

W. ORD.

Governors for Steam-Engines.

No. 138,521.

Patented May 6, 1873.

Fig. 1.

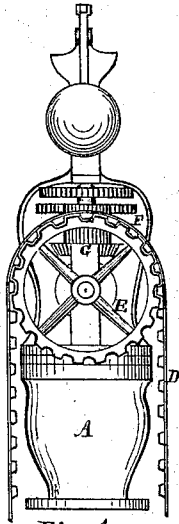


Fig. 2.

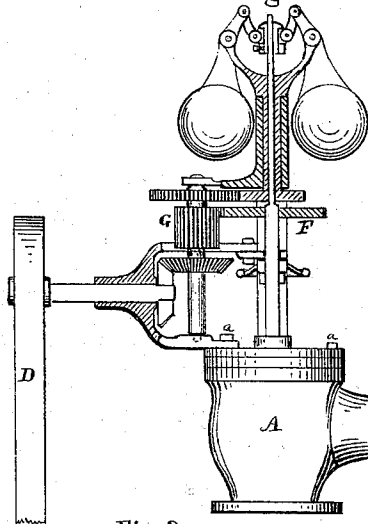


Fig. 4.

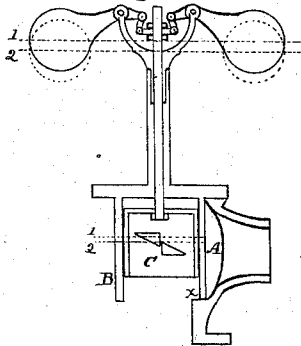
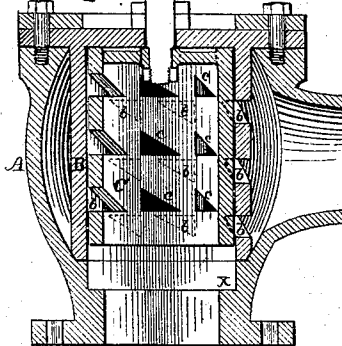


Fig. 3.



WITNESSES.

Wm. E. Wilson

Frank R. Tibbitts

INVENTOR.

William Ord

Per Geo. W. Tibbitts, Atty

UNITED STATES PATENT OFFICE.

WILLIAM ORD, OF BROOKLYN, OHIO.

IMPROVEMENT IN GOVERNORS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **138,521**, dated May 6, 1873; application filed December 27, 1872.

To all whom it may concern:

Be it known that I, WILLIAM ORD, of Brooklyn, in the county of Cuyahoga and State of Ohio, have invented certain Improvements in Governors for Steam-Engines, of which the following is a specification:

The subject of this invention relates to certain improvements in steam-engine governors; and consists of the combination of a valve and shell in which a number of triangular ports are made, being arranged in rows; of gearing for operating the valve, and so constructed as to rotate the valve in proportion to the stroke of the piston or revolution of the crank-shaft; and of a toothed belt and wheel for transmitting motion to the valve-gearing, as hereinafter more fully set forth.

In the accompanying drawing, Figure 1 is an elevation of a governor, showing the geared belt. Fig. 2 is a transverse view of the same, showing the gearing which operates the valve. Fig. 3 is an enlarged detached view, in section, of the valve, showing the construction and arrangement of the ports. Fig. 4 illustrates the equalizing action of the steam on the valve, as stated in the second part of the invention.

A is the outer shell of a valve, made in the usual form. B is a straight cylindrical shell, having a head and flange, and is secured within the shell A by bolts *a a*, and has a series of triangular ports, *b b*, through it. C is a revolving valve-shell, open at both ends, and closely fitting inside of the shell B, and also has a series of triangular ports, *c c*, through it. These ports are so arranged as to cut off the steam very easily and perfectly regulates the movement of the engine. The ports are arranged in perpendicular and horizontal rows, and the gearing which revolves the valve is so arranged that the opening of each perpendicular row of ports serves steam for each stroke of the piston, and also the up-and-down movement of the valve serves to cut off the steam, which, as will be seen by reference to Fig. 3, will be very promptly and perfectly done, as, by having a number of small ports, a slight movement of the valve effects the purpose.

The driving-belt D I make of leather and metal combined, and provide teeth of leather

or other suitable material, and riveted to the belt. A thin strip of flexible metal on the outside of the leather prevents it from stretching, and the teeth prevent its slipping on the wheel E, the object being to insure a uniformity in opening the ports of the valve at every stroke of the engine.

In the valve represented in the drawing there are six perpendicular rows of ports, and are opened six times in one revolution of the valve. The gear-wheels F and G are arranged to revolve the valve once for six strokes of the piston, or three revolutions of the crank-shaft, the wheel F having seventy-five teeth to the pinion G's twenty-five.

To increase the capacity of the valve for the same range of up-and-down movement of the valve, the valve may be enlarged in circumference, and making two more perpendicular rows of ports; then the valve, having eight rows of ports, would require but one revolution to four of the driving-shaft, and the wheel F should have four times as many teeth as the pinion G. By this arrangement the valve having less revolutions is not so liable to wear.

In ordinary governors there is a tendency to run faster when performing light work than heavy, for the following reason: When the extra work is put on the balls drop to give more opening of the ports; consequently the speed is less, and will continue to be less by reason of more pressure being required to do the work. Now, it will be seen that in my governor there is a varying pressure acting on the end of the valve-stem; that by using a stem somewhat larger than is commonly used this extra pressure may be used to balance the speed of the engine. Referring to Fig. 4 of drawing for illustration, suppose the engine to be running light, the balls and valve are sustained or carried on the line 1 1. More work is put on, and the balls drop to line 2, increasing the opening of ports to line 2 on the valve, and so increasing the pressure on the end of the valve-stem, which pressure is met by the tendency to an increased velocity of the balls, these two forces thus balancing and maintaining the same rate of speed as had before the work was put on. Now, suppose the work to be taken off, the balls instantly resume their position on line 1, the

pressure on the valve-stem is diminished, and the same rate of speed is thus maintained under these varying circumstances.

There is a shoulder in the valve-shell A at *x*, which serves as a seat for the valve to fall to and rest upon should it become loose from the stem, and then all the ports are closed.

I claim—

The combination in a governor of the valve

C, shell B, triangular ports *b c*, with the gearing F G, constructed in such relative proportion as described, and the toothed belt D and wheel E, all arranged and operating as and for the purposes set forth.

WM. ORD.

Witnesses:

GEO. W. TIBBITTS,

B. W. HASKINS.