

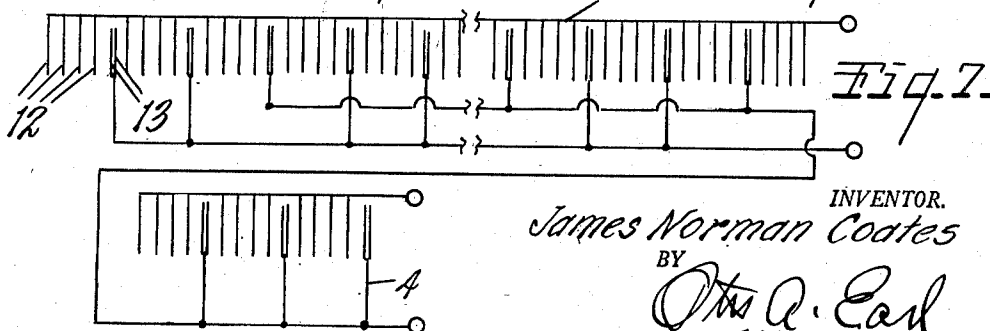
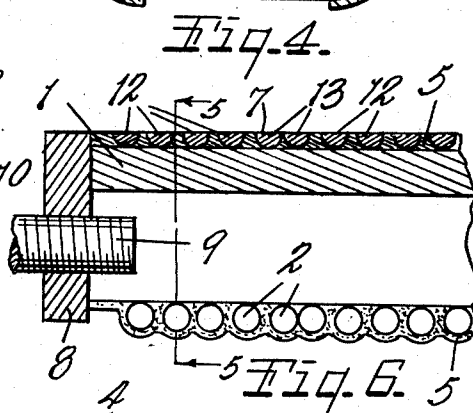
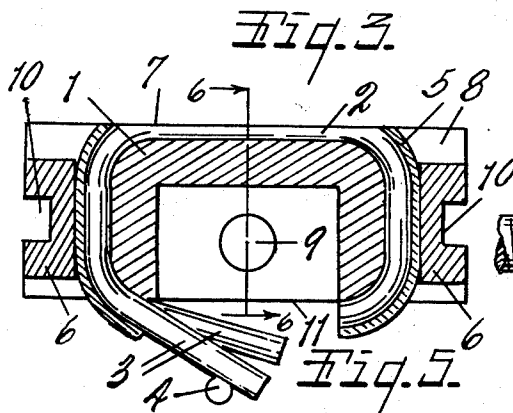
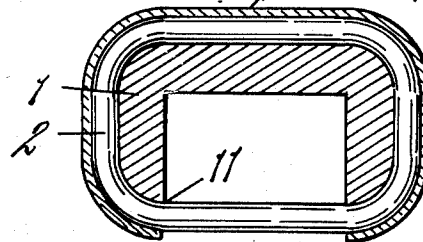
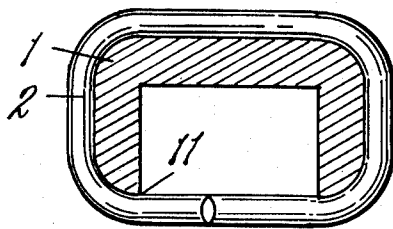
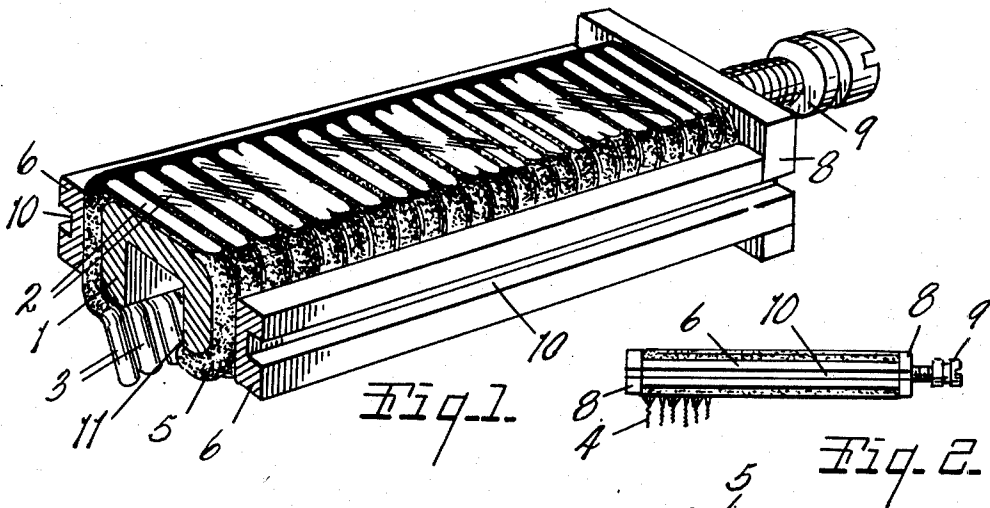
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COMMUTATOR AND METHOD OF MANUFACTURE THEREFOR

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COMMUTATOR AND METHOD OF
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This invention relates to improvements in a commutator and method of manufacture therefor.

The principal objects of this invention are:

First, to provide an improved light weight commutator having a multiplicity of closely spaced contact faces.

Second, to provide a commutator that can be manufactured at a material reduction in cost as compared with similar commutators.

Third, to provide a commutator in which the individual contact elements are formed by winding a continuous strand of conducting wire about a core and then severing the several turns of the winding to form separate contact strands.

Fourth, to provide a method of manufacturing a commutator which eliminates the necessity of fabricating and assembling a great many individual parts.

Fifth, to provide a commutator having a multiplicity of contact elements that are selectively connectible to one or more conductors.

Other objects and advantages of my invention will be apparent from a consideration of the following description and claims. The drawings, of which there is one sheet, illustrate a preferred form of my commutator and the steps involved in manufacturing the same.

Fig. 1 is a perspective view of the finished commutator with one end broken away in cross section.

Fig. 2 is a side elevational view of the finished commutator.

Fig. 3 is an end elevational view of the commutator core and winding following the first step in the manufacture thereof.

Fig. 4 is an end elevational view of the core and winding after the application of a coating of binding material thereto.

Fig. 5 is an end elevational view of the commutator in a further progressed state of assembly.

Fig. 6 is a fragmentary longitudinal cross sectional view through the commutator taken along the plane of the line 6-6 in Fig. 5.

Fig. 7 is a schematic wiring diagram of one possible method of connecting the contacts of the commutator.

My commutator is designed particularly for use in radiosonde weather reporting devices but can obviously be used to advantage in other instances requiring a light weight commutator with a multiplicity of contact elements.

As is best illustrated in Figs. 1, 5 and 6, the commutator consists of an insulating core 1 of elongated downwardly opening U-shaped transverse cross section. A plurality of contact elements 2 in the form of wire strands are wrapped

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in side by side relation around the top and sides of the core with one end of each strand turned downwardly, as at 3, for attachment to one or more conductor leads 4 as desired. A layer or coating of thermoplastic material, desirably of the thermosetting type indicated at 5, binds each strand to the core and a rectangular framework having side rails 6 is fitted around the core to further retain the strands. The top portions of each strand where they extend across the top of the core are ground off flat, as at 7, to form a plurality of contact faces. One of the cross-pieces 8 of the retaining frame is threadedly engaged with an adjusting screw 9 for longitudinally adjusting the commutator and the side rails 6 are provided with grooves 10 adapted to slidably receive supporting fingers or flanges not illustrated.

In the method or process of assembling my commutator, I mount the core 1 in a coil winding machine and wind a continuous coil of silver wire therearound with each turn of the coil bridging the opening in the bottom of the U-shaped core as at 11 in Fig. 3. The top reaches of each turn of the coil are desirably arranged perpendicular to the axis of the core. The spacing of each turn of the coil can, of course, be controlled as desired but for use in radiosonde weather data transmitting devices, I wind four consecutive turns with a small space between each turn as is best illustrated at 12 in Fig. 6. The next two turns, indicated at 13 in Fig. 6, are placed in closely adjacent touching position after which a second series of four spaced turns are wound on the core. After the continuous coil of wire is thus wound on the core, I apply the coating of thermosetting insulating plastic material 5 over the top and sides of the core and coil. The plastic material enters into the spaces between the turns of the coil and serves to bind the turns to the core as well as forming an insulator therebetween. After the binding coating 5 has been applied, the retaining frame with its side rails 6 and end pieces 8 may be applied over the core and coil although the mounting of the retaining frame may be delayed until after the binding coating has been cured and the turns of the coil have been severed as will be described.

After the turns of the coil are firmly retained on the core by the binding coating and the retaining frame, if desired, the lower reach of each turn of the coil is severed along the open under side of the U-shaped core thus converting the consecutive turns of the coil into individual commutator strands. The ends of selected strands can then be soldered or otherwise electrically

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connected to the conductors 4 by bending the strands to separate one from another.

Either before or after the contact strands are connected to the conductors 4, the assembled commutator is placed in a grinding machine to grind off the top surface in a smooth plane. This grinding operation cuts away the top half of each contact strand, leaving the contact surfaces thereon and also smooth off the plastic material between spaced strands to form a continuous smooth top surface that is alternately conducting and nonconducting. The contact strands 13 that are placed in side by side relation form a contact that is twice the width of the contact surfaces on the spaced strands. The commutator is then ready to be assembled in a radiosonde or other electrical device to coact with a movable contact that is translated along the smooth top surface of the commutator, as desired, to make successive electrical connections.

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

1. A commutator comprising an elongated insulating core of downwardly opening U-shaped transverse cross section, a plurality of contact strands of silver wire wrapped around the top and sides of said core with one end of each strand extending bendably across the open under side of the core for attachment to a conductor, some of said strands being spaced from adjacent strands and others of said strands being positioned in adjacent contacting relation to adjacent strands, a binding coating of thermosetting insulating plastic positioned over said core and between said strands, said strands being ground off flat to one half their thickness along the top of said core down to and flush with the coating positioned therebetween, a rectangular frame positioned around the sides and ends of said core and retainingly embracing the sides of said strands, and an adjusting screw threadingly engaged with an end member of said frame.

2. A commutator comprising an elongated insulating core of downwardly opening U-shaped transverse cross section, a plurality of contact strands of silver wire wrapped around the top and sides of said core with one end of each strand extending bendably across the open under side of the core for attachment to a conductor, some of said strands being spaced from adjacent strands and others of said strands being positioned in adjacent contacting relation to adjacent strands, a binding coating of thermosetting insulating plastic positioned over said core and between said strands, said strands being ground off flat to one half their thickness along the top of said core down to and flush with the coating positioned therebetween, and a rectangular frame positioned around the sides and ends of said core and retainingly embracing the sides of said strands.

3. A commutator comprising an elongated insulating core of downwardly opening U-shaped transverse cross section, a plurality of contact strands of silver wire wrapped around the top and sides of said core with one end of each strand extending bendably across the open under side of the core for attachment to a conductor, some of said strands being spaced from adjacent strands, a binding coating of thermosetting insulating plastic positioned over said core and between said strands, said strands being ground off flat to one half their thickness along the top of said core down to and flush with the coating po-

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sitioned therebetween, and a rectangular frame positioned around the sides and ends of said core and embracing the sides of said strands.

4. A commutator comprising an elongated insulating core, a plurality of contact strands of wire wrapped around the top and sides of said core with one end of each strand extending bendably from the under side of the core for attachment to a conductor, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the coil to the core, some of said strands being spaced from adjacent strands, a binding coating of thermosetting insulating plastic positioned over said core and between said spaced strands, said strands being ground off flat to one half their thickness along the top of said core down to and flush with the coating positioned therebetween, and a rectangular frame positioned around the sides and ends of said core and embracing the sides of said strands.

5. A commutator comprising an elongated insulating core, a plurality of contact strands of wire wrapped around the top and sides of said core with one end of each strand extending bendably from the under side of the core for attachment to a conductor, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the coil to the core, some of said strands being spaced from adjacent strands and others of said strands being positioned in adjacent contacting relation to adjacent strands, a binding coating of insulating plastic positioned over said core and between said spaced strands, said strands being ground off flat along the top of said core and flush with the coating positioned therebetween, and a rectangular frame positioned around the sides and ends of said core and embracing the sides of said strands.

6. A commutator comprising an elongated insulating core, a plurality of contact strands of wire wrapped around three sides of said core with one end of each strand extending bendably from the fourth side of the core for attachment to a conductor, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the coil to the core, at least part of said strands being spaced from adjacent strands, and a binding coating of solidified fluid insulating material positioned over said core and between said spaced strands, said strands being ground off flat along one side of said core and flush with the coating positioned therebetween.

7. A commutator comprising an elongated insulating core, a plurality of contact strands of wire wrapped around said core with one end of each strand extending bendably from the core for attachment to a conductor, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the coil to the core, at least part of said strand being spaced from adjacent strands, a coating of solidified insulating plastic material positioned over said core and between said spaced strands, said strands being ground off flat along one side of said core and flush with the coating positioned therebetween, and a rectangular frame positioned around the sides and ends of said core and retainingly embracing the sides of said strands.

8. A commutator comprising an elongated insulating core, a plurality of contact strands of wire wrapped around said core with one end of each strand extending bendably from the core for

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attachment to a conductor, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the coil to the core, at least part of said strands being spaced from adjacent strands, and a binding coating of solidified insulating plastic material positioned over said core and between said spaced strands, said strands being ground off flat along one side of said core and flush with the coating positioned therebetween.

9. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of silver wire around an elongated core of downwardly opening U-shaped transverse cross section with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating thermosetting plastic material over said coil and curing said plastic to bind said coil to said core, applying a retaining frame around the sides and ends of said core to further retain said coil and form a support for the commutator, severing each turn of said coil along the lower open side of said core to form individual contact strands, connecting a severed end of each strand to a conductor, and grinding off the top face of said strands in a plane down to the level of the plastic coating between adjacent strands and for one half the thickness of the wire.

10. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of silver wire around an elongated core of downwardly opening U-shaped transverse cross section with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating thermosetting plastic material over said coil and curing said plastic to bind said coil to said core, applying a retaining frame around the sides and ends of said core to further retain said coil and form a support for the commutator, severing each turn of said coil along the lower open side of said core to form individual contact strands, connecting a severed end of each strand to a conductor, and grinding off the top face of said strands in a plane down to the level of the plastic coating between adjacent strands.

11. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of wire around an elongated core of downwardly opening U-shaped transverse cross section with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating plastic material over said coil and curing said plastic to form insulating dividers between the spaced turns of said coil, applying a retaining frame around the sides and ends of said core to retain said coil and form a support for the commutator, severing part of the turns of said coil along the lower open side of said core to form individual contact strands, connecting a severed end of each strand to a conductor, and grinding off the top face of said strands in a plane down to the level of the insulating coating between adjacent strands.

12. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of wire around an elongated core with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating plastic material over said coil and curing said plastic to form insulating dividers between the spaced turns of said coil, applying a retaining frame around the sides and ends of said core to retain said coil and form a support

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for the commutator, severing part of the turns of said coil along the lower side of said core after said strands have been retained to form individual contact strands, and grinding off the top face of said strands in a plane down to the level of the insulating coating between adjacent strands.

13. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of wire around an elongated core with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating plastic material over said coil and curing said plastic to bind portions of each turn of said coil to said core, severing part of the turns of said coil along the lower side of said core after the turns of the coil have been bound to the core to form individual contact strands, connecting a severed end of each strand to a conductor, and grinding off the top face of said strands in a plane level with the plastic coating between adjacent strands and for one half the thickness of the wire.

14. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of wire around an elongated core with at least part of the turns of said coil spaced from adjacent turns, applying a coating of insulating plastic material over said coil and curing said plastic to bind portions of each turn of said coil to said core, severing part of the turns of said coil along the lower side of said core after the turns of the coil have been bound to the core to form separate contact strands, and grinding off the top face of said strands in a plane level with the plastic coating between adjacent strands.

15. The method of manufacturing a commutator which comprises the steps of, winding a continuous coil of wire around an elongated core with at least part of the turns of the coil spaced from adjacent turns, forming insulating spacers on said core between said spaced turns, applying a retainer around opposite sides and ends of said core to retain said coil on said core, severing selected turns of said coil along one side of said core after said coil has been retained on said core to form separate contact strands, and grinding off said strands and spacers in a surface along another side of said core.

16. A commutator comprising, an elongated insulating core, a plurality of contact strands of wire arranged in side by side spaced relation on said core and embracing three sides thereof, an end of each strand being unconnectedly bendable away from said core as a connector lead, said strands being successive elements of a single coil applied to said core and separated from the coil after application of the wire to the core, means retaining said strands on said core, and insulating spacing means separating adjacent strands along a longitudinally extending portion of said core, said spacing means and the adjacent portions of said strands being conformed in a smooth continuous surface that is alternately electrically conducting and nonconducting.

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