a motion due to the speed of the engine, and to close the same at any fixed point desired during the stroke of the piston, with speed as great or greater than that of a falling body, and thereby avail myself of the benefit of working the steam expansively, without

the disadvantage consequent upon the use of other forms of valve-gear, of wire-drawing the same by covering the port as gradually as it was opened. This class of valve-gear, having the characteristics mentioned, in combination with the mechanism hereinafter next described for varying the size of the steam-passages according to the velocity of the engine, enables me to secure both economy in the use of steam and uniformity in the regulation of the speed of the engine not surpassed by any other engine working steam expansively.

The means which I employ for varying the area of the steam-ports according to the speed at which the engine is running is as follows:

Directly beneath the opening of the steam-ports, the cylinder being cast thick enough to allow of its being done, I place rotary valves of well-known construction, provided either with mortises through them, like the opening in a spigot, or having a portion of their surfaces cut away, so that in a certain position of these valves the passage of steam into the cylinder will be unobstructed for the whole size of the steam-ports; but in all other positions the area of the opening will be reduced by the extent to which the cylindrical surface of such valves covers the port. These valves are connected with rocking levers *c c*, and are operated in any convenient way by rods *d d*, attached to the rocking levers at one end, and the other ends being fitted with a rack, *e*, with which a toothed pinion, *f*, engages, as shown in Fig. 3. The rods *d d*, in the present instance, are worked by that variety of regulator which is called the "mill regulator." The upright shaft of the regulator works within a sleeve, D, which is made to revolve, by means of the bevel-gear wheels E E', upon the end of the same shaft to which the cam which operates the steam-valves is attached. Near the lower end of the rod is a double clutch, F, which rises and falls as the rod of the regulator is varied by the regulator-balls revolving in different planes, and sets in motion, through the bevel-wheels G G', in one direction or in the other, the gear-wheel H, which works the shaft upon which is mounted the pinion *f*, Fig. 3, and thus varies the area of the opening of the steam-ports. When the engine is running at its proper speed the clutches will be disengaged from both pinions, and the area of the

openings remain unchanged until a variation occurs in the velocity of the engine.

I consider that this form of regulator is better adapted for the purpose than any other; but other varieties can be employed with great advantage, and can be connected with the rocker-arms, which control the valves, in many ways which will readily suggest themselves to mechanics, without involving any substantial difference in the principle herein shown.

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

Regulating the velocity of steam-engines by combining a variable steam-port with a liberating valve-gear, substantially in the manner described.

LAURISTON TOWNE.

Witnesses:

B. F. THURSTON,
G. B. BARROWS.