

J. LINDALL.

BRUSH HOLDER FOR MOTORS AND GENERATORS.

APPLICATION FILED AUG. 18, 1905.

2 SHEETS--SHEET 1.

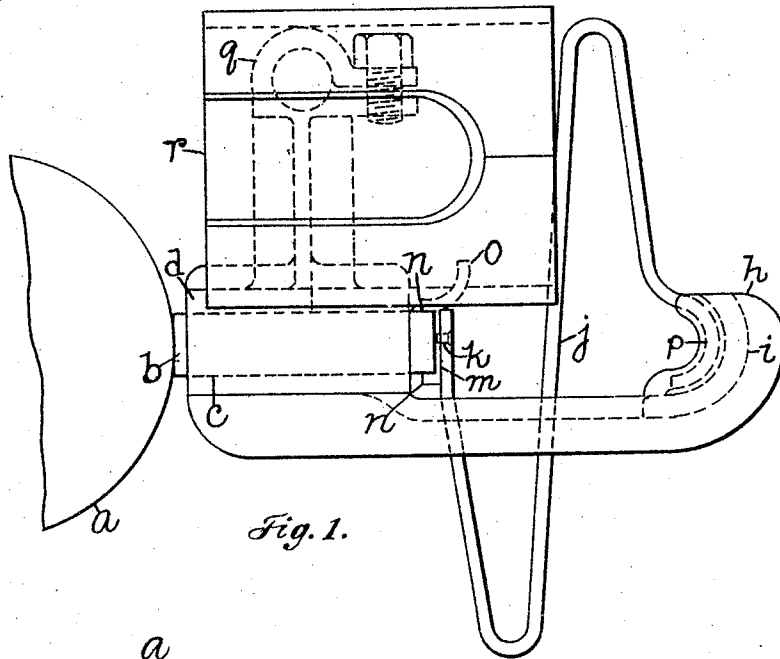


Fig. 1.

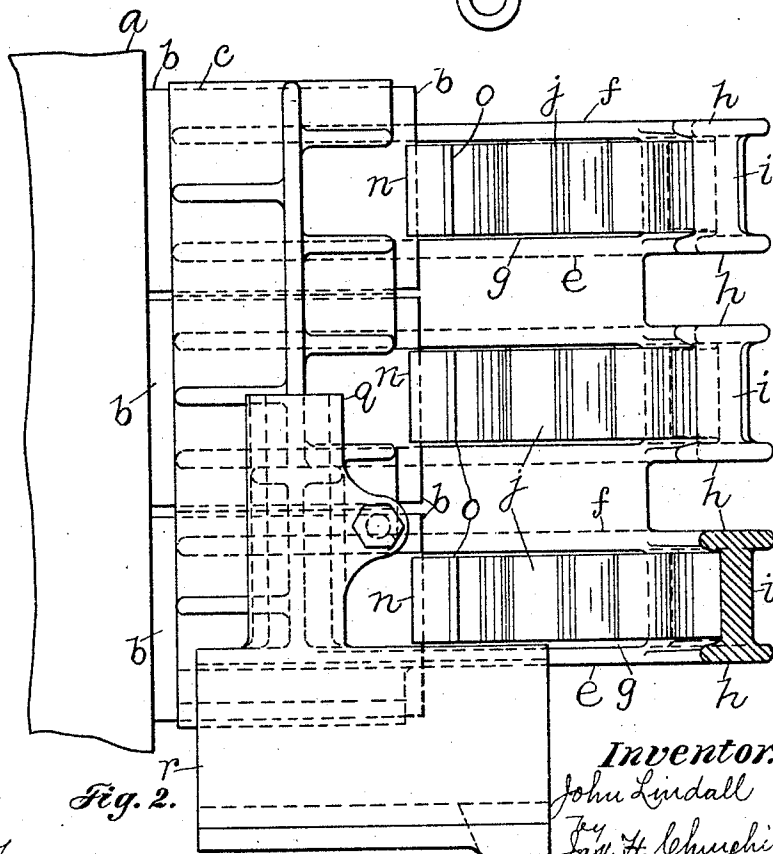


Fig. 2.

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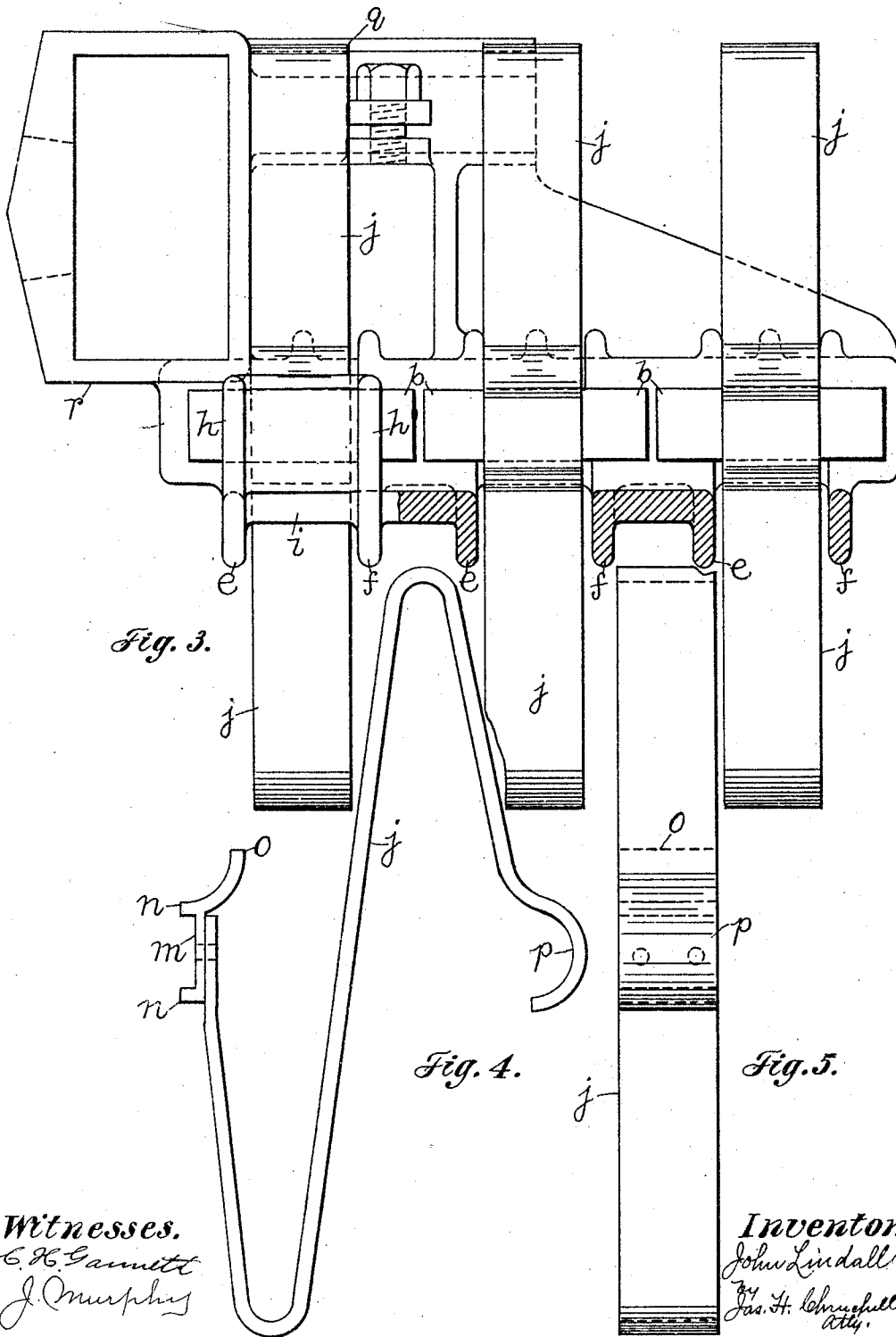
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN LINDALL, OF BOSTON, MASSACHUSETTS.

BRUSH-HOLDER FOR MOTORS AND GENERATORS.

No. 848,182.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed August 18, 1905. Serial No. 274,704.

To all whom it may concern:

Be it known that I, JOHN LINDALL, a citizen of the United States, residing in Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Brush-Holders for Motors and Generators, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a novel brush-holder especially designed and adapted for use on substantially large electric motors or generators, such as are employed on systems using heavy currents.

The present invention has for its object to provide a brush-holder of increased current-carrying capacity which is composed of a minimum number of parts, is of the desired flexibility necessary to avoid sparking, is one in which the wear on the brushes other than at the point of contact is reduced to a minimum, and in which the brush is subjected to a direct thrust by a spring whose tension is substantially constant in all positions of the brush and which can be quickly and easily removed for replacement or repair.

In accordance with this invention the brush-holder is provided with a guideway for the reception of the brush, usually a carbon piece or block, with which coöperates a spring of novel construction, as will be described, which is interposed between the body portion of the brush-holder and an abutment, preferably made in the form of an upturned portion or arm extended from said body portion.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of a brush-holder embodying this invention; Fig. 2, a plan view of the brush-holder shown in Fig. 1; Fig. 3, a partial section and elevation of the holder shown in Fig. 1 looking toward the left, and Figs. 4 and 5 details to be referred to.

Referring to the drawings, *a* represents the commutator of an electric motor or generator, especially such as is employed on electric systems using substantially heavy currents—such, for instance, as electric-railway systems. The commutator *a* has coöperating with it one or more brushes *b*, usually blocks or pieces of carbon, and in the present instance shown as three in number. The

brush *b* is mounted to slide in a guideway *c* in the body portion *d* of a brush-holder, preferably having rearwardly-extended arms *e f*, separated from each other to leave an opening *g* (see Fig. 3) for a purpose as will be described. The arms *e f* are provided at their outer ends with upturned portions or fingers *h*, which are connected by a cross-bar *i*, which may be curved on its inner side, as represented by dotted lines in Fig. 1, and which forms an abutment, against which bears one end of a spring *j*, the other end of which bears against the rear end of the carbon block or brush *b*.

The spring *j* forms an electrical connection between the brush *b* and its holder, and in order to obtain a spring of the desired or required current-carrying capacity, which at the same time is of the flexibility necessary to avoid sparking at the brush *b*, the said spring is made of a substantially long strip or piece of metal, preferably bronze metal, which is bent to form a plurality of connected substantially V-shaped sections extended in opposite directions and on opposite sides of a straight line extended from the brush *b* to the abutment or cross-bar *i* of the holder, as clearly represented in Fig. 1.

In order to obtain a direct thrust upon the brush *b* by the spring, the point of engagement of one end of said spring with the rear end of the brush is in a substantially straight line with the point of engagement of the other end of the spring with the abutment or cross-bar *i* of the holder, and as a result wear on the brush other than at the point of contact with the commutator is reduced to a minimum, and the point of commutation is thereby maintained substantially constant.

The spring is detachably engaged with the brush *b*, and for this purpose I prefer to secure to the front end of the spring, as by the rivet *k*, a clip *m*, having lugs *n* to engage the upper and lower surfaces of the brush, the upper of said clips being preferably provided with a finger-piece *o*, which affords a convenient means for the operator to take hold of and compress the spring when it is desired to remove the same for purpose of inspection, repairs, or replacement. The rear end of the spring *j* may be curved, as at *p*, to conform to the shape of the abutment *i*, as represented in Fig. 1, which enables the spring *j* to be held in its operative position without additional means for attaching it to the holder and also for the purpose of obtaining an ex-

tended contact or engagement of the spring with the holder, thereby securing a superior electrical connection between the spring and holder.

5 By making the spring of substantially V-shaped connected sections extended in opposite directions I am enabled to obtain the carrying capacity required for use on systems employing heavy currents—as, for instance, currents ranging from fifty to five
10 hundred amperes—while at the same time obtaining the flexibility required to avoid sparking and change of commutation. Furthermore, with the construction of spring
15 herein shown the tension is substantially constant in all positions of the brush, thereby avoiding the use of adjusting parts. It will also be observed that the brush-holder herein shown is composed of practically two parts—
20 to wit, the holder proper and the spring—and as a result the initial cost and that of maintenance is reduced to a minimum. It will also be observed that in the brush-holder herein shown the spring is attached to the holder
25 and retained in its operative position by its elasticity.

In the present instance the invention is shown as embodied in a brush-holder comprising three holders; but I do not desire to
30 limit the invention in this respect.

In the present instance the body portion of the holder has affixed to it a piece *q*, to which the electric conductor or lead may be connected, and a piece *r*, which affords means
35 for attaching the brush-holder to its support.

By inspection of Fig. 1 it will be seen that the brush *b* may be readily removed, as it is only necessary for the operator to compress the spring *j* in order to disengage it from the
40 brush and the abutment, after which it can be withdrawn from the slot or opening *g*. This is especially advantageous in the case of motors and generators which are located in narrow or crowded quarters or places difficult of access—as, for instance, on electrically-propelled railway-cars. The clip *m* engages the rear end of the brush for the thickness of the same, thereby making a substantially long contact between the spring and
45 the brush, which is maintained effective at all times by the direct thrust of the spring, which feature, coupled with the superior contact of the spring with the holder and the large current-carrying capacity of the spring, enables a heavy current to be transmitted
50 from the brush to the holder by the spring alone, thereby securing constant and reliable electrical connection between the brush and holder.

60 I have herein shown one embodiment of my invention; but I do not desire to limit myself to the particular construction shown.

I claim—

1. In a brush-holder, in combination, a
65 body portion provided with a guideway for

the reception of the brush, arms extended from said body portion and separated from each other to form an opening, means connecting said arms at their rear end to form an abutment substantially in line with said
70 guideway, and a spring extended through said opening above and below said arms and having one end engaged with the brush in said guideway and its other end engaged with the said abutment, whereby the expansion of
75 said spring exerts a direct thrust upon said brush, substantially as described.

2. In a brush-holder, in combination, a body portion provided with a guideway for the reception of a brush, said brush movable
80 in said guideway, an abutment attached to said holder and located substantially in line with said guideway, and a spring interposed between said brush and abutment and comprising a plurality of substantially V-shaped
85 connected sections having adjacent sections extended on opposite sides of said line and above and below said abutment, substantially as described.

3. In a brush-holder, in combination, a
90 body portion having provision for bodily movement of a brush carried thereby, an abutment attached to said body portion, and a spring interposed between said body portion and said abutment and loosely connected
95 therewith and automatically retained in its operative position by its elasticity, said spring having sections extended above and below said abutment, substantially as described.

4. In a brush-holder, in combination, a
100 body portion provided with a guideway for the reception of a brush, an abutment substantially in line with said guideway, and a spring having substantially V-shaped sections interposed between said abutment and
105 said guideway to engage the brush therein and electrically connect it with said abutment, said spring being detachable from said brush and abutment by its compression and having sections extended above and below
110 said abutment, substantially as described.

5. In a brush-holder, in combination, a body portion provided with a guideway for the reception of a brush, an abutment substantially in line with said guideway, and a
115 spring interposed between said abutment and said brush and having its sections extended above and below said abutment and retained in its operative position solely by its elasticity, substantially as described. 120

6. In a brush-holder, in combination, a body portion provided with a guideway for the reception of a brush, arms extended from said body portion and separated to leave an opening, a cross-bar connecting said arms at
125 their outer end substantially in line with said guideway, and a spring interposed between said cross-bar and said guideway and having one end engaging said cross-bar and its other end engaging a brush in said guideway to ex- 130

ert a direct thrust thereon, said spring having sections extended above and below said cross-bar, substantially as described.

7. In a brush-holder, in combination, a
5 body portion provided with a guideway for the reception of the brush, arms extended from said body portion and separated from each other to form an opening, a cross-bar connecting said arms substantially in line
10 with said guide to form an abutment, and a substantially flat spring electrically connecting said brush and abutment and having its opposite ends located on opposite sides of a line substantially through the guideway and
15 said abutment and having the portion intermediate said ends extended across said line between said arms, for the purpose specified.

8. In a brush-holder, in combination, a body portion provided with a guideway for

the reception of a brush, said brush being 20 movable in said guideway, arms extended from said body portion and separated from each other to form an opening, a curved abutment joining the said arms and located substantially in line with said guideway, and a 25 spring comprising a plurality of substantially V-shaped connected sections interposed between said brush and abutment to electrically connect the same, and having its rear end curved to fit the curved abutment, sub- 30 stantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN LINDALL.

Witnesses:

JAS. H. CHURCHILL,
J. MURPHY.