No. 698,888. Patented Apr. 29, 1902.

V. G. APPLE.

SPEED REGULATOR.

(Application filed Aug. 16, 1900.)

(No Model.)

Fig. 1.

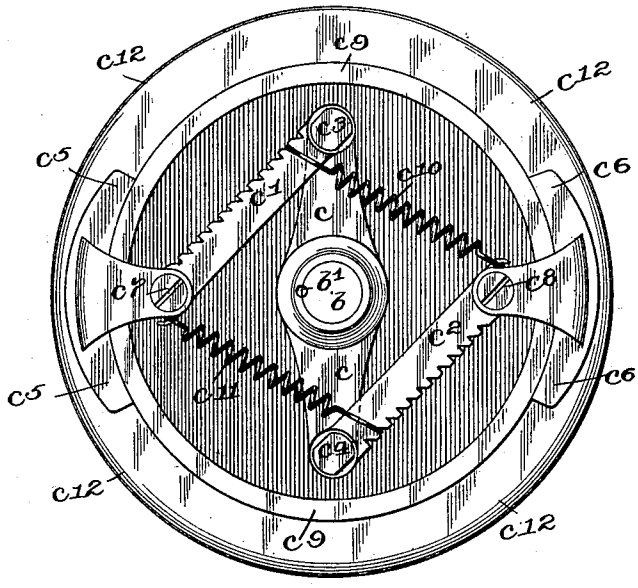
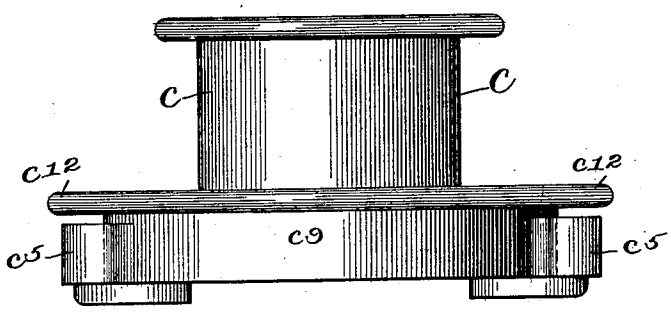


Fig. 2.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

VINCENT G. APPLE, OF DAYTON, OHIO, ASSIGNOR TO THE DAYTON ELECTRICAL MANUFACTURING COMPANY, OF DAYTON, OHIO, A CORPORATION OF OHIO.

SPEED-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 698,888, dated April 29, 1902.

Application filed August 16, 1900. Serial No. 26,999. (No model.)

To all whom it may concern:

Be it known that I, VINCENT G. APPLE, a citizen of the United States, residing at Dayton, county of Montgomery, and State of Ohio, have invented certain new and useful Improvements in Speed-Regulators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable persons skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in speed-regulators. It has special reference to a class of regulators in which the frictional coefficient between the members thereof is decreased as a result of the increased revolutions or velocity of the said regulator.

In my copending application, filed July 25, 1900, Serial No. 24,760, I have shown and described one use for which my present regulator may be employed.

A further object and use of my invention is to provide a means whereby the armature of a dynamo or a like device may be revolved at any speed up to a given number of revolutions that may be decided upon or predetermined and whereby the said armature or like device cannot be revolved at a speed above that said predetermined number of revolutions notwithstanding the fact that the driver which affords the power for revolving the said armature may be rotated at a comparatively much higher speed. Such a device may be used in connection with dynamos when they are driven by the power taken from the axle of a moving railway-train.

There are a number of other uses to which my regulator may be put that will naturally appear in its industrial application.

In the drawings, Figure 1 is a plan view of the regulator. Fig. 2 is a side elevation of the same.

In both the figures the same letters of reference are used to designate similar parts.

C is an ordinary belt-pulley, or it may be any other means for driving the regulator, such as a gear or friction wheel, which may be an integral portion of the regulator.

b is a shaft, to which the driven portion of the regulator is rigidly attached by means of the key b'. *c* is a bar, which is fixed to the shaft in this manner and which constitutes the positive portion of the regulator. It is rigidly attached to the shaft of a dynamo or other device to be rotated. Notched arm c' is pivoted to the bar *c* at c^3, and in a like manner the notched arm c^2 is pivoted to the opposite end of the same bar at c^4. Friction-shoes c^5 and c^6 are pivoted to the respective arms c' and c^2 at c^7 and c^8 in the manner shown. These friction-shoes have bearing upon the outside surface of the friction-rim c^9 of the pulley C. Closed helical springs c^{10} and c^{11} hold the friction-shoes c^5 and c^6 in contact with the rim c^9 and cause a friction-resisting contact to be exerted between the said shoes and rim, whereby the power to drive the shaft may be transmitted from the pulley to the shaft of the armature or other device.

c^{12} is a flange of the pulley, which is an integral part of the rim c^9 and pulley C and presents an effective means for carrying off the heat that may be evolved by the friction due to the unequal speed of the shoes and the said rim. The flange c^{12} presents considerable superficial surface to the air when the pulley is being revolved, which I utilize for the purpose of dispersing such heat.

When the regulator is applied to a shaft to be rotated and a belt encircles the pulley C, the friction that is exerted between the shoes c^5 c^6 and the rim c^9 is sufficient to transmit the torque necessary to turn the shaft, for the reason that the springs c^{10} and c^{11} hold the respective shoes firmly against the said rim with a varying pressure, due to the tension of the said springs.

When the pulley and regulator are rotated at a high velocity, the centrifugal effect tends to cause the shoes c^5 and c^6 to fly off at a tangent from the center against the tension of the springs, the pressure previously existing between the said shoes and the rim being thereby reduced until the velocity of the driver increases to such an extent that the shoes will entirely leave the said rim, and the shaft *b* will not be revolved at a higher rate than its normal speed.

In applying my regulator to a dynamo,

which may be driven by the power taken from the axle of a moving railway-train, the maximum speed of the dynamo is determined, and the relation between the regulator and the driving mechanism attached to the axle of the car may be likewise determined—say at a speed consistent with the normal velocity of the moving train. When the train moves greatly in excess of its normal speed, the armature of the dynamo will not be rotated at a higher velocity than was predetermined by the adjustment of the tension of the springs on account of the frictional contact having become disassociated with the element to be rotated by reason of the incresed velocity of the shoes, as before described. When the speed of the armature, and consequently of the regulator, decreases or descends below a certain minimum predetermined number of revolutions in a given time, the electromotive force of the dynamo will consequently be thereby decreased, and an ordinary automatic cut-out device may be made use of for opening the electric circuit, such device that is common to such uses.

My frictional regulator may be applied either to the prime driver or to the driven device with equal efficiency.

By changing the position of the springs c^{10} and c^{11} the shoes may be made to bear with greater pressure upon the friction-rim c^9, and a higher velocity of the device will be reached before the shoes will leave the said rim by reason of the centrifugal motion described.

Other means than those shown may be employed for adjusting the tension of the shoes upon the friction-surfaces of the other element of the regulator.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a speed-regulator the combination of friction-wheel C a driving-shaft *b*, an arm *c* fixed thereto, levers c' and c^3 hinged to the arm *c*, centrifugal weight friction-shoes c^7 and c^8 hinged to said levers, and adapted to engage a friction-surface on said friction-wheel, and springs c^{10} and c^{11} for normally holding said shoes in contact with said surface, substantially as set forth.

2. In a speed-regulator the combination of, a driven shaft, a pulley adapted to be rotated thereon, an annular friction-rim carried by said pulley, friction-shoes adapted to engage the outside surface of said rim and to be disengaged by their centrifugal effort when rotated, a support fixed to said shaft, levers pivoted to said shoes and to said support, there being notches on said levers, and springs connecting said levers for normally holding said shoes in contact with said rim and adapted to engage said notches for adjusting the tension of said springs.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 8th day of August, A. D. 1900.

VINCENT G. APPLE.

Witnesses:
GEO. T. BROWN,
THOS. L. STEWARD.