No. 711,421. Patented Oct. 14, 1902.

A. B. GILL.

APPARATUS FOR ELECTRICALLY LIGHTING RAILWAY TRAINS.

(Application filed Aug. 25, 1902.)

(No Model.)

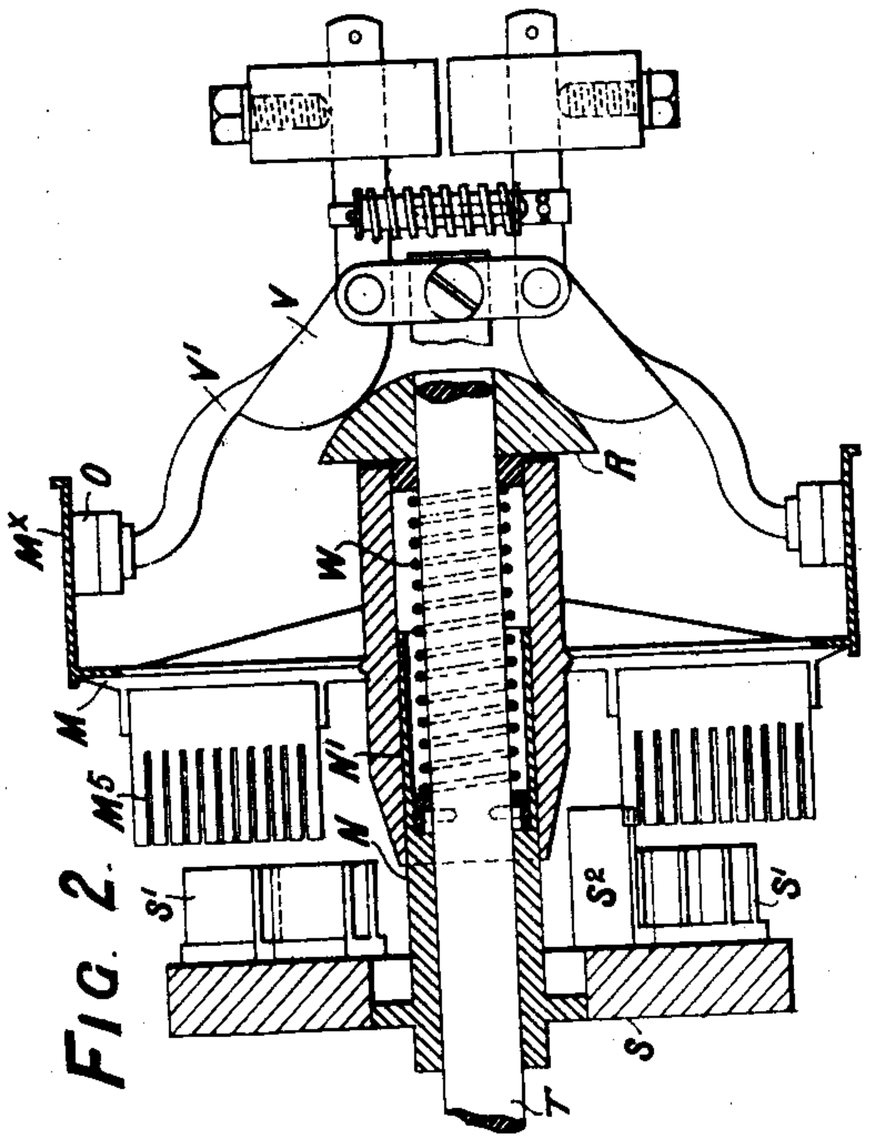

FIG. 2.

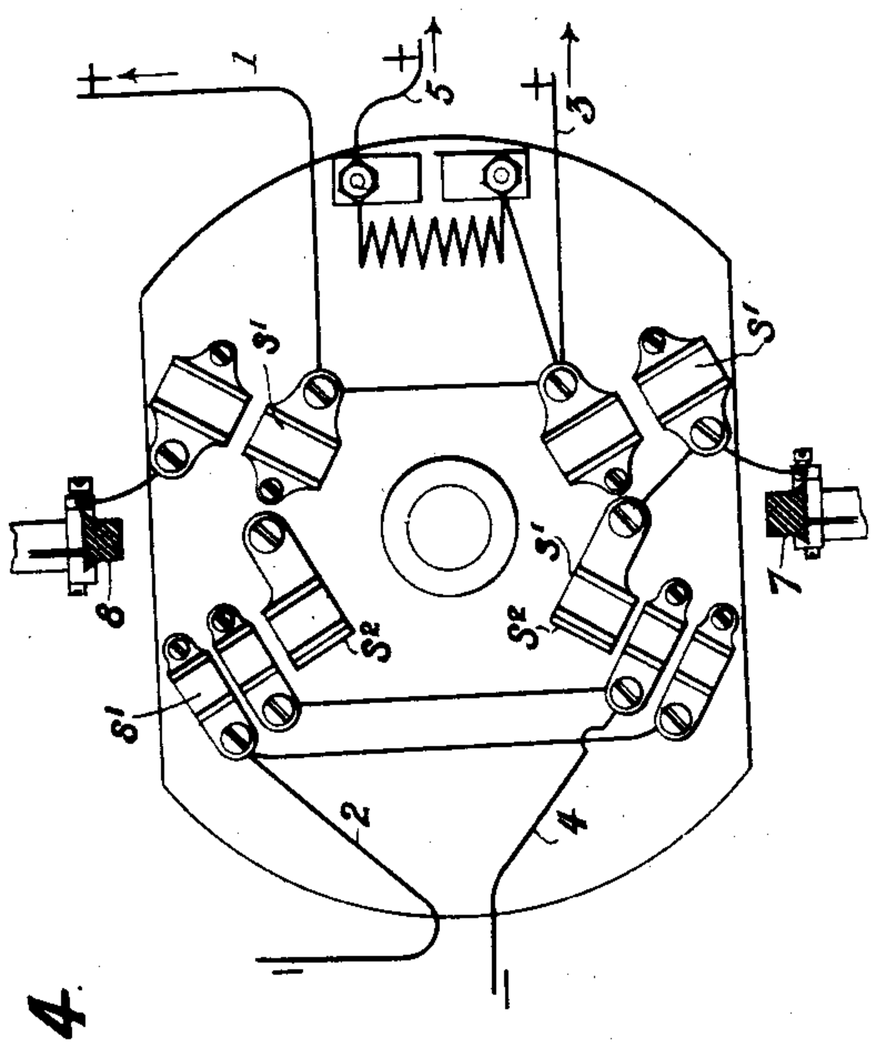

FIG. 4.

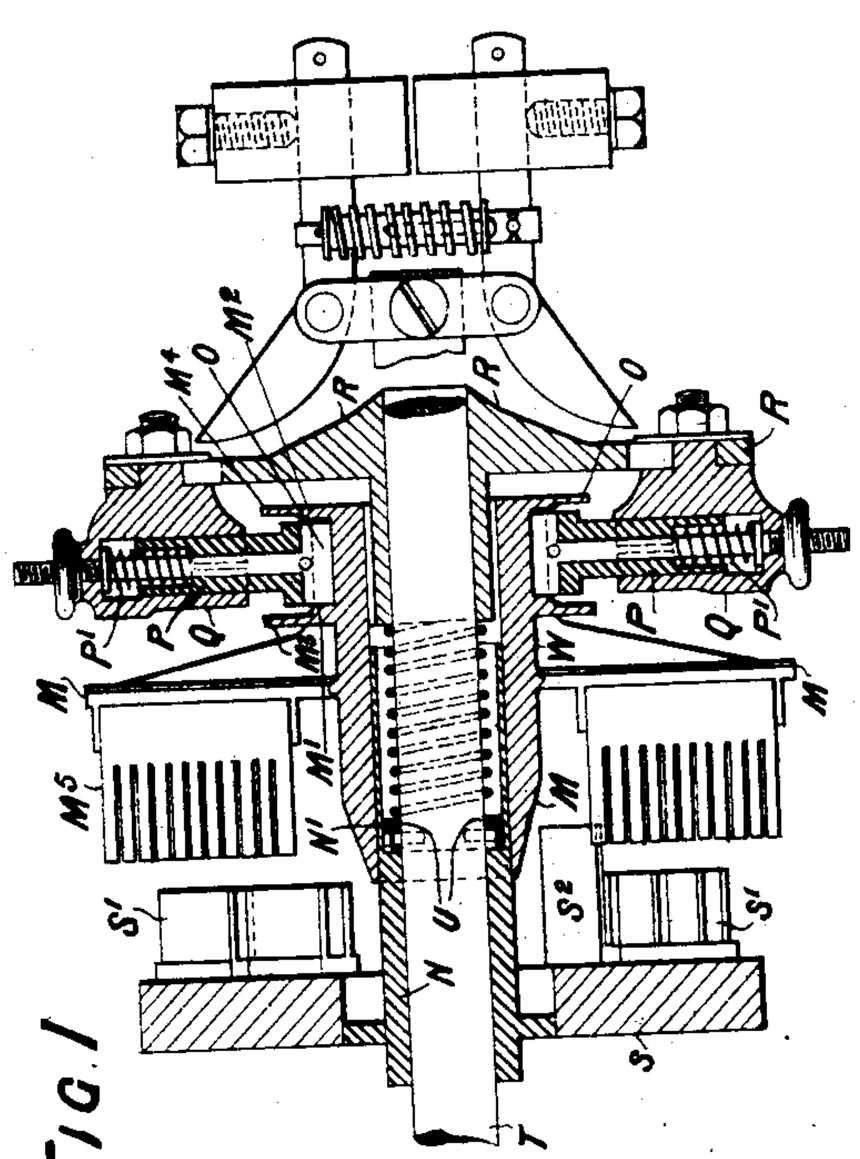

FIG. 1.

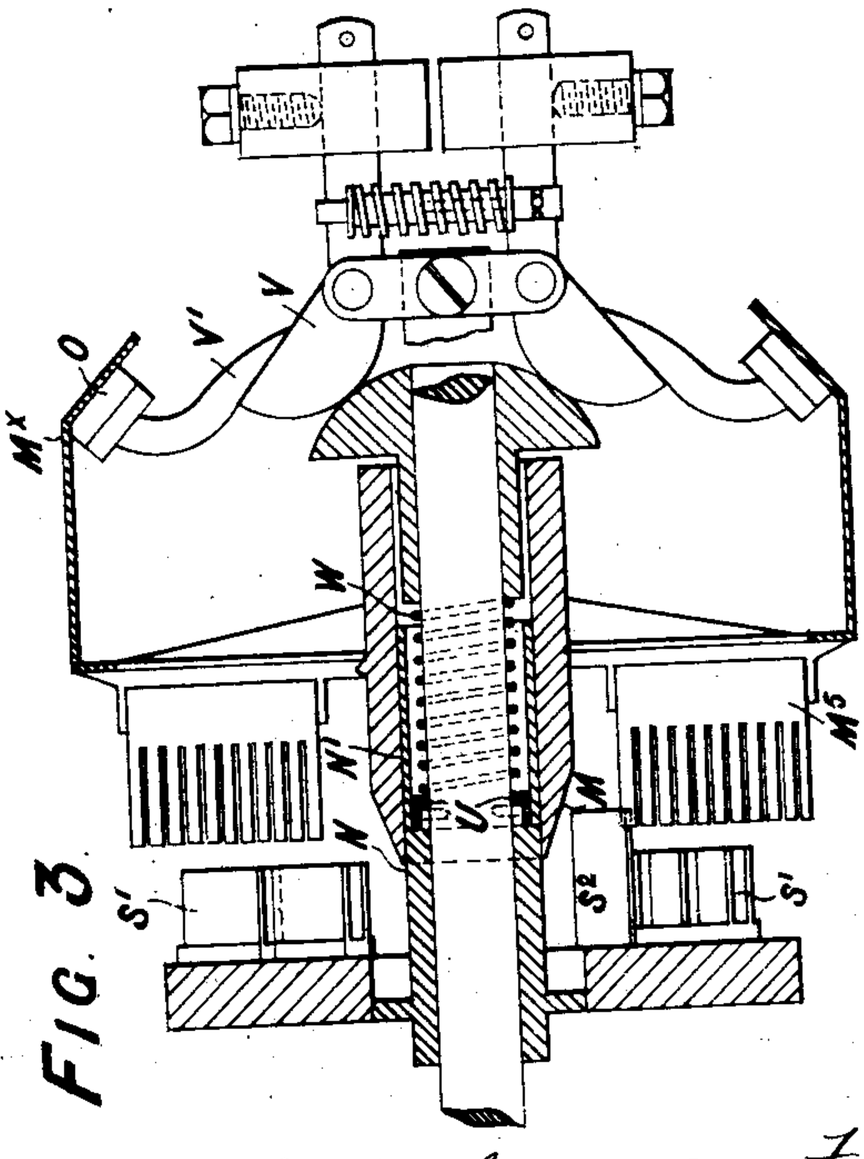

FIG. 3.

E. A. Wolk.
Albert F. Brauer
Witnesses.

Arthur Bernard Gill Inventor.
By Wilhelm Bonner
Attorneys.

UNITED STATES PATENT OFFICE.

ARTHUR BERNARD GILL, OF LONDON, ENGLAND, ASSIGNOR TO J. STONE AND COMPANY, OF DEPTFORD, ENGLAND, A FIRM.

APPARATUS FOR ELECTRICALLY LIGHTING RAILWAY-TRAINS.

SPECIFICATION forming part of Letters Patent No. 711,421, dated October 14, 1902.

Application filed August 25, 1902. Serial No. 120,918. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR BERNARD GILL, a subject of the King of Great Britain, residing at Carlton, Blackheath Park, London, England, have invented new and useful Improvements in Apparatus for Electrically Lighting Railway-Trains, of which the following is a specification.

This invention has reference to an improved apparatus or system for electrically lighting railway-trains and where the dynamo is driven by a belt from a wheel-axle or follows the speed of the train and the amount of current produced is regulated by compound winding of the dynamo, or by altering the "lead" of the brushes, or by altering the intensity of the magnetic field, or by inserting resistances in the main circuit or in the field-circuit, or in both. In order that the current may always flow in the same direction, fixed contacts on a switchboard are used, and on the dynamo-spindle is mounted a contact-arm which is controlled by a centrifugal governor and is carried around by indirect friction with the dynamo-spindle until it is arrested by a stop on the switchboard, and when the speed increases the contact-arm is by the governor slid up the spindle and the arm-contacts slid into the fixed contacts. When the carriage runs in the opposite direction, the contact-arm is by indirect friction with the spindle carried against another stop on the switchboard and makes contact when the speed increases. From the switchboard the current is led to the circuits for lamps and accumulator. When the carriage stops, the current to the lamps is taken from an accumulator.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 shows the invention in sectional elevation. Fig. 2 is a similar view of a modification. Fig. 3 is a like view of a further modified embodiment of the invention, and Fig. 4 is an elevation of the fixed contact-board.

Three dynamo-reversing arrangements are shown in Figs. 1, 2, and 3, and the end view, Fig. 4, shows the fixed contact-board generally used therewith.

Referring first to Fig. 1, the rocking arm M is carried entirely on an extension N′ of the bearing N for the dynamo-spindle T; but it obtains the necessary friction for causing it to make a partial rotation in the direction of the rotation of the armature indirectly—that is to say, from one or more (in this example two) spring-plungers P, which are tipped with blocks O of carbon or other antifrictional material—as, for instance, "white-metal." These spring-plungers are carried in cylinders Q or other guides, which in turn are fixed to (in this case adjustably so) or form part of two extensions R′ of the rotating cone R. The carbon blocks O press against diametrically opposite sides of a channel-way in the boss of the rocking arm M, and consequently by their friction cause the rocking arm to rotate in the same direction as the armature may happen to rotate as far as the stops S^2 on the switchboard allow. This friction is, however, only applied while the dynamo is running at a low speed, because as soon as the speed increases to the predetermined amount the centrifugal force causes the plungers P to fly outward, and thus do away with all friction. The springs P′ at the back of the plungers P, however, are so adjusted that this shall not take place until the dynamo has attained such a speed that the rocking arm M has been carried around to its proper position against a stop S^2 and has been pushed along the bearing N N′ and its spring-contacts M^5 have entered the contacts S′ on the switchboard S by the sidewise pressure of the carbon blocks O against the flanges M′ or M^2 on the boss of the rocking arm M. The converse action takes place when the dynamo slows down, the centrifugal force thereby decreasing, and the plungers P return into the channel-way, so that the rocking-arm contacts M^3 are withdrawn from the fixed contacts S′ by the sidewise pressure on the carbon blocks against the flanges M′ or M^2. The advantages of this arrangement are, first, that lubrication of this part is no longer necessary, and therefore the main bearing alone is lubricated by a ring-oiler or other mechanical oiler; second, that in case the bearing wears out of true, so that the spindle T gets out of line, this will not appreciably affect the working of the rocking arm M toward or away

from the contacts S^2. The channel-way is narrower at M' M^2 at the bottom and wider at the outer side at M^3 M^4, so that when the blocks O have done their work of pushing in the rocking-arm contacts and afterward when by centrifugal force they fly out to the extreme limit at M^3 M^4 they are quite clear of the channel-way, thus avoiding any friction or wearing of the blocks. Instead of this channel-way being square it might be made conical or V shaped.

Instead of the preferred arrangement, Fig. 1, I may provide a rim attached to or forming part of the rocking arm, and against the plane, conical, or curved inner surface of this rim friction-blocks are pressed which are carried on extensions of the ordinary governor-arms. Such an arrangement is shown in Fig. 2, where the carbon blocks O are pressed against the plane inner surface of the rim $M^\times$, the blocks being mounted on extensions V' of the governor-arms V. This arrangement provides only for the partial rotation of the rocking arm M and not for inserting its contacts, the former of which would have to be performed by means of end pressure from the cone R against the boss of the rocking arm M and the latter by the pressure of the spring W against a washer or collar U, fixed on the spindle T, which spring-pressure would come into action as the centrifugal effort of the governor allowed the cone R to return into its normal position.

Fig. 3 shows a rim $M^\times$ with a conical face for the carbon blocks O to press against.

Fig. 4 shows the switchboard S with contacts S' and stops S^2. The wires 1 and 2 connect with the magnet-coils, the wires 3 and 4 with the accumulator, and the wire 5 with the lamps. 7 and 8 represent the carbon "brushes."

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a rotary shaft, switch-contacts and electrical connections, a reversible switch-lever, a stationary bearing on which said switch-lever is loosely mounted and adapted to move longitudinally and circumferentially relative to said shaft, a centrifugal governor connected to said shaft and adapted to move said switch-lever toward said contacts, and means operated by said governor and adapted to frictionally engage with a part connected to said switch-lever to turn the latter, said means being moved out of contact with said part by centrifugal force when a certain speed of said shaft is attained, substantially as set forth.

2. The combination of a rotary shaft, switch-contacts and electrical connections, a reversible switch-lever, a stationary bearing on which said switch-lever is loosely mounted and adapted to move longitudinally and circumferentially relative to said shaft, a cone movable longitudinally relative to said shaft, a centrifugal governor connected to said shaft and adapted to operate said cone to move said switch-lever toward said contacts, and friction-shoes carried by said cone and adapted to frictionally engage a part connected to said switch-lever to turn the latter, said shoes being moved out of contact with said part by centrifugal force when a certain speed of said shaft is attained, substantially as set forth.

3. The combination of a rotary dynamo-shaft, a stationary bearing therefor, switch-contacts and electrical connections, a reversible switch-lever loosely mounted on said stationary bearing and adapted to move longitudinally and circumferentially relative to said shaft, a cone movable longitudinally on said shaft, a centrifugal governor carried by said shaft and adapted to operate said cone to move said switch-lever toward said contacts, friction-shoes carried by said cone and adapted to frictionally engage a part connected to said switch-lever to turn the latter, said shoes being moved out of contact with said part by centrifugal force when a certain speed of said dynamo-shaft is attained, and a spring coiled about said shaft between said bearing and said cone for moving said switch-lever away from said contacts, substantially as set forth.

4. The combination with a dynamo and its switchboard provided with contacts and electric circuits leading therefrom, a reversible contact-lever adapted to connect either pair of contacts, said lever capable of sliding along and of turning on the dynamo-spindle, of an extension of the dynamo-spindle bearing upon which the contact-lever is loosely mounted, a cone capable of sliding along a feather on the dynamo-spindle, a helical spring within the extension and acting against the cone, a centrifugal governor on the dynamo-spindle, flanges on the boss of the contact-lever and blocks working between the flanges and held in guides provided with springs on the cone, for transmitting by indirect friction rotation from the cone to the contact-lever, the said blocks being by centrifugal force thrown out of contact with the flanges when a certain speed has been attained, against the effort of their springs, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ARTHUR BERNARD GILL.

Witnesses:
VICTOR JENSEN,
JOSEPH LAKE.