

J. B. DUFF.
Governors.

No. 137,662.

Patented April 8, 1873.

Fig. 1.

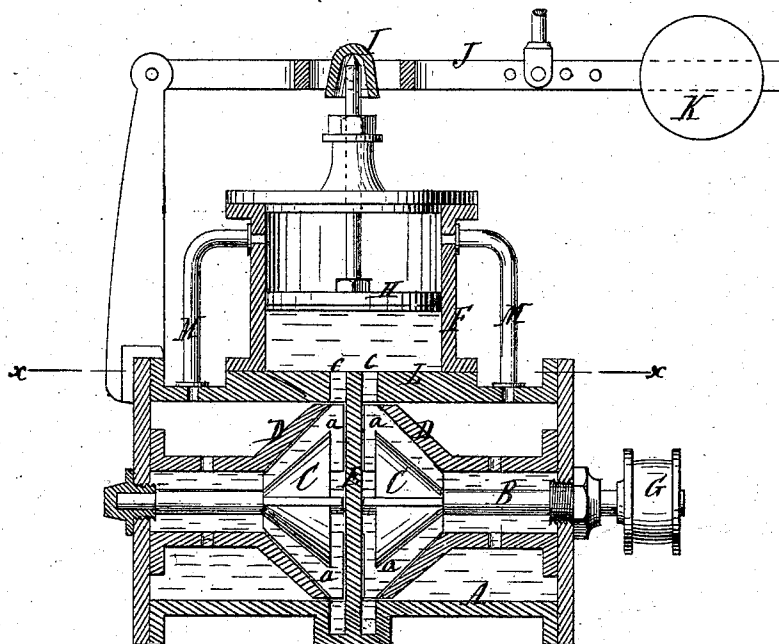
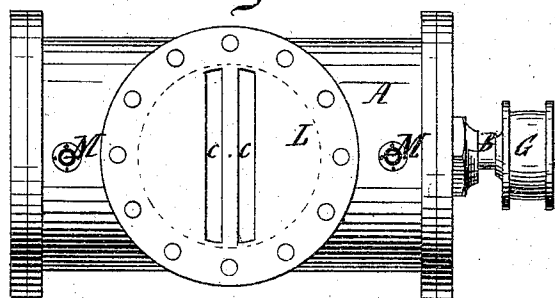


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN GOVERNORS.

Specification forming part of Letters Patent No. **137,662**, dated April 8, 1873; application filed November 8, 1872.

To all whom it may concern:

Be it known that I, JAMES B. DUFF, of the city, county, and State of New York, have invented a new and useful Improvement in Governors for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 represents a vertical central section of my invention. Fig. 2 is a horizontal section of the same in the plane *xx*, Fig. 1.

Similar letters indicate corresponding parts.

This invention relates to an improvement on that class of governors which I have described in my patent, No. 126,039, dated April 23, 1872. My present improvement consists in the arrangement of one or more rotary, centrifugal, or turbinate pistons, or their equivalent, mounted on a shaft or rod running at right angles to the rod of the governor-piston, in such a manner that the gear-wheels previously required for transmitting motion to the pump-piston can be dispensed with, and thereby the construction of the governor is materially simplified and its durability increased; also, in combining with a governor-piston two rotary, centrifugal, or turbinate pump-pistons mounted on the same or on different shafts, and moving in cylinders which are separated from each other by a partition, and each of which communicates with the governor-cylinder by a suitable port in such a manner that, by said partition, the current of liquid created by one of the pump-pistons is prevented from counteracting the current created by the other pump-piston, and the full power of both currents is brought to act on the governor-piston. I obtain the same result by making the two pistons into one, with a plate or disk between them whose diameter is larger than that of the pump-pistons, and wings or blades, and revolves or rotates with the pistons. In this way the opposite currents may be counteracted; but I prefer the stationary partition.

In the drawing, the letter A designates a cylinder, through which extends a horizontal shaft, B, on which are mounted two pump-

pistons, C C. These pistons are provided with wings *a a*, or they may be constructed in any desirable manner on the principle of the piston of a rotary, centrifugal, or turbinate pump, and they work in shells D D flaring outward so that they conform to the shape of the pump-pistons. Said shells terminate at some distance on each side of a partition, E, which separates the pumps one from the other, leaving room for annular channels *b b*, which communicate, through ports *c c*, with the governor-cylinder F.

By this arrangement the current of liquid created by one pump-piston is prevented from counteracting the current produced by the other pump-piston; and, furthermore, the shaft B can be extended through one of the heads of the pump-cylinder, so that a pulley, G, can be mounted thereon, and motion can be imparted to the pump-pistons by means of a belt running on said pulley without the intervention of gear-wheels. I also do away with the use of gear-wheels in using or operating a single vertical, rotary, centrifugal, or turbinate piston by means of extending the vertical shaft of the piston downward through the bottom of the vertical cylinder, and, by means of a grooved pulley placed thereon; and by the application of a V-shaped or round belt running with a half or quarter turn or twist in it, I am enabled to run my belt from a horizontal shaft from a grooved pulley to the grooved pulley on the vertical piston-shaft without my belt running off when the engine that drives it turns in a reverse direction; and thus doing away with the necessity of using gear-wheels to get a right-angled movement, which gears are very objectionable.

This last-named improvement applies more particularly to the class of governors described in my patent of April 23, 1872, No. 126,039, and is of much importance in the construction and durability of the governor.

On the upper surface of the pump-cylinder is formed a circular platform, L, (see Fig. 2,) through which extend the ports *c c*, and the governor-cylinder F, which is open at the bottom, is bolted down upon this platform. In the cylinder F works the governor-piston H, the rod of which is pointed at the top, and extends up through a guide-box into a cap, I

which is secured in an eye of a lever, J, that communicates with the throttle-valve of the engine, and on which is secured a sliding weight, K, to adjust the governor to any desired speed of the engine. The connection between the cap I and the lever J is such that said cap can accommodate itself to the varying positions of the lever without causing the piston-rod to bind. From the upper part of the governor-cylinder extend pipes M down to the pump-cylinders, so that any liquid that may leak past the governor-piston will find its way back into the pump-cylinders.

It will be readily seen that a single pump-piston might be mounted on the horizontal shaft B, and, if this shaft is driven from the engine, the governor-piston will rise and fall as the speed of the engine increases or decreases, and by running the shaft of the rotary, centrifugal, or turbinate pump-piston at right angles to the rod of the governor-piston I have materially simplified the construction of the whole mechanism; but in practice I prefer to use two pump-pistons with intervening partition, and I am enabled to produce a governor which is very sensitive, which can be driven with comparatively little power, and which is not liable to get out of order.

I will also remark that, for the governor-piston, an elastic diaphragm might be substituted; but such device would be clearly a mechanical equivalent for the piston.

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

1. The combination of two or more rotary, centrifugal, or turbinate pump-pistons with a governor-piston or its equivalent, substantially as described.

2. In combination with a governor-piston or its equivalent, two or more rotary, centrifugal, or turbinate pistons mounted on the same shaft or on separate shafts, with a stationary or movable partition intervening between them, substantially as and for the purpose set forth.

3. The arrangement of one or more rotary, centrifugal, or turbinate pump-pistons working in conjunction with a governor-piston or its equivalent, and mounted on a shaft extending through one of the heads of the pump-cylinder, and carrying a pulley for imparting motion to the pump piston or pistons, substantially as described.

Witnesses:

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