No. 865,732. PATENTED SEPT. 10, 1907.

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DYNAMO OR THE LIKE.

APPLICATION FILED MAR. 6, 1905.

2 SHEETS—SHEET 1.

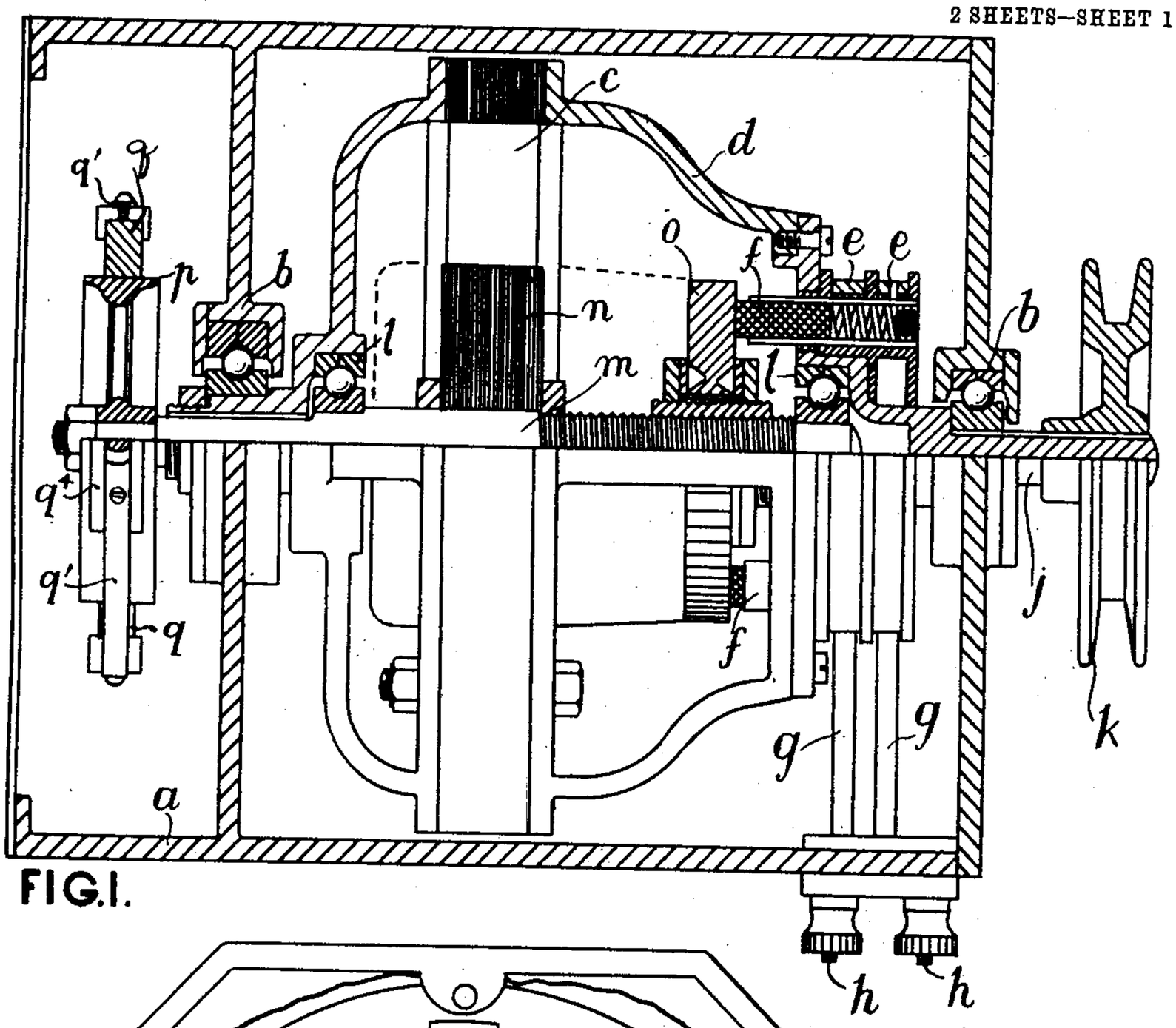

FIG. 1.

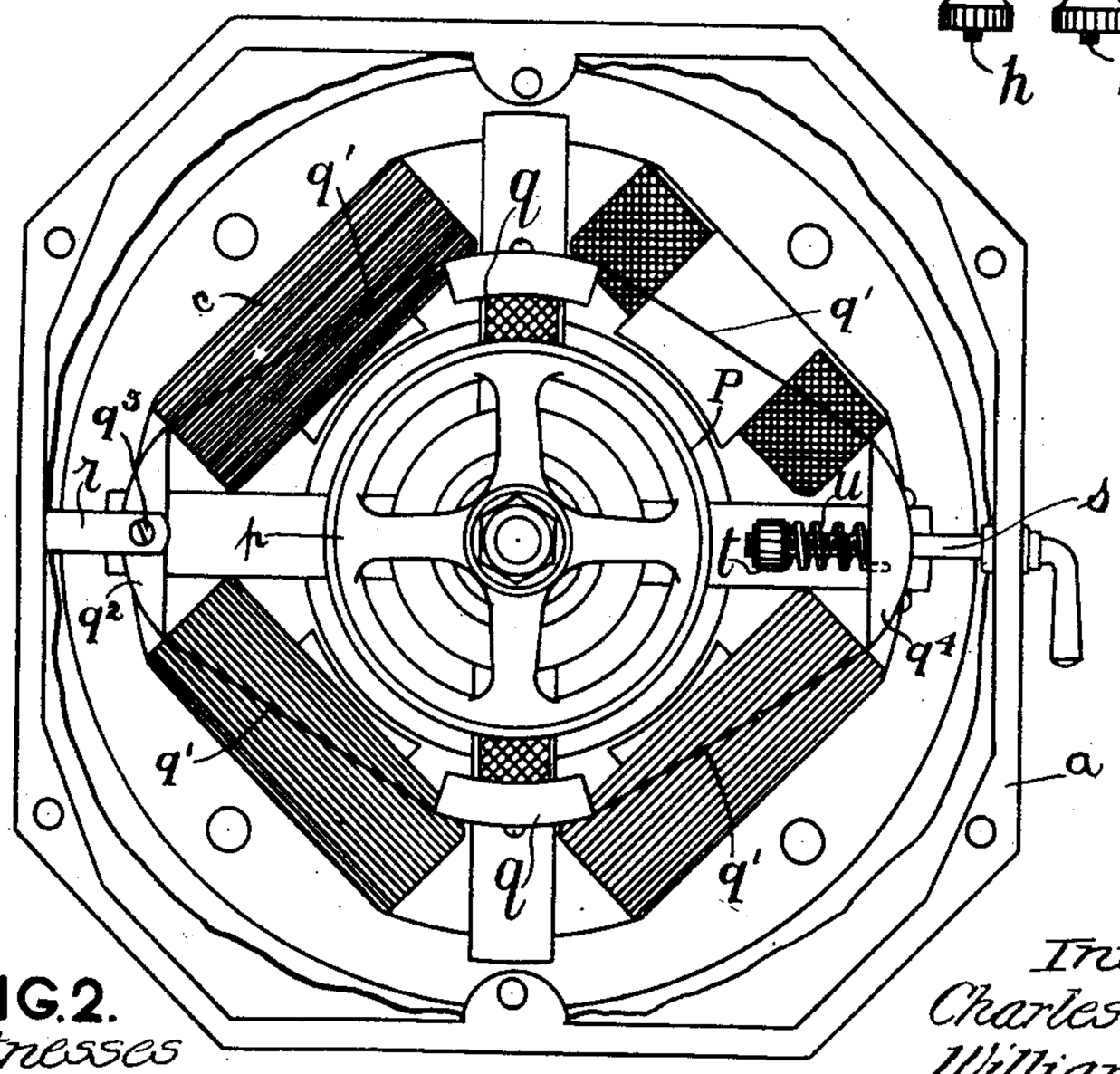

FIG. 2.

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2 SHEETS—SHEET 2.

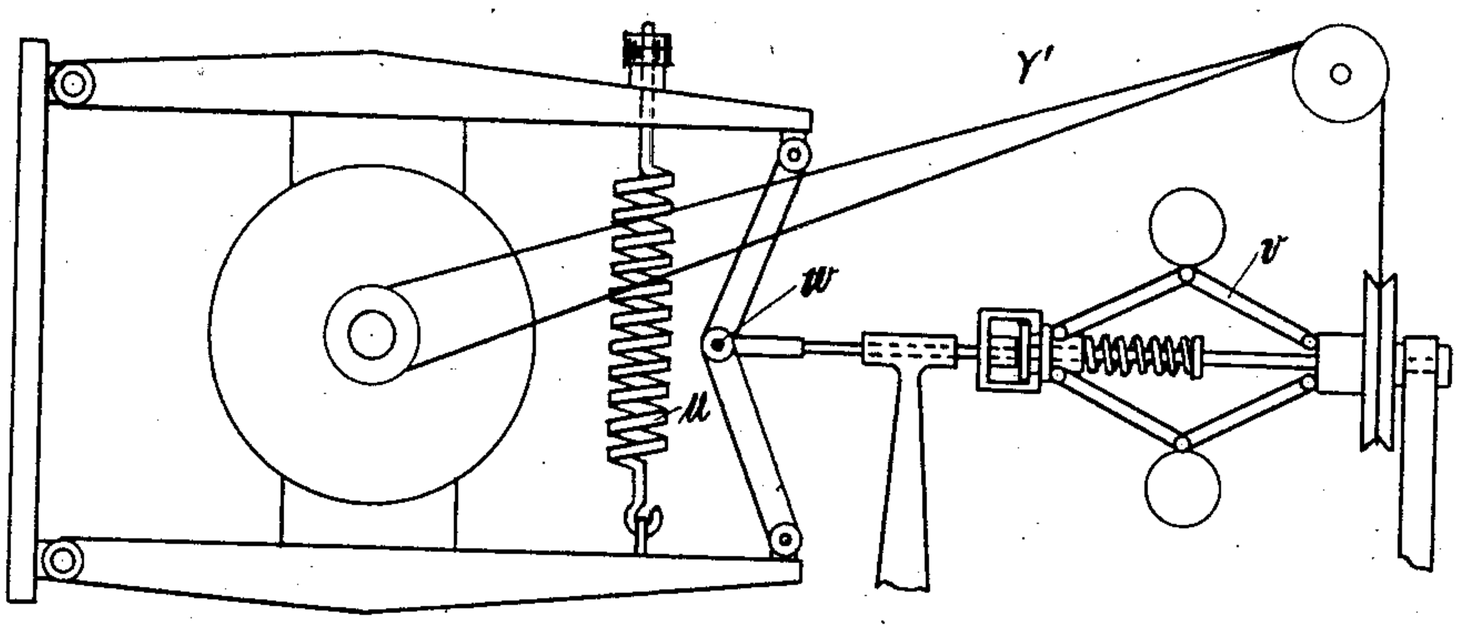


FIG. 3.

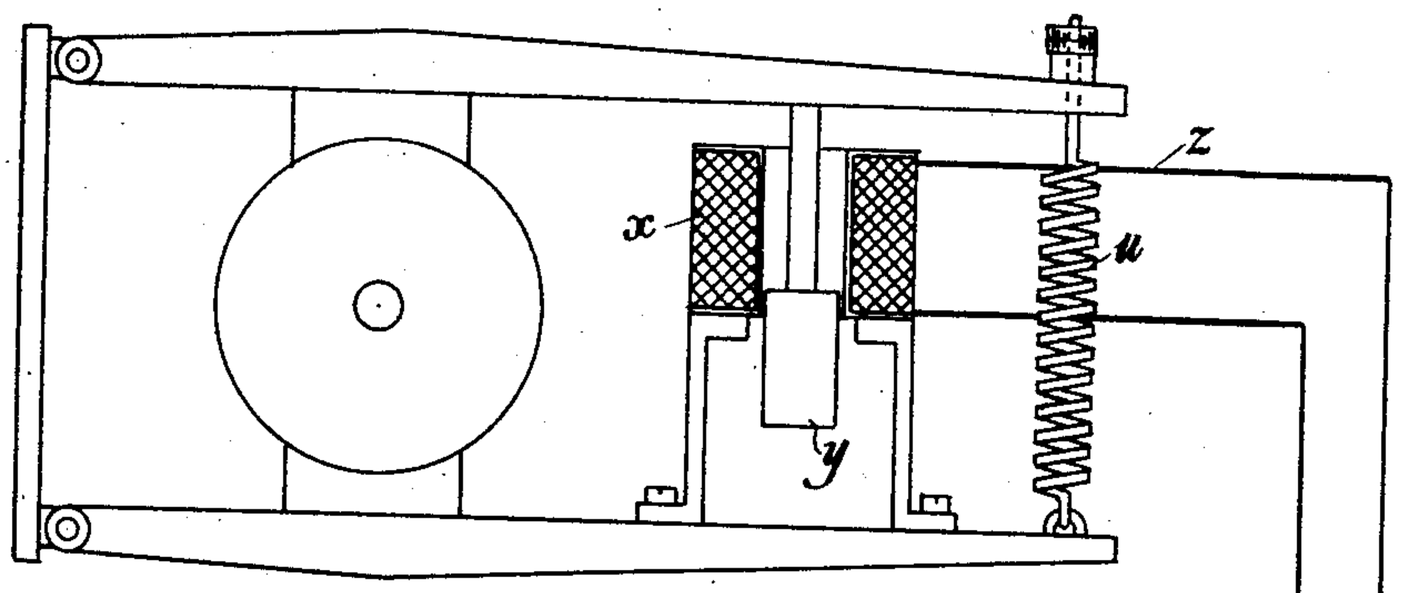
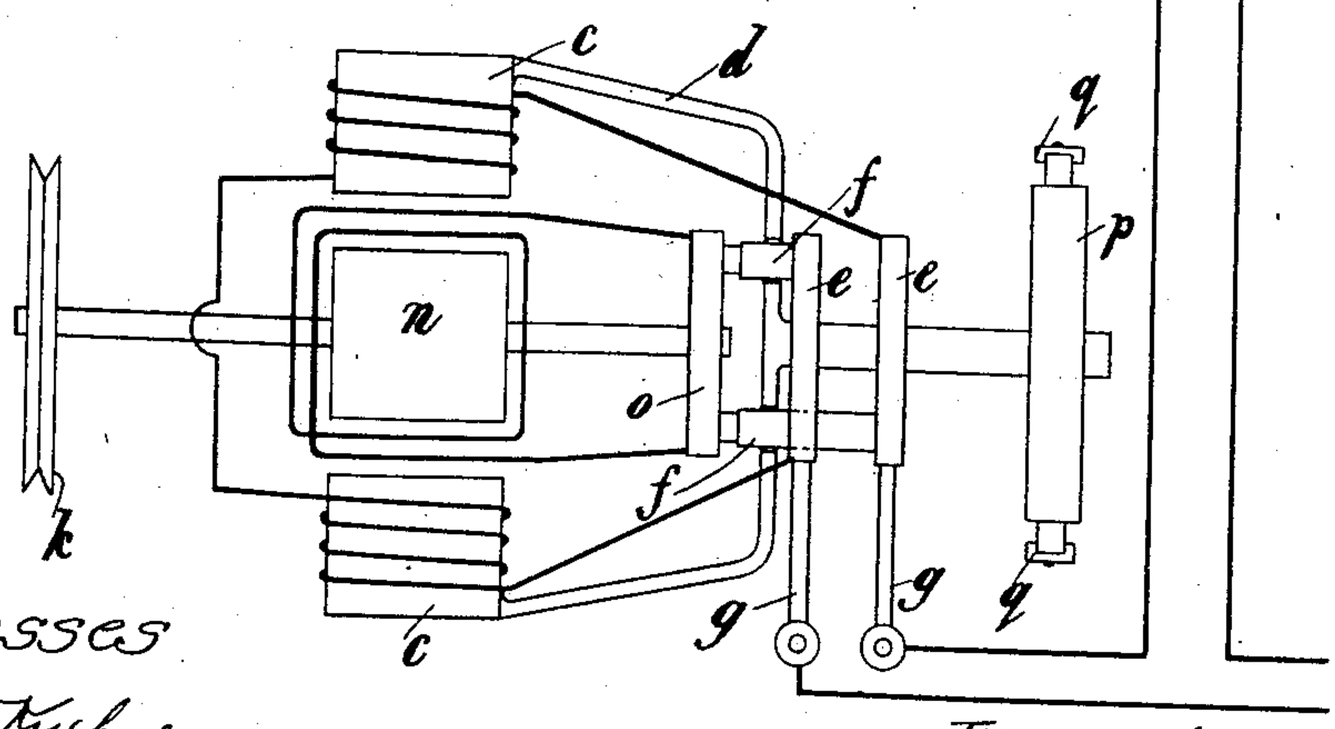


FIG. 4.



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UNITED STATES PATENT OFFICE.

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DYNAMO OR THE LIKE.

No. 865,732. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed March 6, 1905. Serial No. 248,604.

To all whom it may concern:

Be it known that we, CHARLES ANTHONY VANDERVELL and WILLIAM HENRY WARDEN PROCTOR, both subjects of the King of Great Britain and Ireland, and residing at Willesden, London, England, and Coventry, in the county of Warwick, England, respectively, have invented a new and useful Improvement in or Relating to Dynamos or the Like, of which the following is a specification.

This invention relates to improvements in dynamos or the like and has for its object to provide means whereby any desired constant output from a dynamo may be obtained in spite of the dynamo being driven at varying speeds.

According to this invention the dynamo is constructed so that when the desired output is inclined to be exceeded the armature and the field magnets are rotated in the same direction so that the relative speed between the two is maintained constant and the required output maintained in spite of fluctuations of speed.

A device of this kind is particularly advantageous in the case of a dynamo driven by an internal combustion engine fitted to a motor car and used for charging batteries, lighting or the like and also for dynamos used on railway trains for lighting purposes. In such cases the speed at which the rotating element such as the armature is rotated is constantly varying with the result that the output from the dynamo fluctuates and is liable to exceed the safety limit with disastrous results. The devices used to effect a constant output in the majority of cases consist either of slip devices or shunt resistances or the like. Where these are employed, power is necessarily wasted when the speed and output exceed the normal.

In one construction of our invention we arrange in a suitable casing a shaft which is supported in bearings at each end, which shaft may constitute the driving shaft for the armature. This shaft carries a sprocket pinion or the like, whereby it may be driven, a commutator and other devices which are usually fitted to the armature shaft of dynamos.

Arranged around the armature are the field magnets as usual. These field magnets are not held stationary in the usual manner but are supported by arms connected to sleeves arranged around the armature shaft or other convenient part. The result of this method of carrying the field magnets is that they are free to rotate concentric with the armature shaft. The resistance to the rotation of the field magnets is adjusted according to requirements so that when the speed of the armature shaft exceeds what is required to give the desired output the field magnets will be dragged round by the attraction of the rotating armature. In this way the relative speed between the armature and the field magnets is prevented from exceeding that which is necessary to give the desired output.

Various methods may be employed for holding the field magnets stationary and releasing them when required. For example, a brake may be arranged to bear upon the field magnets, their casing or a brake drum or the like connected thereto. The brake can be adjusted by hand and can if necessary be adapted to be released by means of a centrifugal or other governor when the speed of the armature shaft exceeds the normal. In another construction the brake may be held in its operative position by a spring or the like and the pressure be controlled by a suitable magnet or the like. This magnet is constructed so that when the speed of the armature shaft is above the normal it is caused to reduce the pressure of the brake and allow the field magnets to rotate and thus maintain constant speed in relation to the armature. In cases where the armature is held stationary and the field magnets are rotated obviously a similar construction may be employed whereby the armature is caused to rotate when the speed of the field magnets' shaft exceeds the normal as described.

This invention consists essentially therefore in the construction of a dynamo in which the armature and the field magnets are both adapted to rotate, the one being driven from any source of power, the other being held by a brake adjustable as to its retarding effect upon the mechanism controlled by it the whole being arranged in a suitable and compact manner whereby a constant output can be obtained for varying speeds of the element.

In order that the invention may be the better understood it will now be described in relation to the accompanying drawings, reference being had to the letters and figures marked thereon.

Like letters refer to like parts of the various figures.

Figure 1 is a part sectional elevation of a machine constructed in accordance with the present invention. Fig. 2 is an end elevation of the same one of the field magnet coils being shown in section. Fig. 3 is a diagrammatic representation of the adjustable brake gear adapted with a centrifugal governor control. Fig. 4 is a similar brake gear adapted for electro-magnetic control and in connection therewith the mechanical elements and the electric circuits are shown diagrammatically representing the machine as shown in Fig. 1 but in this case the armature is the driven element and the field magnets the braked element as illustrating the obvious alternative arrangement hereinbefore referred to.

Within a casing *a* and in ball bearings *b* carried by said c ing, the field magnets *c* are supported so as to

revolve in the bearings *b*. These field magnets *c* are carried by a framework *d* which supports collecting rings *e* and commutator brushes *f*. Collecting brushes *g* are provided to rub upon the collecting rings *e* and convey the current therefrom to the terminals *h h*. The shaft extension *j* of the field magnets which is external to the casing *a* carries a driving pulley *k* or other equivalent device by which rotary motion can be transmitted to the dynamo. Within the casing *d* of the field magnets, ball bearings *l l* are provided which support a shaft *m* carrying the armature *n* and commutator *o*. At the outer end of the shaft *m* a brake pulley *p* is fixedly carried, the periphery of which engages brake blocks *q*.

The brake clearly shown in side elevation in Fig. 2, is constructed in such a way as to be practically supported in floating manner relative to the shaft or rotating element being controlled by such braking mechanism and thus avoid differences of braking effect due to the rotating element being out of true. This result is effected by supporting the brake blocks on supports which will accommodate themselves to the movements of the brake drum. The brake blocks *q* are carried by light flexible springs q^1 by means of a block q^2 pivoted to the extension *r* by means of the pin q^3 at one end while the other end is mounted on a block q^4 supported upon the adjustable screwed spindle *s* engaging with the nut *t* in such a way as to set up a pressure through the spiral spring *u* between the nut *t* and the block q^4. The nut *t* and the spring *u* are attached to one another while the spring *u* has one of its ends bent so as to engage in a hole in the block q^4 situated at that part where the spring *u* engages against the said block. The tension transmitted to the spring supports q^1 is varied by turning the spindle *s* by means of the handle s^1 so as to compress or extend the spring *u* according to the pressure it is desired should be put upon the blocks *q*. It will be noted that the blocks *q* follow any eccentric movement of the drum *p* without making any appreciable difference of the blocks upon the said drum. From this construction it will be noticed the field magnets are adapted to rotate concentrically with the armature shaft and that the resistance to the rotation of the armature is adjusted according to requirements so that when the speed of the field magnets exceeds what is required to give the desired output the armature will be dragged round by the increased attraction of the rotating field magnets and thus the relative speed between the field magnets and the armature is prevented from exceeding that which is necessary to give the desired maximum output.

In the machine thus far described a simple hand adjustable brake arrangement has been provided but it is obvious modified methods may be employed for holding the armature stationary and releasing it when required for example in Fig. 3, a centrifugal governor *v* is shown diagrammatically which can be driven by the machine itself or by its source of power by a driving band v^1 and by means of toggle levers or other equivalent devices be adapted to release the pressure of the brake spring *u* in proportion to the increase in speed of the driving element or in Fig. 4 the same result may be effected electrically by means of a solenoid *x* acting on a magnetic core *y;* the solenoid being energized by the current produced in the dynamo. When this current exceeds a given amount the action of the solenoid overcomes some of the resistance of the spring *u* and the brake pressure is reduced. It is obvious that the field magnets may be controlled in a similar manner by the brake and the armature be the driven element without in any way departing from the essence of this invention.

Having now described this invention, what we claim and desire to secure by Letters Patent is:—

1. A dynamo consisting of a movable armature and movable field magnets, means for driving one of the said parts and a braking device for the other part adapted to be adjusted by hand while the machine is in motion so that the relative speed of rotation between the parts may be kept at a desired rate, said braking device comprising a pulley connected to the part to be braked, a series of brake blocks adapted to engage with the periphery of said pulley, a flexible spring carrying said blocks, a stationary support for one end of said spring and an adjustable support for the other end of the spring.

2. A dynamo consisting of a movable armature and movable field magnets, means for driving the field magnets, a pulley connected to the armature, a series of brake blocks adapted to engage with said pulley, a flexible spring carrying said blocks, a stationary support for one end of said spring, a block q^4 connected to the other end of the spring, a screw spindle on which the block q^4 is movably supported a stationary nut supporting the spindle and a coiled spring on the spindle between the nut and the block q^4.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

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Witnesses:
RICHARD A. HOFFMANN,
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