J. L. CREVELING.

REVERSIBLE BRUSH HOLDER FOR USE WITH DYNAMOS.

APPLICATION FILED AUG. 19, 1911.

1,251,645. Patented Jan. 1, 1918.

Fig. 1.

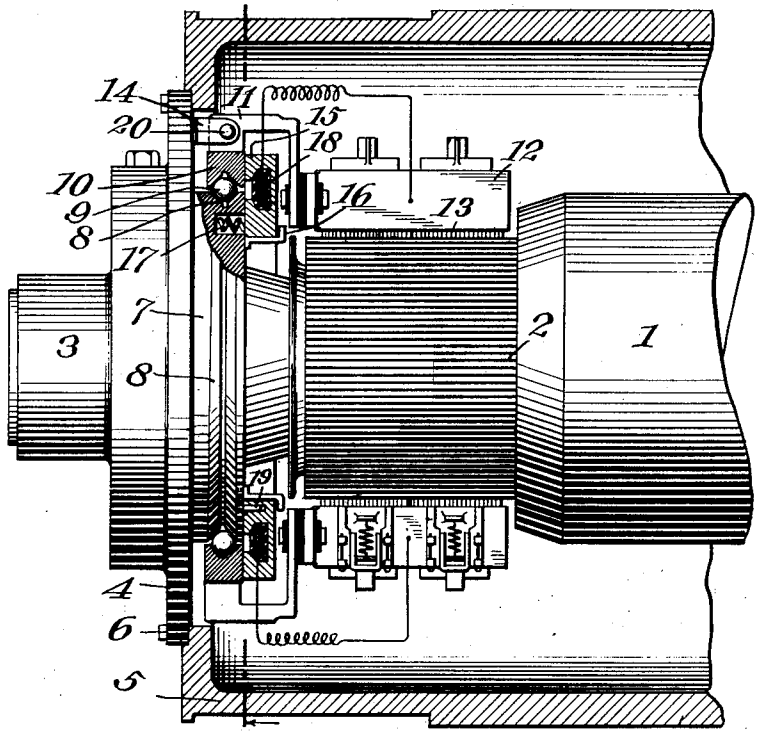
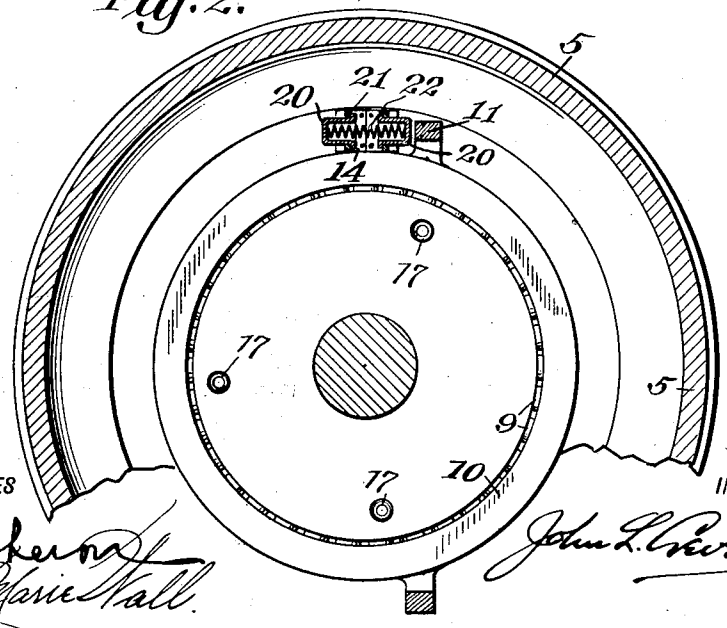


Fig. 2.



WITNESSES

H. Lockerby

Anna Marie Hall

INVENTOR

John L. Creveling

UNITED STATES PATENT OFFICE.

JOHN L. CREVELING, OF NEW YORK, N. Y., ASSIGNOR TO SAFETY CAR HEATING AND LIGHTING COMPANY, A CORPORATION OF NEW JERSEY.

REVERSIBLE BRUSH-HOLDER FOR USE WITH DYNAMOS.

1,251,645. Specification of Letters Patent. Patented Jan. 1, 1918.

Application filed August 19, 1911. Serial No. 644,983.

To all whom it may concern:

Be it known that I, JOHN L. CREVELING, a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Reversible Brush-Holders for Use with Dynamos, as set forth in the annexed specification and drawing forming a part thereof.

My invention pertains to that class of dynamos wherein it is desired to maintain the current of uniform polarity regardless of reversals in direction of rotation of the armature, and has for its particular object to provide means for satisfactorily compensating for reversals in rotation of the armature.

Figure 1 is a partial section and elevation of a portion of a dynamo comprehending my invention.

Fig. 2 is a section of a form of resilient stop or checking means used in my invention.

In the drawing, 1 represents the usual armature of a dynamo provided with the commutator 2, the said armature being carried by the usual shaft (not shown) running in the usual type of bearing carried within the bearing member, or casting 3, which is preferably provided with a flanged portion 4 adapted to be held firmly against the end of the field frame indicated at 5 as by screws 6. The bearing member or end casting also carries a cylindrical extension 7 provided with a ball-race or channel indicated at 8 into which are free to travel the balls 9 engaging a corresponding ball-race in an annular ring 10 which is provided with arms 11 carrying suitable brush-holders as indicated at 12 which are provided with brushes as indicated at 13. As the ball bearing for the ring 10 will allow the said ring to rotate with very little friction, the drag or friction of the brushes 13 upon the commutator 2 will rotate the ring 10 in one direction or the other depending upon the direction of rotation of the armature unless stopped by some engaging means. For this purpose I provide a stop 14 which will allow the ring 10 and brushes 13 to revolve through substantially one hundred and eighty degrees when a bi-polar machine, as indicated in the drawing is used. The stop or engaging means 14 is made yielding or resilient so that, upon sudden reversals, the apparatus will not be subjected to the blow or shock caused by instantaneously arresting the motion of the brushes as when a fixed stop is used. One type of resilient stop which may be used for this purpose is shown in Fig. 2 in which the stop 14 is illustrated as comprising the hollow plungers 20 movably held within the guides 21 and pressed apart as by means of expansion spring 22. This revolution of the brushes in one direction or the other will shift the brushes from one end of the axis of commutation to the other and, therefore, cause the brush which is the positive brush when the generator is running in one direction to occupy the position of the negative brush when running in the other direction, and thus compensate for changes in direction of the armature current in a well-known manner. I have shown a bi-polar machine for sake of simplicity and it will be obvious that a machine with any proper number of poles may be used and the arc through which the brushes are shifted determined accordingly to accomplish the result outlined above. In order to more securely hold the ring 10 in its proper position when the generator is in operation and to prevent chattering of the brushes from tending in time to wear or pit the ball-races, and to prevent the brushes from constantly and rapidly shifting their position with or against the direction of rotation as they would do upon changes in the friction thereupon when held by an elastic or yielding stop and to secure the positive locking of the brushes and brush holders in their proper relative position and prevent vibration thereof, I provide an annular electromagnet, the field frame of which is indicated at 15 and which may be carried as upon brackets of brass, or other non-magnetic material, indicated at 16. A series of small spiral springs 17 are preferably let into recesses in the extension 7 and tend to press the magnet away from the ring 10 and the face of the extension 7, the brackets 16 being so adjusted that the air gap between the magnet frame 15 and the ring 10 and extension 7 is very small always. The magnet is provided with the winding 18 dependent for excitation upon the armature 1 as, for example, placed in shunt across the generator brushes as indicated in the drawing. 19 represents one of a series of slip pins

which may be used if desired to keep the magnet frame 15 from revolving upon its brackets or support.

The operation of my dynamo is substantially as follows:—

If the armature 1 and commutator 2 be revolving in such direction that the top portion of the armature is moving toward the observer, then the friction of the brushes will cause the arm 11 to revolve the ring 10 until arrested by the stop 14 and the parts will be in the positions shown in the drawing. If now the generator speed increase until its voltage be appreciable, the winding 18 will become energized and the magnet frame 15 will be drawn into contact with the face of the member 7 and the ring 10, to which members it is preferably smoothly fitted. As this will form an exceptionally good magnetic circuit the tractive effect of the electromagnet will be considerable, and the ring 10 will be rigidly held in its proper position and practically no strain will be borne by the balls 9 and ball-race 8. Further, the brush supporting mechanism will not chatter against the yielding or resilient stop as it would do if not firmly held by some positive engaging means. The ring 10 will be firmly held by the magnet 15—18 so long as the generator electro-motive force be appreciable or sufficient to be useful. If, however, the generator speed be brought down to *nil*, its electromotive force will fall to zero, and the springs 17 will press the annular magnet away from the extension 7 and ring 10, and the brushes will be free to revolve into the reverse position. If the generator armature now be revolved in a reverse direction the revolving of the brushes will rectify the current to line and the magnet 15—18 will again become energized and grasp the extension 7 and ring 10 and hold the latter firmly in place and relieve the balls and ball-races of strain as above outlined.

From the foregoing it will be obvious that my dynamo is provided with a pole changing apparatus and means for carrying the mechanical strain usually borne by the pole changer bearing when the generator is running and also the strain usually borne by the stop or engaging means, and that when the generator is still and in condition for reversal the pole changing apparatus will be released and capable of proper action upon said reversal.

I make no claim herein to a plurality of brushes rotatably held upon the commutator and adapted to be stopped at definite points in their revolution by rigid stop devices; nor do I claim, generically in this application, commutator brushes held from rotation at predetermined points by magnetic means. These features, in their proper combinations and coöperative arrangements, are made the subject-matter of another application filed by me on the 7th day of August, 1911, Serial No. 642,582.

I do not wish in any way to limit myself to any details of construction or exact mode of operation set forth in this specification, which are given to illustrate one type of generator embodying the essentials of my invention, for it will be obvious to those skilled in the art that wide departure in the way of details may be made without departing from the spirit and scope of my invention which is as set forth in the following claims:

1. The combination of a dynamo electric machine having an armature; a commutator; and commutator brushes resting thereon; brush-holders therefor; movable means for supporting said brush-holders, and to which the latter are fixed in predetermined relation; yielding means for limiting the movement of the movable means; and magnetic means for holding the brushes when they have reached the limit of movement.

2. A dynamo comprehending an armature subject to reversals in direction of rotation, movable means coöperating with said armature for maintaining a constant polarity of the current delivered upon said reversals, including means for yieldingly limiting the movement of said means, and magnetic means dependent upon the rotation of said armature for holding said first-named means.

3. A dynamo comprehending an armature subject to reversals in direction of rotation, coöperating means movable with said armature for maintaining a constant polarity of the current delivered upon said reversals, a yielding stop coöperating therewith, and magnetic means for firmly holding said first-named means.

4. The combination with a dynamo having an armature, a commutator and brushes in operative relation thereto; of rotatable means for supporting said brushes; means for yieldingly limiting the rotation thereof; and magnetic means dependent upon the rotation of the armature for holding said rotatable means in fixed positions.

5. A dynamo having an armature, a commutator and brushes therefor; means for holding said brushes in operative relation to said commutator; means for supporting said brush-holding means whereby the same may be rotated; yielding means for limiting rotation thereof; and magnetic means for engaging and holding said brush holding means.

6. A dynamo comprehending an armature, a commutator and brushes; means for carrying said brushes in operative relation to said commutator and permitting rotation of the same; means whereby said rotation is yieldingly arrested within desired limits; and magnetic means coöperating with said brush-carrying means for engaging and

holding the same in fixed operative positions.

7. The combination with a dynamo having an armature, a commutator, and brushes in operative relation thereto; of rotatable means for supporting said brushes; means for yieldingly arresting rotation thereof; and independent means coöperating with the rotatable means to firmly hold said brushes at their limit of rotation.

8. The combination with a dynamo electric machine, having an armature, a commutator, and commutator brushes resting thereon; brush-holders therefor; rotatable means for supporting said brush-holders including a fixed arm; and yielding means carried by the frame of the machine in a fixed position for limiting the movement of the rotatable means by engagement with said arm; and additional means for holding the brushes when they have reached the limit of rotation.

JOHN L. CREVELING.

Witnesses:
ANNA M. WALL,
M. HERSKOVITZ.