July 15, 1952 J. KLYM 2,602,988

COMMUTATOR AND BLANK FOR FORMING SAME

Filed Nov. 23, 1948

Fig. 1

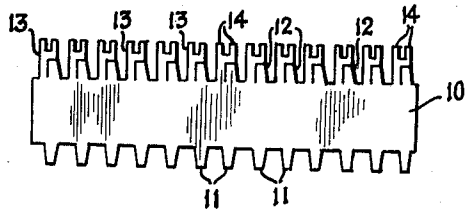


Fig. 2.

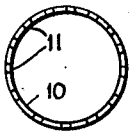


Fig. 5.

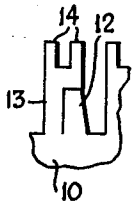


Fig. 6.

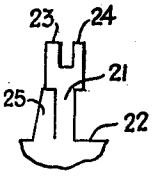


Fig. 7.

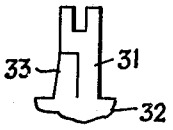


Fig. 3.

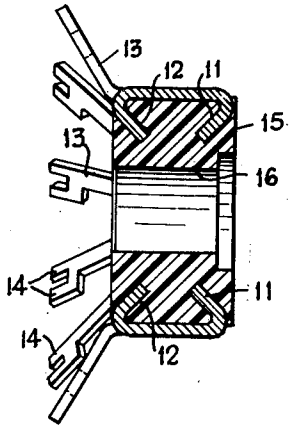
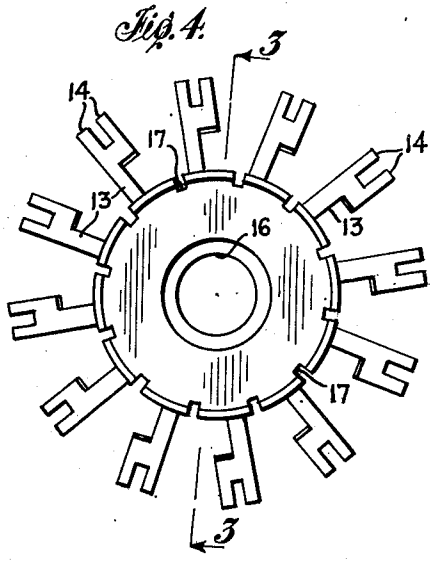


Fig. 4.



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COMMUTATOR AND BLANK FOR FORMING SAME

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2 Claims. (Cl. 29—190)

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This invention relates to a commutator construction, especially to blanks for use in forming commutators and the invention is particularly adapted to the formation of small commutators.

Heretofore there have been various constructions proposed for commutators and for the blanks used in forming same and such commutators normally comprise a resinous body portion which carries a plurality of metallic commutator bars at circumferentially spaced portions of the body. Usually these commutator bars are secured to the resinous body by some kind of an anchoring device. Furthermore, the commutator segments must have risers provided thereon which are adapted to be engaged with leads from the armature winding. Usually such armature leads are soldered to the commutator risers. With the type of commutator blanks and constructions known today, it usually is necessary for the person assembling a commutator to an armature to tie the armature lead to the riser, to thread the armature lead through a special hole formed in the riser or to otherwise temporarily secure the armature lead to the riser. Thereafter the armature leads then had to be permanently soldered to the commutator risers. In all events, the assembly of the commutator to an armature has been a relatively slow, tedious and costly operation.

The general object of the present invention is to provide a novel, improved commutator construction and to avoid and overcome the foregoing and other difficulties with previous types of commutators and assembly of same.

Another object of the invention is to provide a commutator blank that is particularly adapted for use in the formation of relatively small diameter commutators.

Another object of the invention is to provide a commutator construction which can be readily engaged with a plurality of leads.

A further object of the invention is to form a commutator blank from a flat metal sheet by an inexpensive operation and with use of relatively inexpensive forming apparatus.

Another object of the invention is to provide risers for a commutator, which risers can easily be deformed into engagement with a lead.

A further object of the invention is to provide a new and improved commutator blank which is adapted to have good anchorage to a commutator body and which also has a deformable riser for rapid, inexpensive engagement with an armature lead.

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The foregoing and other objects and advantages of the invention will be made apparent as the specification proceeds.

Attention is directed to the accompanying drawings, wherein:

Fig. 1 is a plan of a commutator blank embodying the principles of the invention;

Fig. 2 is an end elevation of a ring formed from the blank of Fig. 1;

Fig. 3 is a vertical cross section taken on the line 3—3 of Fig. 4 showing the commutator formed from the blank of Fig. 1;

Fig. 4 is a side elevation of the commutator of Fig. 2; and

Figs. 5, 6 and 7 are enlarged detail plans of several different types of commutator risers of the invention.

Reference is now made to the details of the structure shown in the drawings and corresponding numerals will be used to refer to the same parts of the commutator in the drawings and in the specification.

Fig. 1 shows a metal blank 10, usually formed from copper, with the blank 10 being made by stamping or punching out the blank 10 from a flat metal sheet so that the blank is of planar shape. Along one edge of the blank 10 there are formed a plurality of longitudinally spaced anchoring or locking fingers 11 and substantially similarly contoured locking fingers 12 are formed along the opposite side edge of the blank 10. Usually the fingers 11 are of tapered form, as shown, whereas the fingers 12 usually have one side portion thereof tapered inwardly of the finger as it protrudes from the blank 10 but the opposite side edge of the finger 12 usually extends normally from the longitudinal axis of the blank 10. The blank 10 also is provided with a plurality of substantially h-shaped risers 13 which extend therefrom intermediate each pair of fingers 12 formed on the blank. The risers 13 are so constructed and arranged that each riser is abutted against one of the fingers 12 and is longitudinally spaced from the other of the fingers 12 thereadjacent. It will

be noted that the fingers 11 and 12 are transversely opposed so as to provide transversely extending sections in the blank 10 wherein no projecting finger or riser is formed. This facilitates cutting or otherwise severing the blank 10 into a plurality of commutator segments, as hereinafter pointed out.

One of the features of the invention is that the h-shaped risers 13 are provided with enlarged end or base sections at the outer ends thereof. These base portions of the risers 13 are provided with two spaced deformable fingers 14 that are adapted to receive an armature lead therebetween. Thus in assembling a commutator formed from the blank 10 to an armature, the armature leads are individually positioned between the fingers 14 which then can easily be compressed together so as to at least temporarily secure the armature lead to the commutator riser. Usually at some later assembly operation, the armature leads can be soldered as a group to the commutator risers, as by dipping an end of the armature, and the commutator, into a solder pot.

Fig. 1 best shows that the h-shaped risers 13, while they have enlarged base portions provided thereon, are adapted to combine with the fingers 12 so as to form a more or less continuous extension that protrudes from one side of the blank 10. Hence the risers, while provided with end sections that are particularly adapted for rapid, easy engagement with an armature lead, do not interfere with the provision of transversely extending zones into the commutator blank which facilitate and permit the commutator blank to be severed into a plurality of individual commutator segments. By the formation of the blank 10 to the shape shown, use of a relatively inexpensive, uncomplicated forming die for the blank is permitted. Maximum efficiency can be achieved in use of a metal sheet from which the blank 10 is cut, due to the special contour of the blank of the invention.

Figs. 3 and 4 show the formation of a substantially conventional commutator from the blank 10. In accordance with conventional practice, the blank 10 is rolled to annular form and the ends thereof are secured together. Thereafter the commutator ring so formed is associated with a conventional resin-asbestos mixture and the fingers 11 and 12 are folded inwardly of the commutator ring in accordance with conventional practice. At a suitable time the resinous material is subjected to a heating operation so as to set the resin with the commutator ring firmly secured thereto on the periphery thereof so that a resinous body 15 is formed which has a bore 16 for receipt of a mounting shaft. At any desired time, the risers 13 are bent so as to extend substantially radially outwardly of the commutator ring, as indicated in Fig. 3. Fig. 4 indicates that a plurality of circumferentially spaced slots 17 may be cut into the commutator of the invention so as to divide the commutator ring into a plurality of circumferentially spaced commutator segments each of which is provided with a riser 13 and each of which has a pair of fingers 11 and 12 embedded in the resin body 15 for retaining the commutator segment in position.

Prior to cutting the slots 17 into the commutator, it usually is necessary to true up the commutator by making a circumferential cut off the periphery of the commutator after which the slots 17 are formed in accordance with conventional practice.

Fig. 6 shows a little different shape of a riser 21 which is formed on a blank 22 and extending from one side edge thereof. In this instance the riser 21 is provided with two arms 23 and 24 which are in spaced association whereby an armature lead can be received therebetween and have the arms crimped into engagement therewith. The arm 24 may be slightly smaller than the arm 23 so as to reduce the over-all width of the riser 21 and facilitate deformation of the arm 24. An anchoring finger 25 is formed immediately adjacent one side edge of the riser 21 at the base of the arm 23. This finger may protrude laterally from the riser 21, if desired. A riser 31, which is a reversely shaped riser in comparison with the riser 13, is shown in Fig. 7. This riser 31 is formed on a blank 32 and it has a locking finger 33 associated therewith in a manner similar to the fingers 12 of the blank 10.

It will be noted that in all embodiments of the invention disclosed herein that a locking finger is formed immediately adjacent and abutting the armature riser which is provided with an enlarged end portion adapted to be deformed into engagement with an armature lead. The locking finger always extends from the enlarged outer end of the riser inwardly of the blank to the center portion of the blank whereby the reduced width portion of the armature riser is at least partially filled in by the locking finger in order to provide a minimum over-all width for the riser and locking finger associated therewith. Thus an effective utilization of the metal sheet is provided in forming the commutator blank of the invention and separation of the commutator blank into commutator segments is facilitated. The locking fingers may be of tapered width so as to prevent contact between such fingers when they are turned inwardly of the commutator to engage with the resin body of same.

While several complete embodiments of the invention have been disclosed herein, it will be appreciated that modification of these particular embodiments of the invention may be resorted to without departing from the scope of the invention as defined by the appended claims.

Having thus described my invention, what I claim is:

1. A blank for use in forming a commutator wherein the blank is transversely severed at a plurality of places to form commutator segments therefrom, said blank comprising a flat metal strip having a plurality of spaced fingers extending outwardly from the strip in the plane thereof along both sides of the strip, said fingers being so arranged that corresponding fingers on each side of said strip are opposed transversely of same, the said strip also having a plurality of longitudinally spaced risers formed on one side thereof intermediate the fingers with each riser being abutted against one adjacent finger and being spaced from the other adjacent finger on such side of said strip, said risers being provided with enlarged outer ends that have a pair of spaced deformable fingers formed thereon for engagement with armature leads and that substantially overlie the abutted finger but leave spaces open transversely of the blank adjacent each finger to enable the blank to be cut into a plurality of commutator segments.

2. A blank for forming commutators comprising a strip of metal, a plurality of risers formed integrally with said strip and extending from longitudinally spaced portions of one of the sides of said strip, and a plurality of locking fingers formed integrally with said strip at longitudinally spaced portions of the said side of said strip and

with each finger abutted at one edge against an edge of one of said risers, said risers extending laterally further from said strip than said fingers and having bifurcated ends, the laterally inner portion of a riser and the finger thereagainst being substantially as wide as and in alignment with the end portion of the riser which is laterally enlarged.

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