(No Model.)

E. R. FRANCIS.

COMMUTATOR.

No. 516,732. Patented Mar. 20, 1894.

Fig. 1

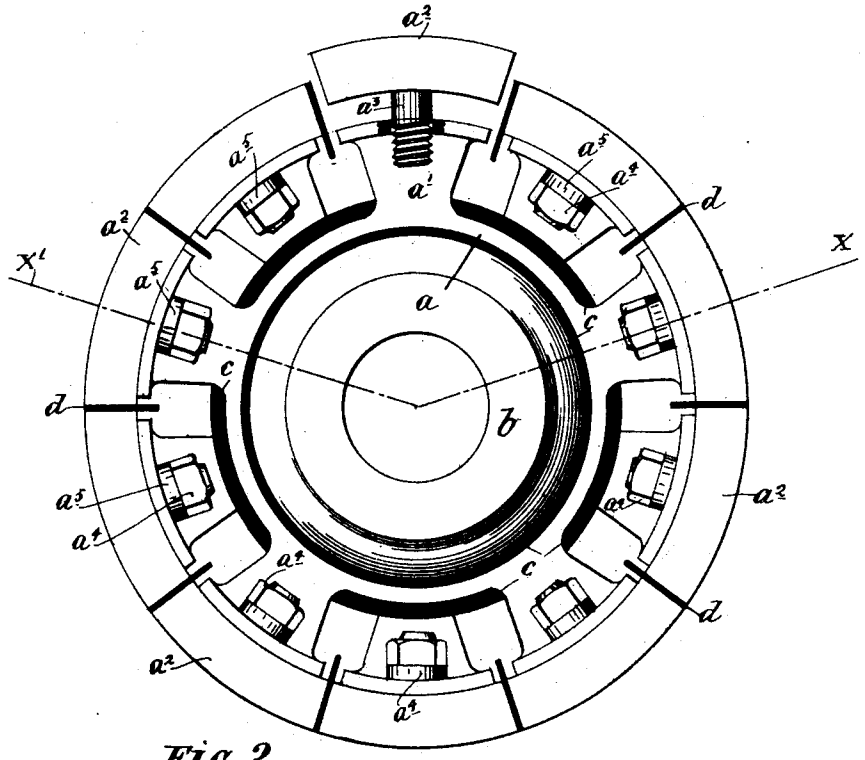


Fig. 2

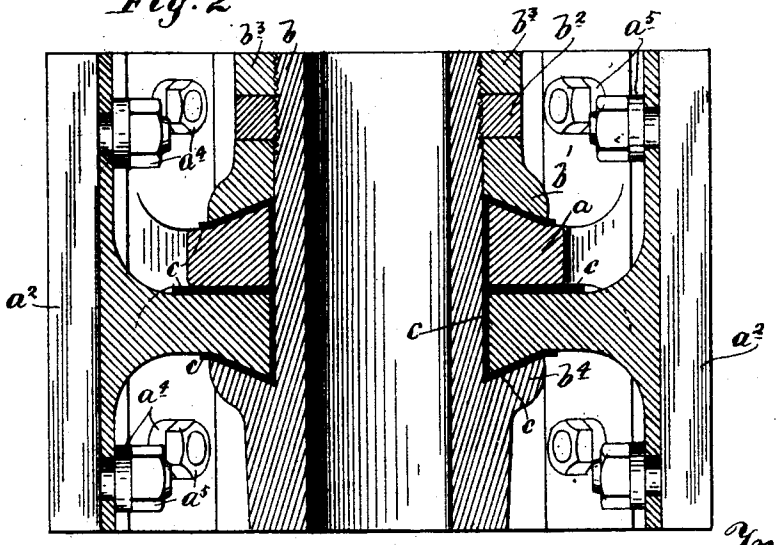
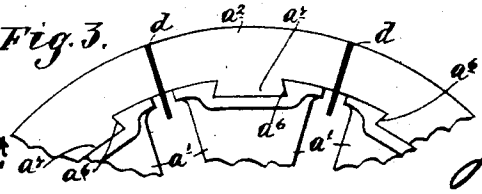


Fig. 3.



Witnesses.
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EDWARD R. FRANCIS, OF MINNEAPOLIS, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO JOHN N. McGIBBEN, OF SAUK CENTRE, MINNESOTA.

COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 516,732, dated March 20, 1894.

Application filed May 13, 1893. Serial No. 474,089. (No model.)

To all whom it may concern:

Be it known that I, EDWARD R. FRANCIS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Commutators; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to commutators; and has for its object to provide certain improvements therein, with a view of increased economy.

My invention was especially designed for that class of commutators, wherein the terminal plates are constructed with radial arms the segment stubs carrying the contact segments, which stubs interlock with each other in alternate arrangement. In this class of commutators, as hitherto constructed, the contact segments are formed integral with the radial arms and body portions of the plates. It is a well-known fact, that the contact segments wear away rapidly under the electrical and frictional action. The life of the commutator is limited by the life of the contact segments, or parts coming in contact with the brushes. When the contact segments wear out, the entire commutator, as hitherto constructed, must be thrown away. The cylinder and body portions of the terminal plates, and the means for securing the same together make up a large part of the commutator; and would last for a great length of time, if it were not for the wearing away of the contact segments.

The special object of my invention, is to construct this class of commutators with removable contact segments, whereby an old commutator may be rendered as good as new, by simply substituting new contact segments. The contact segments are also applied in such a way, in my preferred construction, that they will secure the insulating strips in position by the wedging or clamping action of the contact segments, with respect to each other, when secured to the body portions of the terminal plates.

The exact nature of my improvements, will be hereinafter more fully described, and the novel features of the same, will be defined in the claims.

The accompanying drawings illustrate my improved commutator, wherein, like letters referring to like parts—

Figure 1 is an end elevation of the commutator; and Fig. 2 is a section of the same, on the line X X′ of Fig. 1. Fig. 3 is an end elevation of part of the commutator showing a modified form of my improvement.

a a' a^2, are the terminal plates, of which the parts a are the body portions, the parts a' are radial segment stubs, and the parts a^2 are the removable contact segments, secured to the stubs a'. The body portions a of the terminal plates are secured in the customary way to the cylinder b, with a dove-tailed groove connection, by the loose washer or collar b', clamping nut b^2 and jam-nut b^3, having screw-threaded engagement with the right end of the cylinder b, and serving to lock the said plates against the dovetailed fixed collar b^4. The body portions of the terminal plates are insulated from the cylinder b and from each other, by the insulating material c; and the contact-segments a^2 are separated by the insulating strips d of mica, or other suitable material.

The segmental stubs a' of the terminal plates interlock with each other in alternate arrangement. The contact segments a^2 are correspondingly arranged, with respect to each other, and in my preferred construction, are provided with screw threaded stud-bolts a^3, working radially through the heads of the stub-segments and secured thereto, by the clamping nuts and washers a^4 and a^5, respectively. In virtue of this construction, the contact segments a^2, are secured to the segment-stubs a', by a radial movement. Hence, clearance is afforded for locating the insulating strips d; and when the contact segments are drawn into place by the clamping nuts, the insulating strips, between the segments, will be firmly held in place, by the clamping or wedging action of the contact segments, in respect to each other. This is a great advantage, in that the insulating strips are thereby positively held with a compressing action,

which excludes all oil spaces, and prevents any possibility of the insulations becoming displaced.

Referring to Fig. 3, the general construction is similar to that already described and shown in Figs. 1 and 2, but the segment-stubs a', are provided on their heads with transverse dove-tailed grooves a^6, and the contact-segments a^2 have corresponding tenons a^7, engaging with said grooves. This construction affords removable contact segments; which are insertible into and removable out of position, by an endwise sliding movement. This construction, while it affords a means for applying new contact segments to an old commutator, is not so satisfactory as the construction shown in the other views, for the reason that it does not afford the clamping action on the insulating strips d and the heads of the segment-stubs a'.

With the construction herein described, it is obvious that the body portion of a commutator, may be made to last for a great length of time, by simply substituting new contact segments a^2.

It is possible to convert the existing commutators having terminal plates with contact segments formed integral with the body portions of the plates, into the form described as made in accordance with my invention, by simply cutting away the segment portions thereof, so as to form the segment stubs a', and then applying the removable contact segments a^2, as shown in the drawings. In other words, when the existing type of commuator terminal plate segments become worn away to a point where they are of no further service, they may be dressed off, and the radial arms connecting the same with the central portions of the plate be converted into segment-stubs suitable for the application of my removable contact-segments. It is obvious, therefore, that my invention is of a special value for repairing old commutators.

What I claim, and desire to secure by Letters of the United States, is as follows:

1. A commutator having alternate terminal plates, constructed with interlocking segment-stubs and alternate contact segments removably secured to said segment stubs, substantially as described.

2. A commutator having its alternate terminal plates constructed with interlocking segment-stubs, contact segments removably secured to said stubs with a clamping action on radial lines, and insulating strips secured between the said segments by the said radial clamping or wedging action of said segments, with respect to each other when secured to said stubs, substantially as described.

3. A commutator having its alternate terminal plates constructed with radial interlocking segment stubs and corresponding contact segments, removably secured to said stubs by radially applied bolts and nuts, substantially as described.

4. The commutator having the insulated terminal plates a a' a^2, with the interlocking radial segment stubs a' and the contact segments a^2 in alternate arrangement, the radial stud-bolts a^3 fixed to the contact segments and working radially through the segment stubs, the insulating strips d between the contact segments and the clamping nuts and washers a^4 a^5, applied to the bolts a^3, for securing the contact segments and the insulating strips in position with a clamping action, substantially as described.

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

EDWARD R. FRANCIS.

Witnesses:
WILLIAM F. CARPENTER,
JAS. F. WILLIAMSON.