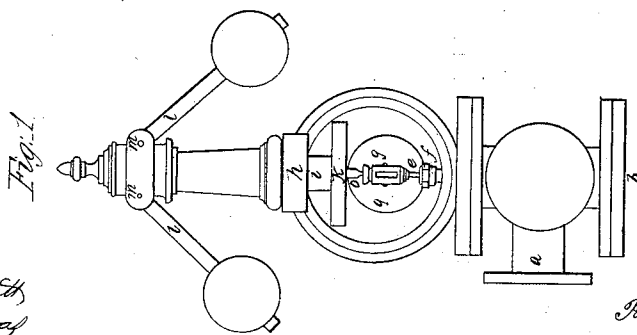
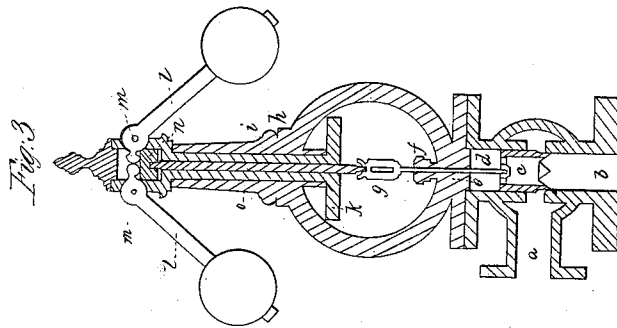
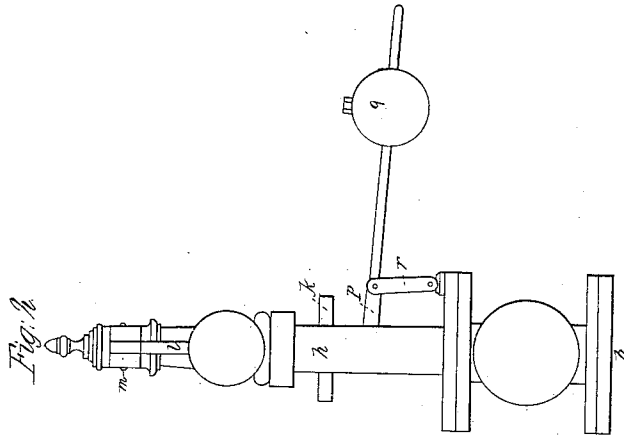


R. W. GARDNER.
STEAM ENGINE GOVERNOR.

No. 29,579.

Patented Aug. 14, 1860.



Witnesses:
Edward Smith
Samuel Jones

Inventor
Robert W. Gardner

UNITED STATES PATENT OFFICE.

ROBERT W. GARDNER, OF QUINCY, ILLINOIS.

GOVERNOR FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. 29,579, dated August 14, 1860; Reissued September 5, 1865, No. 2,064.

To all whom it may concern:

Be it known that I, ROBERT W. GARDNER, of Quincy, in the county of Adams and State of Illinois, have invented certain new and useful Improvements in Governors for Steam-Engines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, of which—

Figure 1 is a front elevation; Fig. 2, a side elevation; and Fig. 3, a section.

In all kinds of steam engine governors there are necessarily a number of separate pieces acting on each other by means of numerous joints, sliding surfaces, and bearing surfaces, all of which in order that the governor may not be impeded in its action, and not have its sensitiveness impaired by undue friction must have a certain degree of play or looseness the amount of which combined makes up a considerable quantity of "lost motion," as it is usually called, before a change of motion in the governor can act on the valve, so that a very considerable change of velocity of the engine is permitted while the governor is taking up the lost motion, and before it is brought to bear on the valve. My improvement effectually obviates the defect spoken of, thereby rendering the governor extremely sensitive to the slightest variations in the rate of the engine, and transferring its motion without loss to the valve.

In the drawings (*a*) is the steam pipe leading from the boiler, and (*b*) the passage into the steam chest.

(*c*) is a balance throttle valve, being cylindrical and working steam tight in the chamber (*d*). Near its lower edge it fits on a conical seat in the steam passage, which is thereby closed when the valve is down and when it is raised the steam passes by the annular opening above the valve seat, and between the serrated teeth in the lower edge of the valve. There are openings in the top of the valve (*e*) which serve to equalize the pressure above and below it. The valve rod (*e*) passes up through a stuffing box (*f*) to the head (*g*).

(*h*) is the standard on which the several parts of the governor work. The hollow shaft (*i*) revolves in the pillar of the standard (*h*) having its driving pulley or gear wheel (*k*) at its lower extremity, and the cap at its upper end supporting the two arms or levers (*l*) with the weighted balls

at their outer extremities, which work on the pivots (*m*) as fulcra. The cap of the hollow shaft (*i*) is bored smooth, and the block (*n*) affixed as a head on the spindle (*o*) plays up and down within it, bearing against the short ends of the arms or ball levers (*l*).

The head (*g*) of the valve rod has a mortise in which the extremity of the lever (*p*) is inserted, constantly pressing it upward by the action of the sliding weight (*q*) on the opposite side of its link fulcrum (*r*). The end of the spindle (*o*) is not connected with the head of the valve rod (*g*) by a swivel joint or otherwise, but merely rests and revolves on it, a cavity being formed around it to retain the oil. The sliding weight (*q*) is adjusted in such a position on the lever (*p*) as nearly to balance the weight of the valve rod, and the moving parts of the governor, and the principal part of the weight being thus sustained by a single point the broader bearing surfaces are relieved, and thereby an important saving of friction is effected. But the main object of this arrangement is the entire obviation of the lost motion, which is attained by the several joints and bearing surfaces being constantly pressed against each other in the same direction, by the action of the weight (*q*) so that whether the balls are ascending or descending by the varying velocity of the engine, the joints or fittings, however loose they may have been made, or may have become by wear, are never relaxed, so as to allow of the slightest play or lost motion.

Besides the saving of lost motion and friction my improvement possesses other important advantages. It admits of the employment of a valve having a very small range of motion, like the one shown in the drawings, requiring but a small rise or fall in the governor to open or close it entirely, which makes it extremely sensitive to slight changes of speed. Another advantage is the facility with which the steam can be shut off and the engine stopped, independently of the action of the governor, in case of sudden emergency by means of the lever (*p*); which with the addition of a cord or lever, can be made available in any part of the building, and the power of stopping the engine at any moment be at hand, without the delay of calling on the engineer. Those who are conversant with flour, saw and other mills will appreciate the importance of this.

The speed of the engine may also be regulated by adjusting the position of the weight (g) so as to balance more or less of the weight of the governor, thereby giving a
5 different opening of the valve to the same elevation of the balls.

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

Supporting the spindle of a governor on
10 the head of the valve stem, but unconnected

therewith, in combination with an adjustable weighted lever, tending to keep the several parts in close contact, and partly balancing the weight of the moving parts of the governor, substantially in the manner
15 and for the purposes described.

ROBERT W. GARDNER.

Witnesses:

EDWARD EVERETT,
JAS. O. GRAVES.