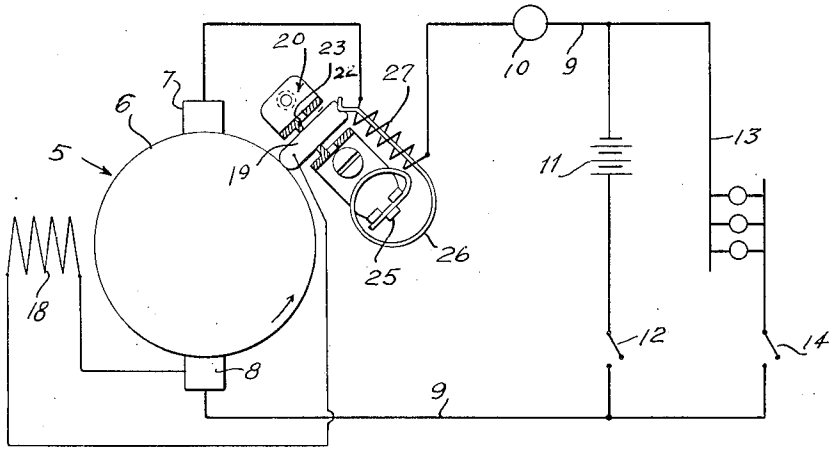
Nov. 26, 1929. A. E. BUCHENBERG 1,736,844

BRUSH HOLDER

Original Filed June 21, 1919

Fig. 1.



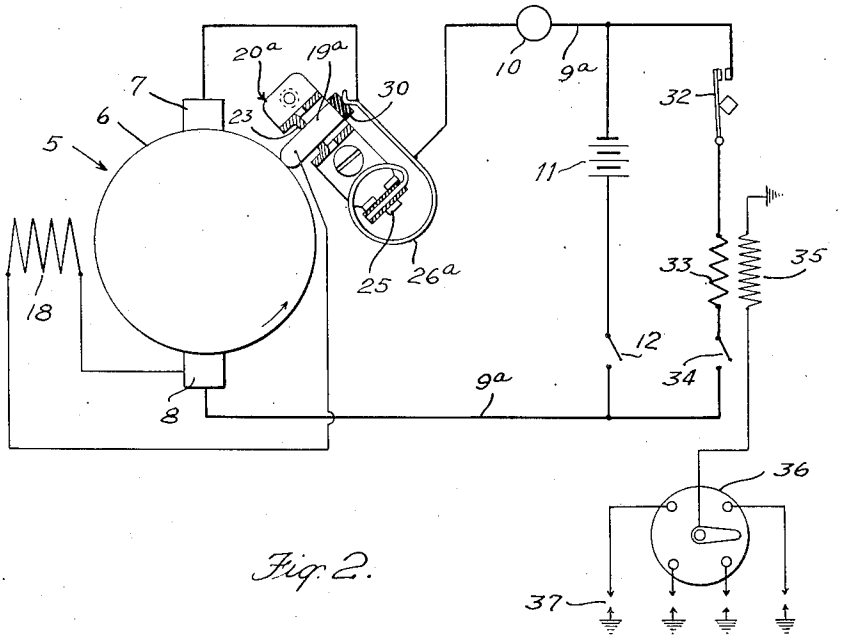


Fig. 2.

INVENTOR
ALVIN E. BUCHENBERG
BY
Chester W. Brasellin
ATTORNEY

Patented Nov. 26, 1929 1,736,844

UNITED STATES PATENT OFFICE

ALVIN E. BUCHENBERG, OF TOLEDO, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ELECTRIC AUTO-LITE COMPANY, OF TOLEDO, OHIO, A CORPORATION OF OHIO

BRUSH HOLDER

Original application filed June 21, 1919, Serial No. 305,899. Divided and this application filed January 28, 1927. Serial No. 164,194.

My invention relates to dynamo-electric machines of the third brush type, and is a division of my co-pending application Serial No. 305,899.

An object of the invention is to provide means for automatically varying the position of the third brush in response to changes in temperature of the surrounding medium.

Another object is the provision of means for automatically varying the position of the third brush in response to conditions in the circuit to which the machine is connected.

A further object is the construction of a suitable brush holder for third brush which will enable it to vary its point of contact with the commutator.

Another object of the invention is to provide a combined spring and thermostat which will exert a force against the brush tending to hold it in contact with the commutator and cause a tilting action of the brush when certain changes of temperature take place.

Further objects of this invention relate to economies of manufacture and details of construction as will hereinafter appear from the detailed description to follow. I accomplish the objects of my invention in certain instances by the devices and means described in the following specification, but it is evident that the same may be varied widely without departing from the scope of the invention, as pointed out in the appended claims. Structures constituting certain embodiments of my invention, any one of which may be the preferred, are illustrated in the accompanying drawings forming a part thereof, in which:

Figure 1 is a diagrammatic view of a third brush generator, embodying my invention and a work circuit connected thereto, the third brush spring being provided with a current winding;

Fig. 2 is a diagrammatic view similar to Fig. 1, except that the current is passed through a portion of the third brush spring.

In the drawings, similar reference numerals refer to similar parts throughout the several views.

In Fig. 1 of the drawings I have shown a two pole generator 5 of the third brush type, having a commutator 6 and two oppositely disposed main brushes 7 and 8 connected to an external circuit 9. In this circuit is shown a cut-out 10 and connected to this circuit is a storage battery 11 controlled by switch 12, and also a lighting circuit 13 controlled by the switch 14. The generator 5 has a shunt field winding 18 whose terminals are connected respectively to main brush 8 and a third brush 19 positioned intermediate the two main brushes 7 and 8. This third brush 19 is carried by a brush holder 20, which is bent up from a punching and has an opening 22 to receive the brush 19, the opening being somewhat wider than the brush. Two ears or lugs 23 are stamped out from those portions of the brush holder, forming opposite walls of said opening, to contact with the brush and to permit it to rock therein, in order that the brush may change its point of contact with the commutator. Three upstanding lugs 25 are provided at one end of the brush holder, and between the middle lug and the two outer lugs one end of a spring 26 is secured, while the other end is provided with a sharply bent portion adapted to engage in a recess formed in the outer end of the brush 19. Surrounding a portion of the spring 26 is a coil of wire 27 which is preferably, although not necessarily, made of resistance metal. The terminals of this coil are connected in series with the circuit 9.

It will thus be seen that by this arrangement the entire current traversing the circuit flows through the winding 27 and thereby heats the spring 26 to cause it to expand and rock brush 19, changing the point of contact of this brush with the commutator so as to decrease the arc on the commutator between this brush and main brush 8, across which

the field winding is connected. It is to be noted that the spring 26 is heated not only by the winding 27, but receives heat from the commutator, the armature winding and other parts of the generator so that its expansion is also responsive to the internal temperature of the machine as a whole. Furthermore, the temperature within the machine will vary considerably with climatic conditions. For example, the average temperature of the machine during the summer time will be higher than during the winter time. This is an important feature when the machine is used on an automobile, as a charging generator, since it is well known that during the summer months less current is taken from the battery to operate the lights than in the winter time, and the battery accordingly requires less charging current.

In the modification shown by Fig. 2, there is illustrated a brush holder 20^a carrying a third brush 19^a which is adapted to be rocked therein, in the same manner as in Fig. 1. However, in this case the spring is insulated from the brush holder and the brush is provided with a cap of insulating material 30 against which the spring bears and is seated in a notch provided therein. In this modification a portion of the spring is connected directly in the circuit 9^a so that the entire charging current passes through a portion of the spring, which, when heated thereby, expands to rock the brush just as in Fig. 1. In this modification I have shown an ignition circuit connected to the circuit 9^a instead of a lighting circuit. However, both lighting and ignition circuits would probably be employed where this system is used on an automobile. The ignition circuit includes a cam driven interrupter 32, the primary 33 of an induction coil, and an ignition switch 34. The secondary 35 of the induction coil is grounded at one terminal and is connected through a distributor 36 to spark plugs 37. As this modification functions in substantially the same manner as that illustrated by Fig. 1, an explanation therof will be omitted.

From the above it will be noted that I have provided a combined spring and thermostat which not only exerts a pressure against the brush tending to hold it in contact with the commutator, but also causes a pivotal action of the brush due to changes in temperature, and it is to be understood that the brush holder disclosed herein is not limited to the regulation of a third brush generator for constant current or for constant voltage but may be employed to regulate the speed of a shunt wound motor subjected to varying loads.

While I have described my invention in more or less detail, and as being embodied in certain precise forms, I do not desire or intend to be limited thereto, as on the contrary my invention contemplates broadly all proper changes, as well as the omission of immaterial elements and the substitution of equivalents therefor, as circumstances may suggest or necessity render expedient.

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

1. In a brush shifting device, a brush; means to pivotally support said brush; and a combined thermostat and spring adapted to press said brush against a commutator, and to tilt said brush upon a change of temperature.

2. In a brush shifting device, a brush holder; a brush pivotally supported therein; a thermostat attached to said brush, holder extending at right angles to said brush and adapted to exert a pressure against said brush longitudinally thereof and to pivot said brush when the length of said thermostat increases or decreases.

3. In a brush shifting device for a generator, a brush holder; a brush pivotally supported therein; a thermostat extending at right angles to said brush engaging the end thereof and adapted to exert a pressure against said brush in the direction of the axis thereof, and to pivot said brush when the length of said thermostat is varied; and means to vary the length of said thermostat in response to variations in load current of the generator.

4. In a brush shifting device, a brush holder; a brush pivotally supported therein; a thermostat having a straight portion at right angles to said brush and engaging the end thereof; and a coiled portion, the end of which is attached to said brush holder, and by means of which pressure is exerted by said straight portion against said brush longitudinally thereof.

5. In a brush shifting device, in combination a brush; means for pivotally supporting said brush; and a thermostat secured to said brush supporting means and adapted to press said brush against a commutator and to tilt said brush upon a change of temperature.

6. In a brush shifting device, in combination a brush; means for pivotally supporting said brush; and a thermostat insulatingly supported upon said brush holding means and adapted to press said brush against a commutator and to tilt said brush upon a change of temperature.

7. In a brush shifting device in combination a brush; means to pivotally support said brush; and a combined thermostat and spring insulatingly supported by said brush supporting means and adapted to press said brush against a commutator and to tilt said brush upon a change of temperature.

8. In a brush shifting device, in combination a brush; a supporting means for said brush; a thermostat carried by said brush supporting means; and insulating means connecting said thermostat and said brush, said

thermostat adapted to press said brush against the commutator and to tilt said brush upon a change of temperature.

9. In a brush shifting device, in combination a brush; means for pivotally supporting said brush; and a current conducting thermostat secured to said brush supporting means and adapted to press said brush against a commutator and to tilt said brush upon a change of temperature.

In testimony whereof, I affix my signature.

ALVIN E. BUCHENBERG.