No. 742,743. PATENTED OCT. 27, 1903.

C. J. ROACH.

COMMUTATOR.

APPLICATION FILED JUNE 27, 1903.

NO MODEL.

Fig. 1.

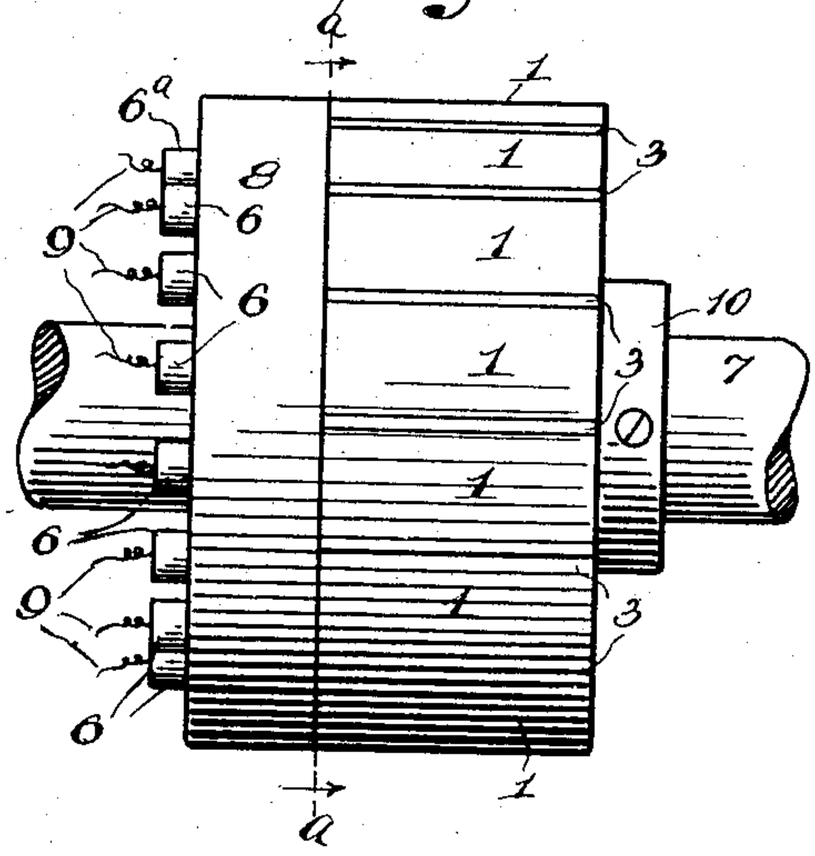


Fig. 2

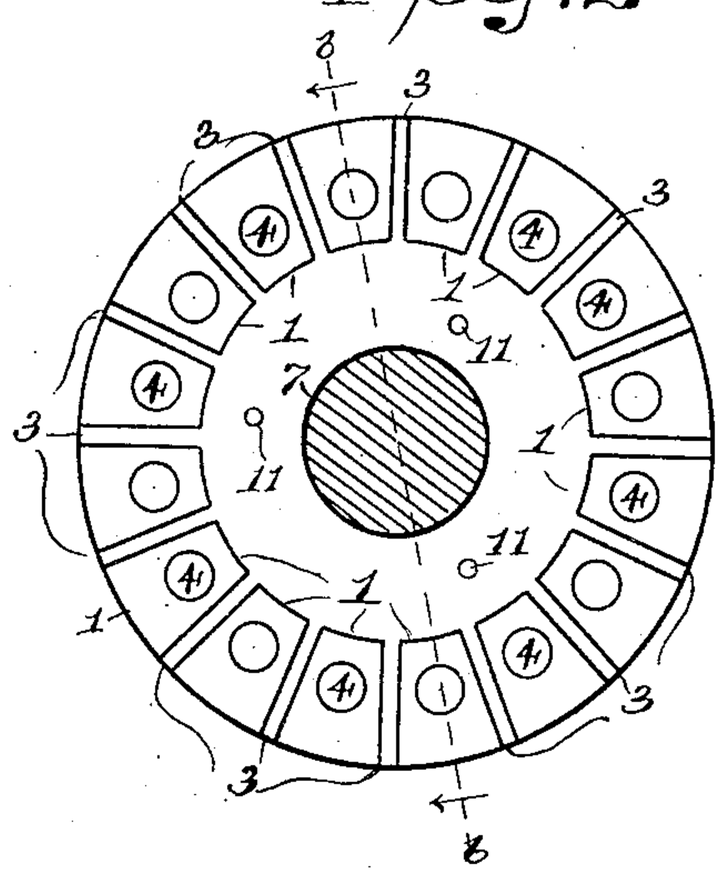


Fig. 3.

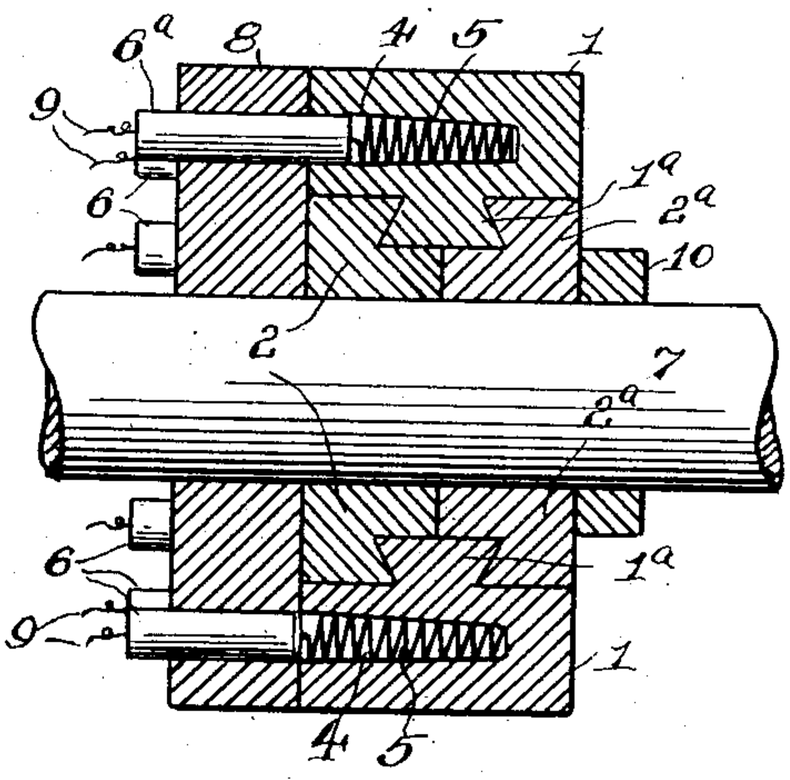


Fig. 4.

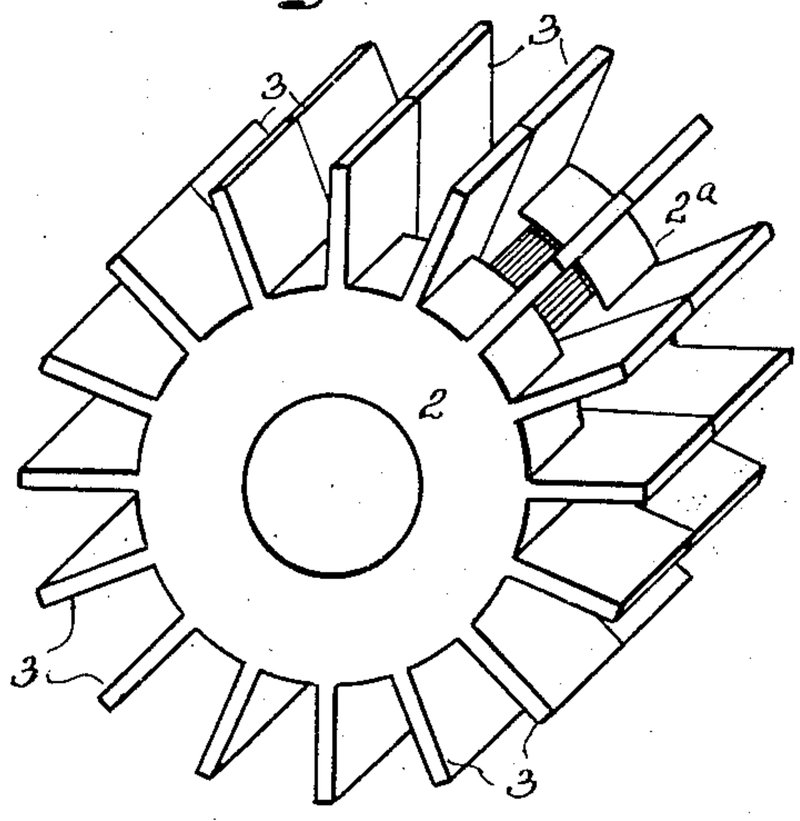


Fig. 5.

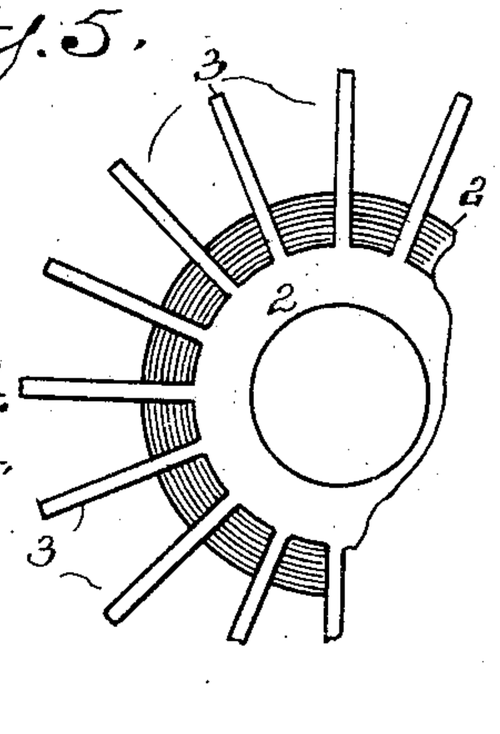
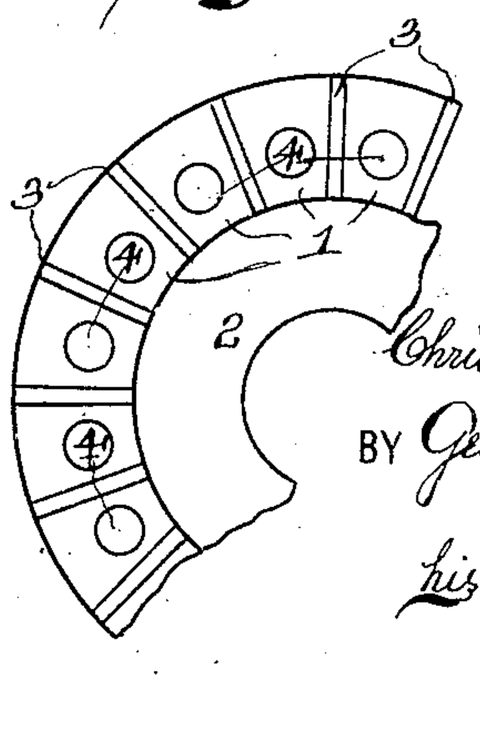


Fig. 6.



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No. 742,743. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

CHRISTOPHER J. ROACH, OF HARTFORD, CONNECTICUT.

COMMUTATOR.

SPECIFICATION forming part of Letters Patent No. 742,743, dated October 27, 1903.

Application filed June 27, 1903. Serial No. 163,403. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER J. ROACH, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Commutators, of which the following is a specification.

My invention relates to commutators and to that class adapted more particularly for small machines requiring a small amount of current or of a small ampere capacity. In commutators adapted for light work or of small ampere capacity it is desirable to reduce the size as small as possible, so as to keep down the peripheral speed and save the wear of the brushes; but owing to the fact that the core of these small commutators is usually made in two parts which must be fastened together by some mechanical contrivance that will necessarily take up more or less space it will readily be seen that there is a limit to reduction for the ordinary commutator now in use beyond which it is impossible to go.

In my improved commutator the insulated core can be made as small as is consistent with the proper amount of insulation required by simply vulcanizing the two parts of the core together, and thus do away with mechanical fastening.

In my improvement the commutator can be removed when worn out and replaced by another without disturbing the armature-coils, as the electrical contact between the commutator-pins and the commutator-bars is effected by means of a coil of wire entering a hole in the ends of the bars and having frictional contact with the sides of the holes, which contact is readily broken when the commutator is withdrawn.

To enable others to understand my invention, reference is had to the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved commutator mounted on a broken section of a shaft. Fig. 2 is a front elevation of the commutator and sectional view of the shaft through line *a* of Fig. 1. Fig. 3 is a sectional view of the commutator through line *b* of Fig. 2 and sectional view of the disk carrying the commutator-pins, insulating-core, retaining-collar, and broken view of the shaft. Fig. 4 is a detail perspective view of the two parts of the insulating-core. Fig. 5 is a broken front elevation of one part of the core. Fig. 6 is a broken front elevation of the commutator and core, showing the thin webs between the commutator-bars as not being integral with the core, as shown in the other views.

Its construction and operation are as follows:

1 represents the commutator-bars, having the angular feet 1^a, adapted to be embraced by the two parts 2 and 2^a of the core, which parts are undercut to receive the feet of the said bars, as shown more clearly at Fig. 3. These bars are arranged about the periphery of the core and are separated by the thin insulating-webs 3. These webs may be made integral with the body of the two parts of the core, or they may be separate, as shown at Fig. 6. A more extended description of these webs and core will be hereinafter given.

4 represents holes in the front end of each of the commutator-bars and extending therein to a depth sufficient to insure a good electrical contact between the wire coils 5, secured to one end of the commutator-pins 6, and the sides of said holes. While these holes could be made straight to receive straight coils of wire, I show them tapered and the wire coil also tapered, as such a construction will not only insure a more perfect electrical contact when the commutator is in place, but the wire coils can be more readily withdrawn from the holes and the contact easily broken when the commutator is removed from the shaft 7.

8 is a circular disk secured to the shaft 7 and is provided with holes registering with the holes 4 of the commutator-bars, and in these holes are placed the commutator-pins 6, carrying at their outer ends the armature wires or coils 9, leading to the armature. (Not shown.) These pins, as before mentioned, are all connected at their opposite ends to the contact-coils 5, and while all of the contact-coil ends of these pins could also enter the holes in the ends of the commutator-bars one only, 6^a, is shown as entering, which serves as a driver.

It will be understood that the different views of the commutator do not represent the smallest size of which it is capable of being re-

duced. In fact, the two parts of the core can be reduced to an extent that will just give sufficient insulation between the commutator-bars and the shaft on which the commutator is mounted.

The insulating-cores 2 and 2^a and the webs 3 are made of a material adapted to be vulcanized, and when the commutator is made large enough so that the commutator-bars will stand far enough apart to give strength and stability to the radiating insulating-webs 3 these webs can be made an integral part of the body portions 2 and 2^a; but when the commutator is reduced to its lowest possible diameter these webs would necessarily be very thin, and it would therefore be advisable to insert them between the bars after such bars are located.

The locating of the commutator-bars equidistant about the periphery of the cores is very important in order that the holes in the ends of these bars register exactly with the commutator-pins in the disk 8. To do this, I employ a jig (not shown) having pins projecting therefrom adapted to enter the holes in the bars, and as the circular arrangement of the pins will coincide exactly with the position of the bars on the reduced cores the thin insulating-webs can be inserted between the bars and the whole vulcanized together. When the cores are large enough to permit of the webs 3 being an integral part thereof, these webs are cast or molded onto the said cores and of course will be located equidistant about the periphery of the cores, so that the bars can be placed between the webs and the commutator placed in the vulcanizer to vulcanize the two parts 2 and 2^a firmly together, and thus make one solid structure.

When the commutator is worn out, the collar 10 is loosened and said collar and commutator slipped off from the shaft, and this can be done, as before mentioned, without disturbing the commutator-pins on their armature connections. A new commutator is then slipped on and the electrical contacts are automatically and instantly made.

When the commutators are large enough to permit the webs 3 being made an integral part of the insulating-core, the commutator could be held together by the pins 11, (shown at Fig. 2;) but when the core is reduced in diameter to a point where mechanical fastening is impracticable then vulcanizing is necessary.

From the foregoing description and drawings it will readily be seen that my improved commutator is not only adapted to be manufactured cheaply, but is readily connected and disconnected and can be made of very small diameter, which makes it very desirable for light work or small ampere capacity. It is particularly adapted for electric fans, where commutators wear out rapidly and where the advantage of being able to readily remove the worn-out one and replace with a new one would be greatly appreciated, as there would be no skill required in making the change.

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

1. A commutator having the insulating-core in two parts, commutator-bars about the periphery of said cores, means provided on said bars to be embraced by said parts of the core, insulating-webs between said bars, the said cores vulcanized together, for the purpose set forth.

2. A commutator comprising a two-part insulating-core, commutator-bars about said core, commutator-pins carrying armature-wires on one end, and on the other end spring contact-wires, the ends of said bars provided with recesses to receive said contact-wires, for the purpose set forth.

3. A commutator having commutator-bars provided with recesses in one of their ends, commutator-pins carrying coiled-spring contact-wires adapted to enter said recesses and be readily removed therefrom, for the purpose set forth.

4. A commutator having commutator-bars provided with a tapered recess in one of their ends, commutator-pins carrying a taper wire coil to form electrical contact with said recesses, for the purpose set forth.

5. A commutator comprising an insulating-core carrying commutator-bars about its periphery, a rotatable support, a commutator-pin-holding disk fixed to said support, commutator-pins mounted therein and carrying on one end wire contact-coils, recesses in one end of said bars to receive said coils and thus form electrical contact with said bars, means for removably retaining the commutator against the face of said disk, for the purpose set forth.

6. A commutator comprising a two-part insulating-core, commutator-bars located about the periphery thereof, means on said bars to be embraced by said two-part core, a shaft on which said commutator is mounted, a disk secured to said shaft, commutator-pins mounted in said disk, one end of said pins carrying electrical contact-wires, a recess in one end of said bars to receive said wires to form a spring-contact between said pins and bars, means for removably retaining the commutator against said disk, for the purpose set forth.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 11th day of June, A. D. 1903.

CHRISTOPHER J. ROACH.

Witnesses:
G. DROUVÉ,
S. J. CHAFFEE.