A. W. BROWNE.

GOVERNORS FOR ENGINES.

No. 189,693. Patented April 17, 1877.

Fig. 3.

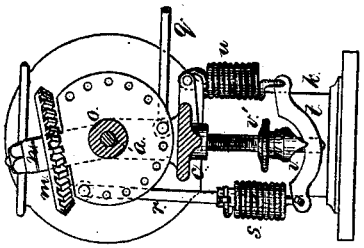


Fig. 1.

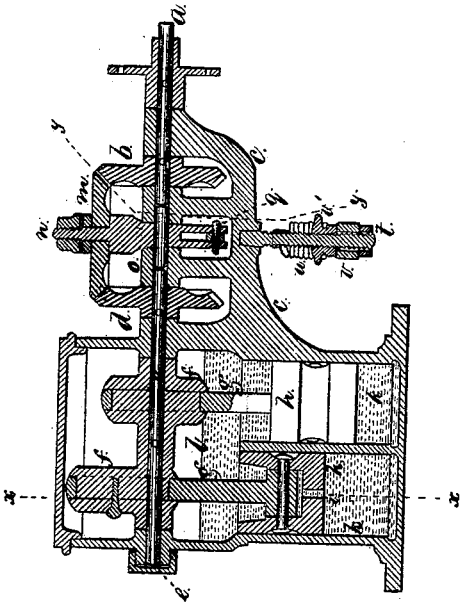


Fig. 4.

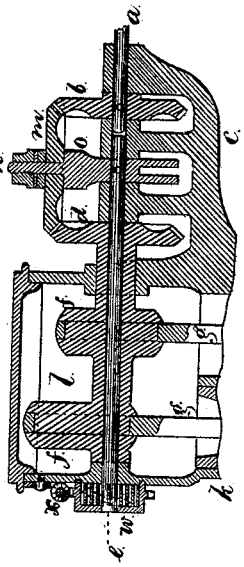
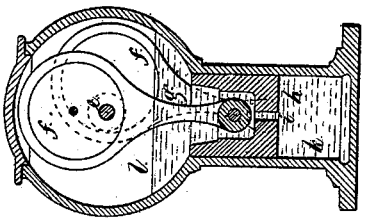


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

ARTHUR W. BROWNE, OF BROOKLYN, NEW YORK, ASSIGNOR TO HIMSELF AND WILLIAM E. KELLY, OF NEW BRUNSWICK, NEW JERSEY.

IMPROVEMENT IN GOVERNORS FOR ENGINES.

Specification forming part of Letters Patent No. **189,693**, dated April 17, 1877; application filed October 11, 1876.

To all whom it may concern:

Be it known that I, ARTHUR W. BROWNE, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Governors for Engines, of which the following is a specification:

A governor has been made with three miter-gears, the first receiving its motion from the engine, and turning the second, and that is retained in position by a spring; but its axis can swing and give a movement to the throttle-valve, and the third miter-wheel communicates motion to governor-balls, so that the intermediate miter-wheel will assume a different position when there is any change in speed between the governor and motor.

My present invention applies to the same general class of governors; but I make use of a pump or plungers working in cylinders, in combination with the three miter-gears, by means of which the difficulties attendant upon the use of governors are removed, because the plungers offer a uniform resistance to the revolution of the third wheel; but with governor-balls the resistance varies according to the speed and the friction to which the parts are exposed.

My governor is especially adapted to marine-engines, because the motion of the vessel does not vary the resistance of the plungers materially. There have been other instances in which a fan has been used as a resistance, but its velocity is easily increased or decreased. By my invention the plungers working in a non-elastic liquid are resisted in their motion with uniformity, and they operate reliably under all speeds.

In the drawing, Figure 1 is a longitudinal section. Fig. 2 is a transverse section at the line *x x*, and Fig. 3 is a transverse section at the line *y y*.

The shaft *a* and first miter-gear wheel *b* are revolved by any suitable connection to the motor, and a frame, *c*, supports the parts of the governor.

The third wheel *d*, shaft *e*, and eccentric *f* actuate the links *g* and plungers *h* in the cylinders *k*. There is a reservoir, *l*, above the cylinders *k*, and the same contains a liquid, by preference oil, and each plunger works loose in the cylinder, and should have a hole at *i*, through which the liquid passes, first one way and then the other. As the plungers move hence these cylinders and plungers simply act as detainers to the revolution of the third wheel *d*. If the wheel *d* is revolved faster it can only be done by the expenditure of more power; if slower less power will be required to operate the plungers.

The second or intermediate miter *m* is on a stud, *n*, upon the frame *o*, that swings either upon the shafts *a* and *e* or upon a shaft in line with them, so that the teeth of *m* are constantly in gear with both *b* and *d*, and from the frame *o* a connection is made as at *q* to the valve to be operated.

The link *r* to the spring *s*, and the lever *t*, spring *u*, and adjustable fulcrum *v*, furnish a means of applying a holding force to the frame *o*. Otherwise it and the wheel *n* would revolve around, and the third wheel *d* stand still.

The screw *v'* allows for the fulcrum *v* being moved, and thereby the strain or tension of the springs *s* and *u* will be varied according to the adjustment.

The parts are to be proportioned and adjusted. Power being applied to the first wheel *b*, all three miter-wheels are revolved upon or with their respective shafts or studs, and the frame *o* will be swung into such a position that the power of the springs *s u* to hold the frame *o* from turning equals the force applied through the intermediate miter-wheel to turn the third wheel *d* at the same speed as the motor-wheel *b*.

If the speed of the motor lessens so does that of the third wheel *d*; hence the power to move it will not be as great as before, and the springs *s u* will swing the frame *o* one way; and if the speed of the motor increases so does that of the wheel *d*. Hence the force required to move the plungers or overcome the resistance of the wheel *d* is increased, and the wheel *m* and frame *o* have to swing in the opposite direction until the springs *s* and *u* are strained sufficiently to cause to be transmitted through the wheel *m* the force necessary to turn the third wheel *d* at its increased

speed, and the movement of the frame *o* by this means becomes the means for opening or closing the throttle-valve or other regulator.

Under some circumstances weights may be used in place of the springs, and, where it is desired to place the spring resistance in some other place than that occupied by the springs *s u*, the shaft of the frame *o* may be continued through the eccentrics *f f*, and these latter be connected to the miter *d* by a sleeve, and at the end of the shaft *e* a volute spring may be applied, as seen in Fig. 4, one end of said spring being attached to the shaft *e* and the other to the spring-barrel *w*, on which is a gear, and the gear itself is made so as to be turned either one way or the other by the worm-pinion *x*, to tighten or slacken the spring and cause the governor to act in the desired manner at greater or less speed.

A pump has also been employed to force liquid into a cylinder having an escape, so that the increased speed of the motor and pump may act in this cylinder to change the position of the valve. In my device the pumps only become a resistance to a revolving motion and the mechanism connecting with the governor intervenes between the motor and this resistance so as to be very sensitive to changes of speed.

I claim as my invention—

In combination with the piston or plungers acting as a resistance, a valve, a swinging frame, and devices for transmitting motion from the motor to the piston through such frame, substantially as set forth.

Signed by me this 28th day of July, A. D 1874.

A. W. BROWNE.

Witnesses:
GEO. T. PINCKNEY,
CHAS. H. SMITH.