

(No Model.)

C. HOFFMANN.
COMMUTATOR.

No. 520,264.

Patented May 22, 1894.

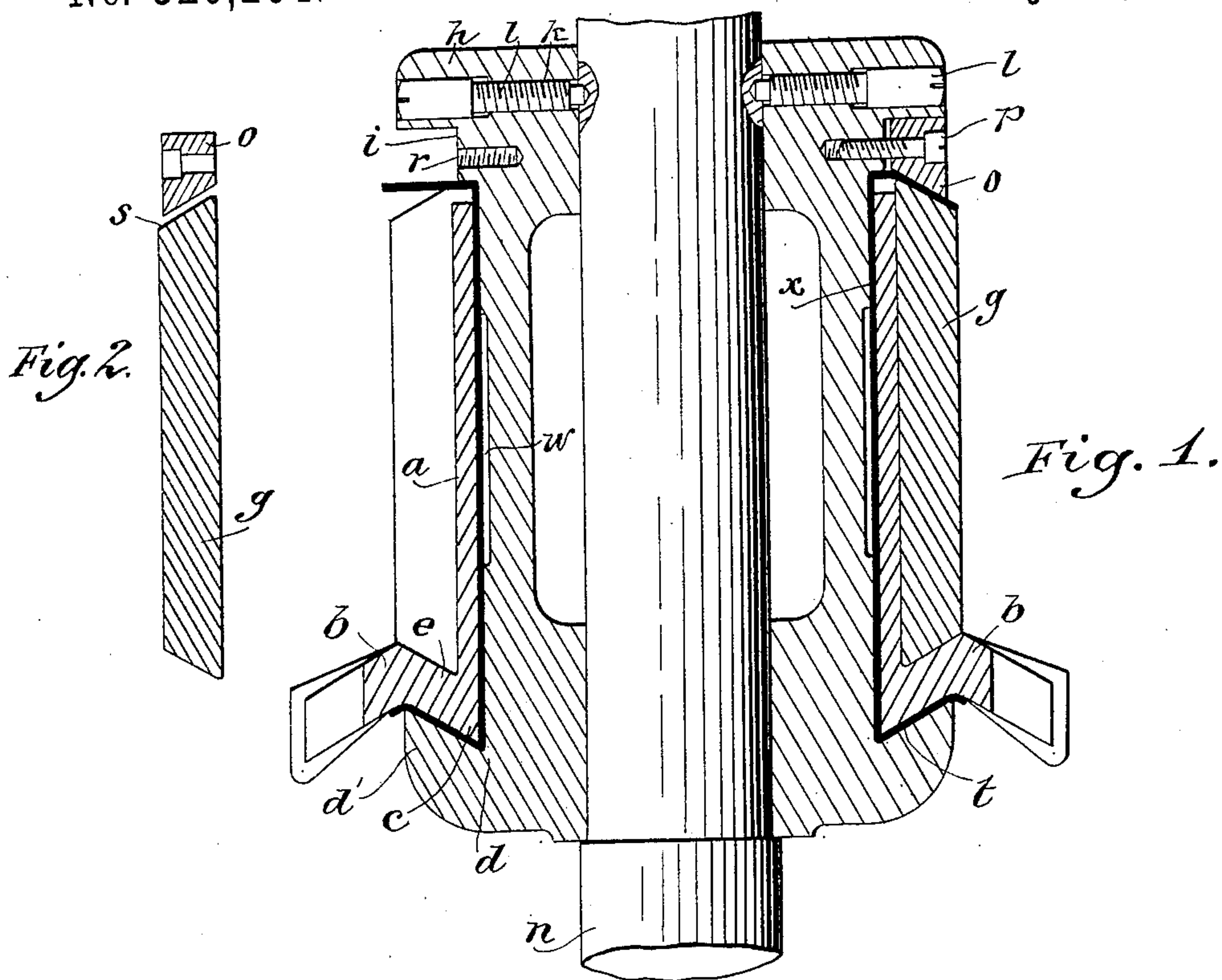
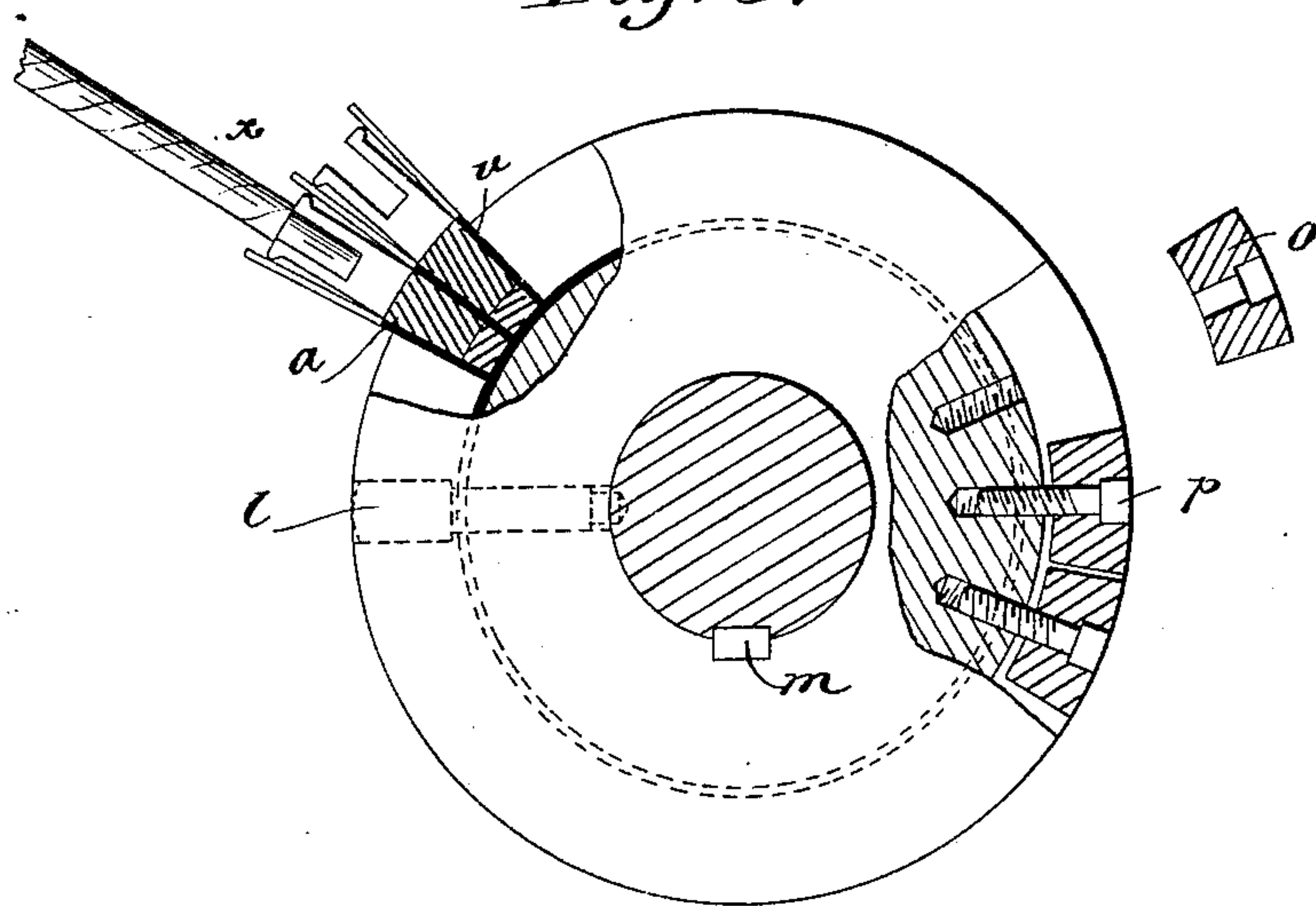


Fig. 3.



WITNESSES:

John H. Deemer 3

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CARL HOFFMANN, OF BERLIN, GERMANY, ASSIGNOR TO SIEMENS & HALSKE,
OF SAME PLACE.

COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 520,264, dated May 22, 1894.

Application filed September 28, 1893. Serial No. 486,667. (No model.)

To all whom it may concern:

Be it known that I, CARL HOFFMANN, a subject of the King of Prussia, German Emperor, residing at the city of Berlin, Kingdom of Prussia, German Empire, have invented new and useful Improvements in Commutators, of which the following is a specification.

This invention relates to commutators for dynamo electric machines in general, and particularly to the bars and the particular construction of the hub thereof, and it has for its object to provide a device of this nature which shall overcome the objections to those now in use.

As commutator bars have been and are at present made, they consist of a body having a downwardly projecting portion of such construction as to allow of its being rigidly secured in place in the commutator, but when, however, the bar has been once located, it has been impossible to remove it for repairs or other cause, without seriously injuring and sometimes destroying the insulation of the hub. The usual bar has moreover, at its inner end an upwardly projecting portion provided with a slot or other means for the reception of the end of its respective armature winding which end is then surrounded and securely fastened therein by means of solder or other suitable sealing and conducting substance. Herein lies a second objection in that to remove the bar it is also necessary to remove the end of the winding secured therein, which is a difficult task and one attended by liability to injury of the bar and armature.

In the accompanying drawings forming a part of this specification: Figure 1 is a longitudinal sectional view of a commutator hub, showing its shaft in elevation, and the arrangement and location of the elements of the compound bar. Fig. 2 is a section of the contact element of the bar and its key. Fig. 3 is a front end view of the hub having portions thereof broken to show the location and arrangement of the bars and also the position and manner of securing the keys in place.

The commutator hub used in connection with my invention is formed of the usual material and is of the usual construction with the exception of the outer end thereof which is provided with an annular projection or

flange *h* and having a shoulder *i* thereon, the former having a number of threaded perforations *k* for the reception of key-screws *l*, which may act in conjunction with the spline *m* to prevent revolution and displacement of the hub with reference to the armature shaft *n*. The shoulder *i* is also provided with threaded perforations for a purpose as will be hereinafter set forth.

My commutator bar consists of a ground portion *a*, which may be made of copper or other metal and of a depth less than that of the narrowed portion *x* of the hub and having an upwardly extending slotted or perforated lug *b* at its rear end for the reception of the end of its respective armature winding, which may be secured in place in the usual manner. The initial portion of the lug *b* has an outward slant forming an angle *c* to fit into and be held within a corresponding re-entrant angle *d* in the annular projection *d'* of the hub. The inclination of the said portion also has the effect to establish a re-entrant angle *e* for the reception and retention of the inner end of the contact element of the bar. This contact element consists of a bar *g* which may be made of a suitable metal or of carbon or of any other suitable mineral, the longitudinal vertical section thereof having a trapezoidal form as is shown in Fig. 2 of the drawings.

In securing each of my bars *g* to their respective backings *a*, I use a key *o*, shown in Fig. 2, which is of a form to lie against the inner surface of flange *h* and to rest upon the upper surface of shoulder *i* to which I secure it, preferably by means of a screw *p* passed through it and into the portion *i* which is provided with a threaded perforation *r* for the reception thereof. The inner side of the key *o* is formed to correspond to and lie snugly against the outer end *s* of the contact bar *g*, when brought into position through the medium of screw *p*.

In assembling the elements of my invention, it is my practice to apply a suitable insulation *t* entirely around the narrowed portion of the hub and of such a width as to extend upwardly and beyond the annular flanges thereof. A base bar *a* is then put into position, it being of a length slightly less

than the distance between the flanges of the hub, to facilitate its adjustment. A contact bar *g*, having its under surface formed to lie snugly against and in intimate electrical contact with its respective base bar, is then placed into position as shown in Fig. 1, its inner end entering and being held within the opening (key) *c* of the bar *a*. The bar *g* is slightly longer than the upper surface of bar *a*, as is shown. A key *o* is then put into position between the outer end of the bar *g* and the flange *h*, the projecting portion of the insulation being forced over to lie between and thoroughly insulate them. A screw *p* is then turned into place and firmly holds the several elements in their several positions. A strip of insulating material *u* is then placed on either side of the compound bar and a second couple is then secured in place. This procedure is continued until the several bars are located, when the commutator is keyed to its shaft and the ends of the armature windings are secured in their respective places. The narrowed portion of the hub is provided with an annular depression *w* forming a means for the insertion of a tool beneath the base bar to assist in its removal from the hub.

Having now described my invention and the manner of assembling the parts thereof, I do declare that what I claim is—

1. The combination with a commutator bar comprising separable elements, of an individual retaining key common to the bar and the separate elements thereof.
2. The combination with a commutator bar comprising a base bar and a contact bar, of a common retaining key therefor.

3. The combination with a commutator bar comprising a base bar and a removable contact bar, of a common retaining key therefor.

4. The combination with a commutator bar comprising a base bar having means for the attachment of its armature winding, and a contact bar; of a common retaining key therefor.

5. The combination with a commutator bar composed of separable elements, of an adjusting and retaining key therefor.

6. The combination with a compound commutator bar, of a device for retaining the elements in their respective positions, said device being insulated from the elements of the bar.

7. The combination with a commutator bar of a hub therefor, having a narrowed portion provided with an annular depression for the reception of means for the removal of said bar, as set forth.

8. A commutator, consisting of a shell; removable base bars secured thereto and insulated therefrom; removable contact bars; and an insulated retaining key for each pair of said bars, seated in said shell.

9. A commutator bar consisting of a metallic base bar and a contact bar of greater refractoriness.

10. A commutator bar consisting of a metallic base bar and a carbon contact bar.

In testimony whereof I affix my signature in the presence of two witnesses.

CARL HOFFMANN.

Witnesses:

OSCAR BIELEFELD,
JOHN B. JACKSON.