E. A. BOURRY.

Dynamometrical-Governor.

No. 216,826. Patented June 24, 1879.

Fig: 5.

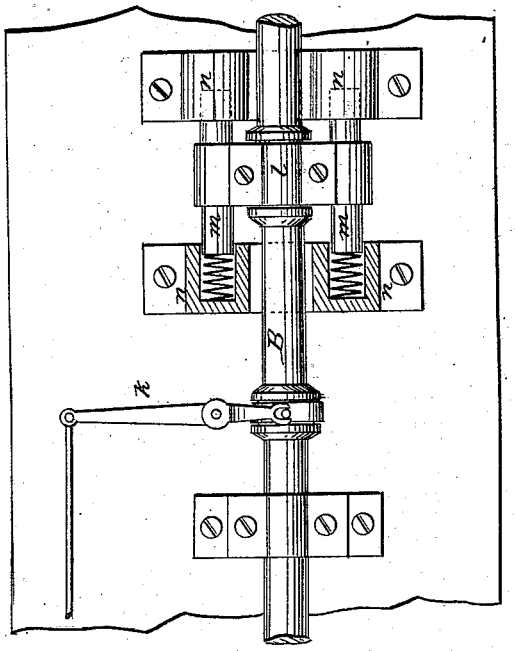

Fig: 3.

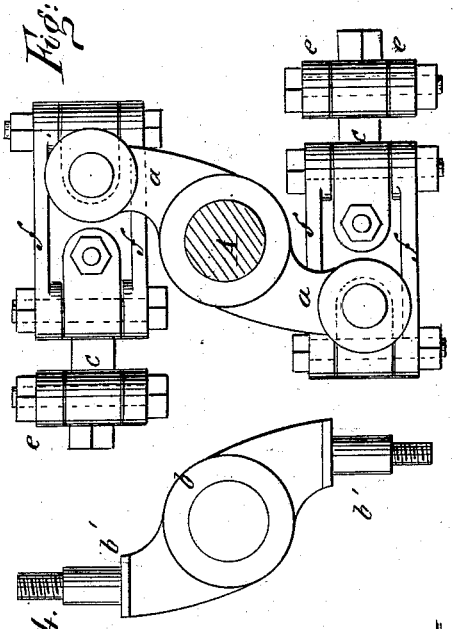

Fig: 4.

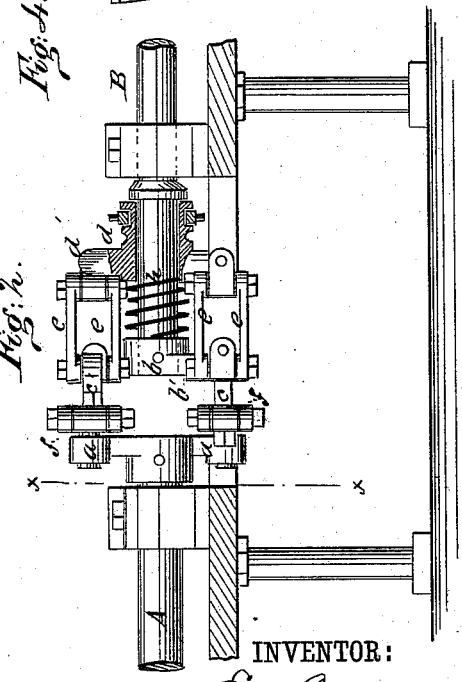

Fig: 1.

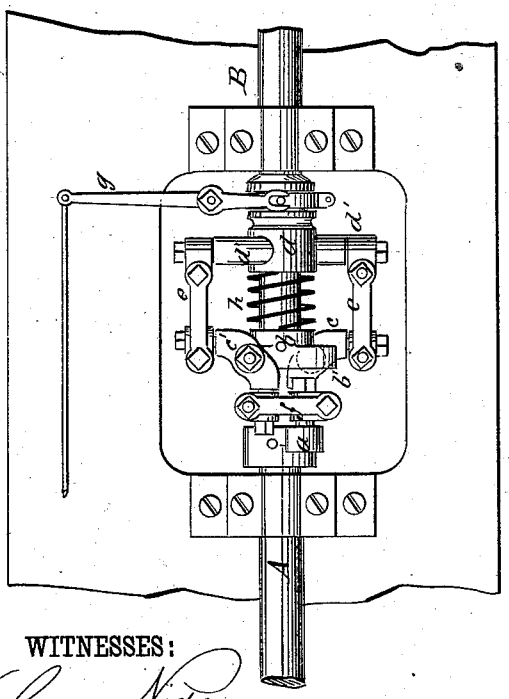

Fig: 2.

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UNITED STATES PATENT OFFICE.

ERNEST A. BOURRY, OF ST. GALLEN, SWITZERLAND.

IMPROVEMENT IN DYNAMOMETRICAL GOVERNORS.

Specification forming part of Letters Patent No. **216,826**, dated June 24, 1879; application filed April 1, 1879.

To all whom it may concern:

Be it known that I, ERNEST AUGUST BOURRY, of St. Gallen, Switzerland, have invented a new and Improved Governor, of which the following is a specification.

My invention consists in a dynamometrical governor, wherein, by suitable appliances, variations in the power-load or resistance are utilized directly to operate the throttle-valve, cut-off gear, slides, cocks, &c., without recourse to accelerations or retardation in the speed. The variations in the resistance can be made to manifest themselves in two different ways—in the circular or in the longitudinal direction of the shaft. In the first case the prime and secondary shafts are united by elastic couplings, the play of which is converted into an accessible motion for regulating the motive power. In the second case the thrust of the shaft acts against an elastic cushioned cross-head, and operates directly upon a lever that is connected to the regulator of the motive power.

The said principle of action may be applied to governors for motors by many combinations of devices.

In the accompanying drawings I have shown simple mechanism for regulating the motor by circular and longitudinal movement of the shaft.

In the drawings, Figure 1 is a top view of the governor fitted to operate by circular motion or torsion. Fig. 2 is a vertical section on line of the shaft. Fig. 3 is a cross-section on line *x x* of Fig. 2. Fig. 4 is a detail view. Fig. 5 is a sectional plan view of the governor fitted to operate by longitudinal movement of the shaft.

Similar letters of reference indicate corresponding parts.

Referring to Figs. 1, 2, and 3, A is the prime shaft of the motor or shaft operated by the motor, and B is the secondary shaft, to which the power of the motor is transmitted by the coupling devices, next described. Upon A is fixed a double crank or sleeve having diametrically-opposed crank-arms *a a*. Upon shaft B is a fixed sleeve or collar, *b*, having radial arms *b' b'*, upon which are hung crank-levers *c c'*. This sleeve and radial arms *b'* are shown separately in Fig. 4. There is also upon shaft *b* a loose sleeve or follower, *d*, having projecting arms *d'*, which connect by links *e e* to levers *c c*. The other ends of levers *c* are connected by links *f f* with the crank-pin of cranks *a a*.

The loose sleeve *d* is fitted with a loose collar, that connects with lever *g*, from which communication is made with the throttle-valve, cut-off, &c. Around shaft B is a strong spring, *h*, that tends to press the follower *d* away from sleeve *b*.

When power is applied to turn shaft A the connections described will cause the follower *d* to slide on shaft B toward sleeve *b*, compressing spring *h* until its resistance is equal to the power applied, when the full power of the motor will be upon shaft B. Any increase or decrease of power or resistance in shaft B will tend to change the position of follower *d*, and consequently operate the lever *g*.

The described construction utilizes the dynamometrical effect in a circular direction, or in the sense of torsion. The devices shown in Fig. 5 act by longitudinal thrust of the shaft.

B is the shaft driven by the motor. *k* is a lever, connecting with shaft B by a loose collar, and communicating with the throttle or cut-off. *l* is a pillow-block or cross-head of shaft B, fitted to slide with the shaft, and carrying pistons *m m*, that enter cylinders *n n*, which contain elastic bodies or springs.

The shaft B is moved endwise more or less, and the springs in cylinders *n* compressed by the resistance on shaft B—as, for instance, the propeller of a screw-steamer. This self-adjustment operates lever *k* to regulate the motor, and the same effect is produced by variations in the power transmitted.

By the above-described apparatus an instantaneous effect is obtained by any change in power or resistance. The apparatus may also be used as an unerring and constant indicator of the power transmitted, and also a detecter of undue friction.

Various mechanical means may be substituted for those shown for utilizing the motion caused by resistance for governing purposes. In place of the spring-coupling devices shown

bevel-gear wheels, racks, and pinions may be used, and water, air, and other fluids substituted for the springs.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the shafts A B, of the double cranks *a*, the sleeve with radial arms *b'*, the follower *d*, having projecting arms *d'* and loose collar connecting with lever *g*, the springs *h*, and the levers *c c'*, connected by links with the arms *d'* and cranks *a*, as shown and described.

2. The combination, with lever *k* and shaft B connected by loose collar, of the pillow-block *l*, the pistons *m*, and the cylinders *n*, provided with springs, as and for the purpose specified.

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