(No Model.) 3 Sheets—Sheet 1.

J. T. O'BRIAN.

ELECTRIC GOVERNOR.

No. 468,686. Patented Feb. 9, 1892.

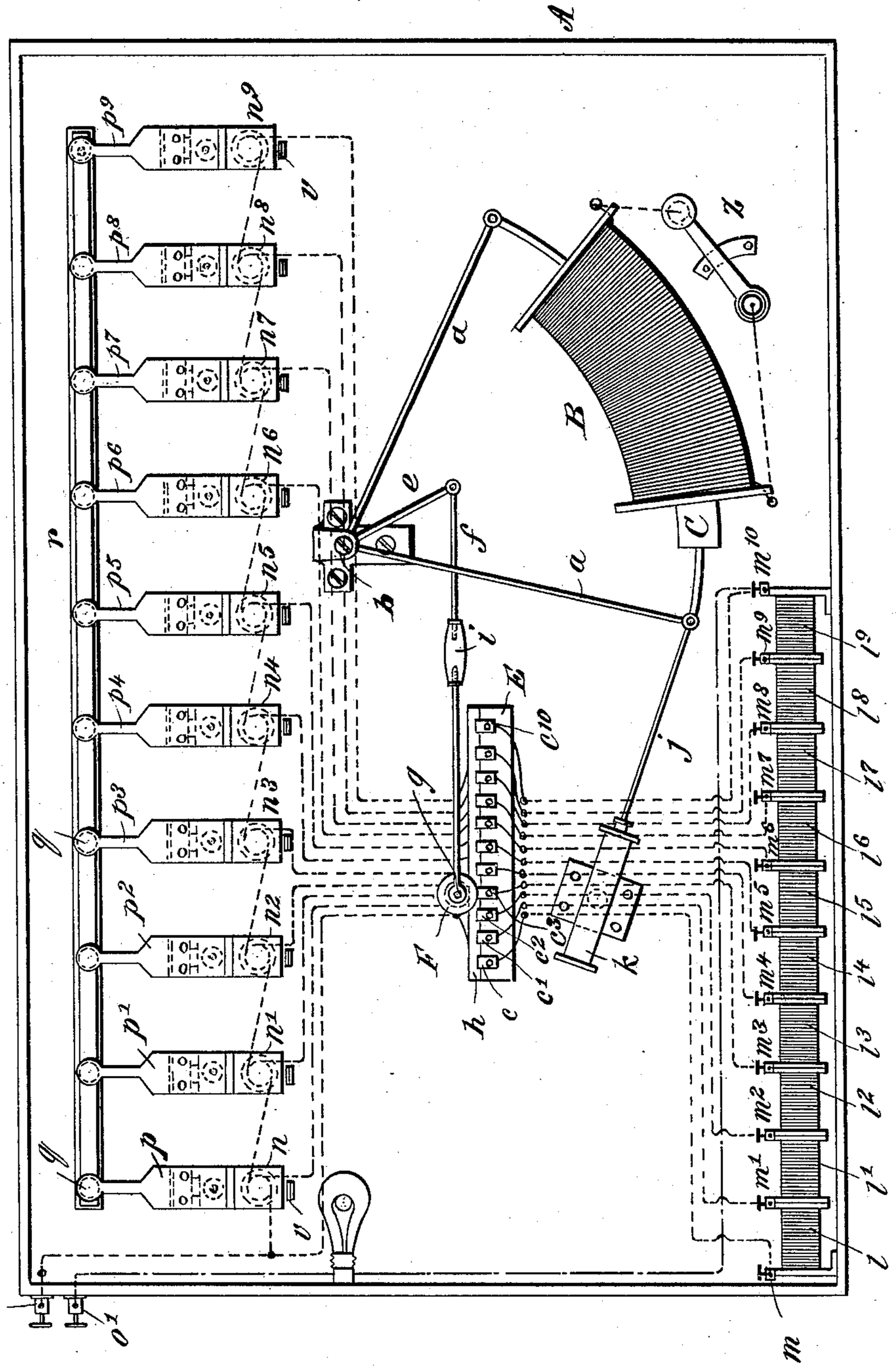

Fig. 1.

WITNESSES:

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C. Sedgwick

INVENTOR:

J. T. O'Brian

BY Munn & Co.

ATTORNEYS

(No Model.) 3 Sheets—Sheet 2.

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ELECTRIC GOVERNOR.

No. 468,686. Patented Feb. 9, 1892.

Fig. 3.

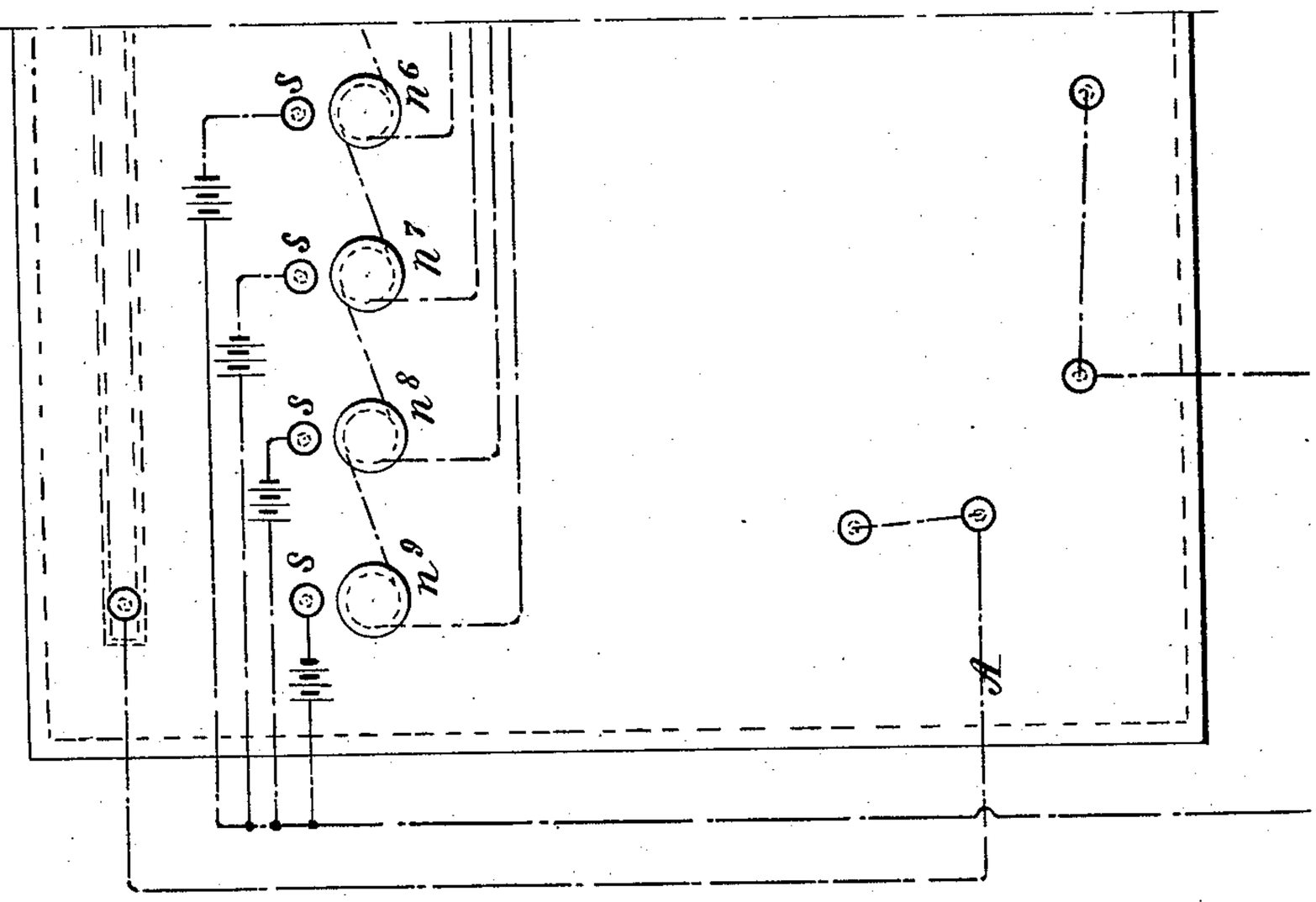


Fig. 2.

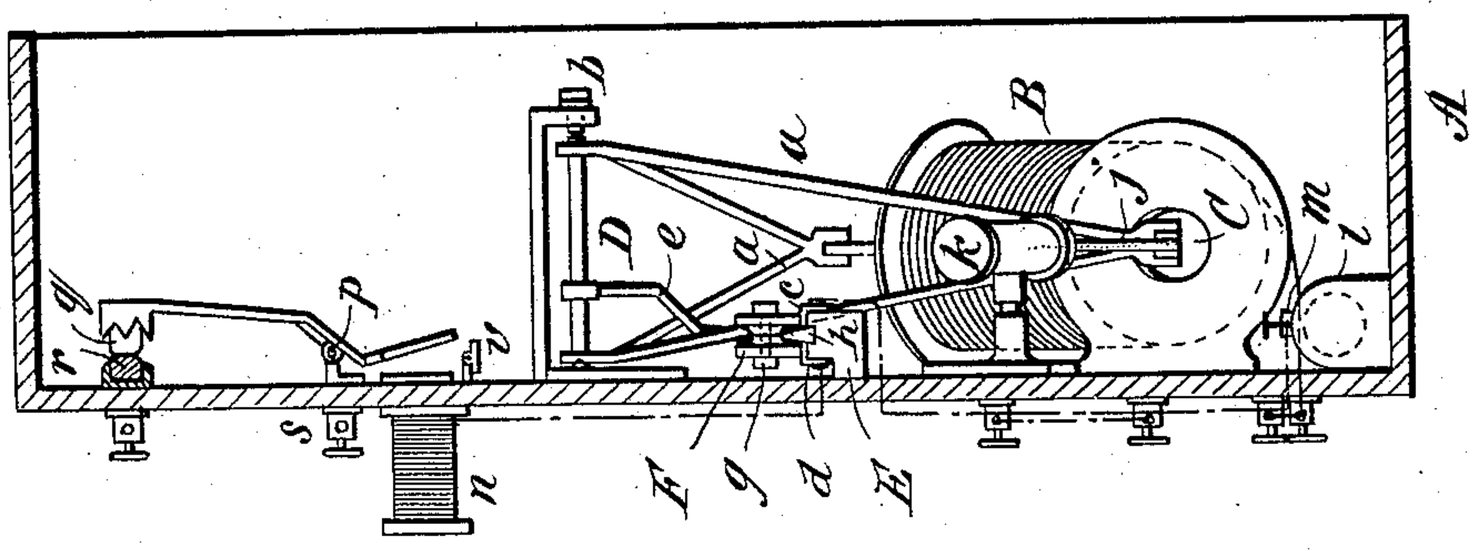
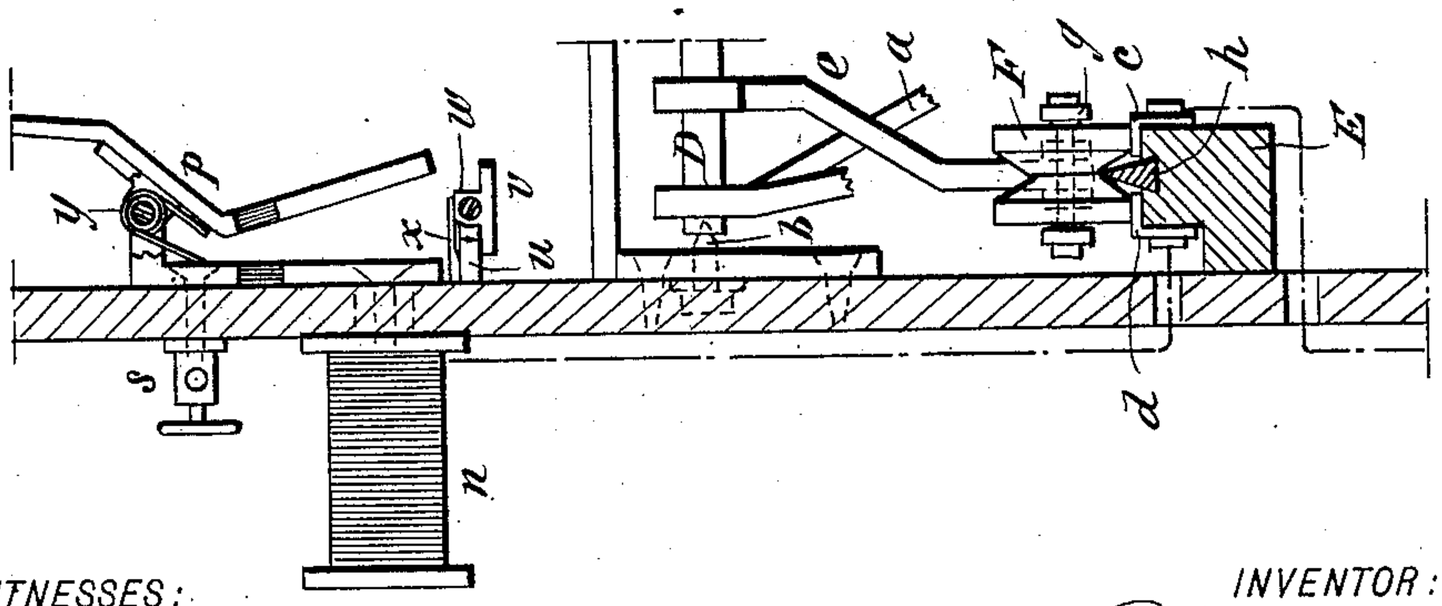


Fig. 4.



WITNESSES:

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ELECTRIC GOVERNOR.

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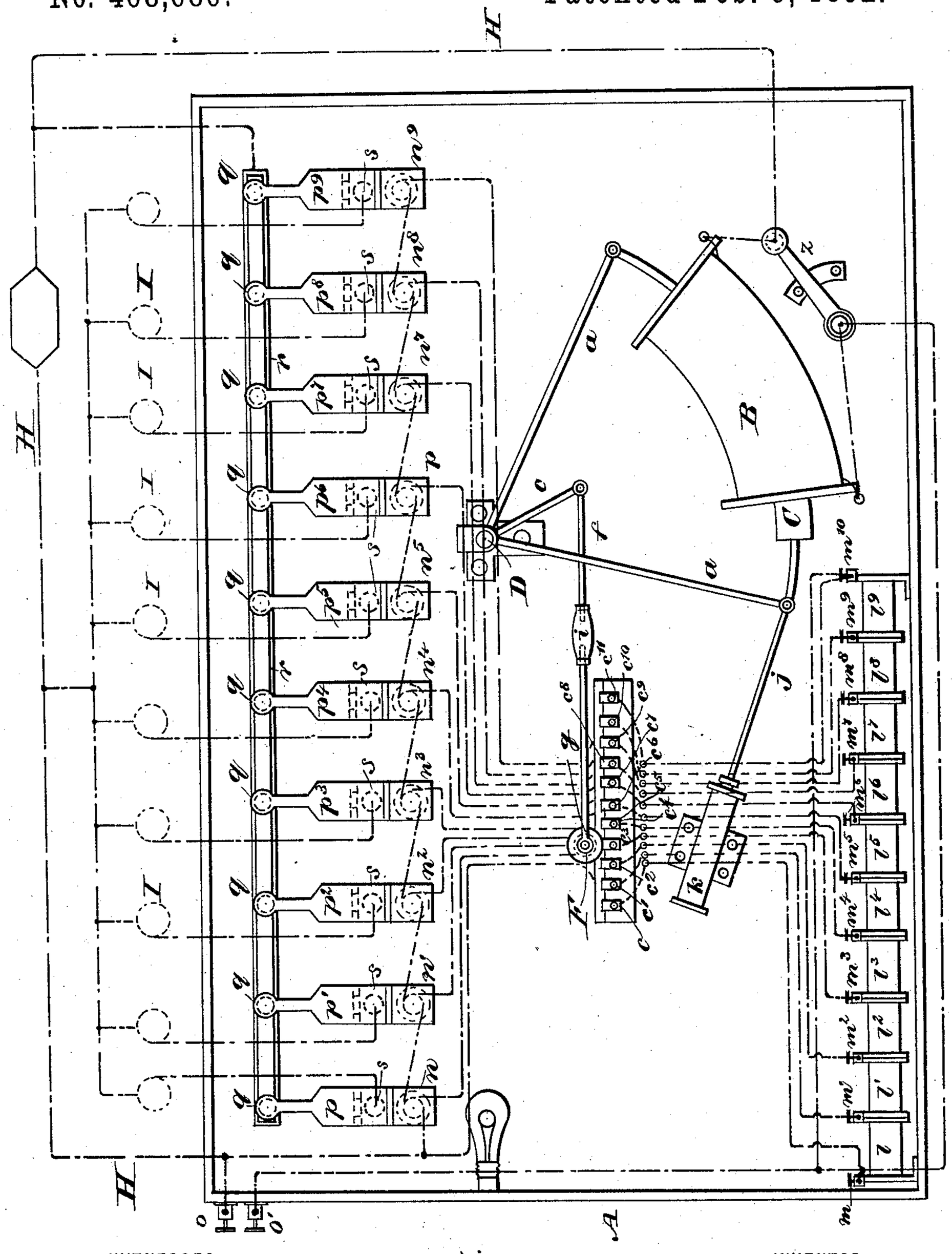

WITNESSES:

Donn Twitchell

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Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN T. O'BRIAN, OF KEARNEY, NEBRASKA.

ELECTRIC GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 468,686, dated February 9, 1892.

Application filed February 9, 1891. Serial No. 380,753. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. O'BRIAN, of Kearney, in the county of Buffalo and State of Nebraska, have invented a new and Improved Electrical Governor, of which the following is a specification, reference being had to the annexed drawings, forming a part thereof, in which—

Figure 1 is a front elevation of my improved electrical governor. Fig. 2 is a sectional end elevation. Fig. 3 is a rear elevation of one end, showing the electrical connections. Fig. 4 is an enlarged sectional end elevation showing the construction of the parts in detail; and Fig. 5 is a diagrammatical view of the governor, showing the circuits.

Similar letters of reference indicate corresponding parts in all the views.

The object of my invention is to construct an electrical governor for controlling the current on a circuit by introducing resistance into the circuit or removing it therefrom, or by changing the exciting-current in the field-magnet of an electrical generator.

My invention consists in the combination of a curved solenoid, a curved perpendicular armature, a series of contacts, a circuit closer and opener operated by the perpendicular armature, a series of resistance-coils, and a series of electro-magnetic cut-outs; also, in the combination, with the perpendicular armature, of an air dash-pot for modifying its movements, all as will be hereinafter more fully described.

To the back of the casing A is secured a curved solenoid B, adapted to receive the entire current to be controlled by the governor. To the curved solenoid B is fitted a curved armature C, which is suspended by rods *a* from a shaft D, turning on centers *b*. To the back of the casing A is secured an insulating-bar E, to the front side of which are attached the angled contact-pieces *c c′ c² c³ c⁴ c⁵ c⁶ c⁷ c⁸ c⁹ c¹⁰*, &c., and to the back side of the insulating-bar E is secured a corresponding number of contact-pieces *d d′*, &c.

To the shaft D is attached an arm *e*, which is pivoted to the rod *f*, having at its free extremity a fork *g*, in which is journaled a metallic grooved contact-roller F, which rolls upon the two sets of contacts *c c′ d d′*, &c. The said contact-pieces are separated by a bar *h* of insulating material secured to the bar E and forming a guide for the contact-roller F. The rod *f*, which carries the contact-roller F, is divided and furnished with an insulating-section *i*. To the end of the armature C is pivotally connected the piston-rod *j* of the dash-pot *k*, which modifies the movements of the armature.

In the bottom of the casing A is supported a series of resistance-coils *l l′ l² l³ l⁴ l⁵ l⁶ l⁷ l⁸ l⁹*, &c., connected with the binding-posts *m m′ m² m³ m⁴ m⁵ m⁶ m⁷ m⁸ m⁹ m¹⁰*, &c., and upon the back of the upper portion of the casing A are secured the magnets *n n′ n² n³ n⁴ n⁵ n⁶ n⁷ n⁸ n⁹*, &c. To the end of the casing A are secured binding-posts *o o′*, the binding-post *o* being connected with one terminal of the magnet *n* and also with the contact-piece *d* on the bar E. The corresponding contact-piece *c* is connected electrically with the binding-post *m* of the resistance-coil *l*. The binding-post *o′* is connected electrically with the binding-post *m¹⁰* of the coil *l⁹*. The magnet *n′* is connected with the contact-piece *d′*, and the connections are carried out in a similar way throughout the series of magnets *n n′*, &c., and contact-pieces *d d′*, &c. The contact-piece *c′* is connected with the binding-post *m′*, which is common to the coils *l l′*. The binding-post *c²* is connected electrically with the binding-post *m²*, which is common to the coils *l′ l²*, and this order of connection is carried out through the entire series of contact-pieces and resistance-coils.

Above the magnets *n n′*, &c., are pivoted a series of armature-levers *p p′ p² p³ p⁴ p⁵ p⁶ p⁷ p⁸ p⁹*, &c. The armatures upon the lower ends of the levers *p p′*, &c., are opposite the poles of the magnets *n n′*, &c., and the upper ends of the said armatures carry carbon contact-pieces *q*. To the back of the casing A and within the path of the carbon contact-pieces *q* is arranged a carbon bar *r*. To the support of each armature-lever *p* is attached a binding-post *s*. To a post *u*, projecting from the back of the casing A, is pivoted a latch *v*, which is furnished with a square shoulder *w*, engaged by the spring *x*, secured to the post. The armature-lever *p* is provided

with a spring y, which surrounds its pivot and tends to draw the armature away from the magnet n and close the circuit between the carbon contact-piece q and carbon bar r.

The resistance-coils $l\,l'$, &c., have a uniform resistance adapted to the current flowing in the circuit in which the governor is used, and the magnets $n\,n'$, &c., have the same resistance. A switch z is provided, by means of which the solenoid B may be short-circuited. The solenoid B is in the main circuit and the strip r and binding-posts s are in branches of the main circuit H, which include storage-batteries I, or, in lieu thereof, motors or resistance.

The current entering the apparatus by the binding-post o' is conveyed to the binding-post m^{10}, whence it passes through the resistance-coils $l^9\,l^8\,l^7\,l^6\,l^5\,l^4\,l^3$ to the contact-piece c^3, the roller F, contact-piece d^3 and wire connected therewith, through the magnets n^2, n', and n, thence to the binding-post o. The magnets $n\,n'\,n^2$, being energized, attract their armatures and break the branch circuits which they control. Any movement of the roller F toward the solenoid B cuts out the resistance-coils $l\;l'\;l^2$, &c., in succession and cuts in in lieu of the said coils the magnets $n\;n'\;n^2$, &c., in succession, thus keeping the resistance offered by the apparatus to the passing current always constant.

Whenever the current in the main circuit is above the normal, the core C is drawn into the solenoid B, moving forward the contact-roller F on the contact-pieces $c\;d$, &c., thus cutting out one or more of the resistance-coils l, cutting in one or more of the magnets n, thereby causing one or more of the armature-levers $p\;p'$, &c., to be tilted, breaking the circuit between the contact q and the bar r and allowing the surplus current to go through the storage-batteries I in the storage-battery circuits controlled by the roller F. When the current in the main circuit diminishes, the roller F returns toward its former position, and in so doing cuts out one or more of the magnets n, thus allowing the contact q to strike the bar r, which operation cuts out the storage-battery or motor or other translating devices included in the circuit or circuits controlled by the roller F, and also cuts in resistance l to compensate for the removal of the magnet n from the circuit, thus keeping the resistance of the governor constant.

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

1. In an electric governor, the combination of the solenoid B, provided with an armature C, a circuit-controller carried by the armature, a series of contacts arranged to be connected by the circuit-controller, resistances, and translating devices arranged to be thrown into and out of the circuit by the circuit-controller, the said resistances and translating devices being made with like resistance to permit of alternating the translating devices and resistances without changing the total resistance of the circuit, substantially as specified.

2. In an electric governor, the combination, with an electro-magnetic circuit-controller, of a series of resistance-coils in which the several coils have the same resistance, a series of magnets having like resistance as the resistance-coils, and having the same resistance, and a series of armature-levers operated by the magnets for closing auxiliary circuits, substantially as specified.

3. The circuit-controller formed of the insulating-bar E, contact-pieces $c\;c'\;d\;d'$, &c., attached to the said bar, translating devices and resistances connected with the said contact-pieces, the guiding-bar h, the grooved roller F, and the solenoid B and armature C for moving the same, substantially as specified.

JOHN T. O'BRIAN.

Witnesses:
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GEO. W. BROWN.