

Feb. 22, 1944.

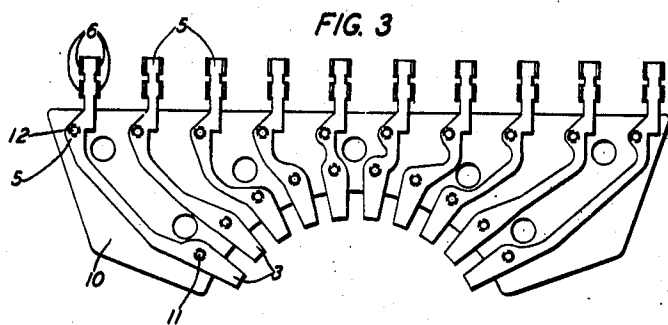
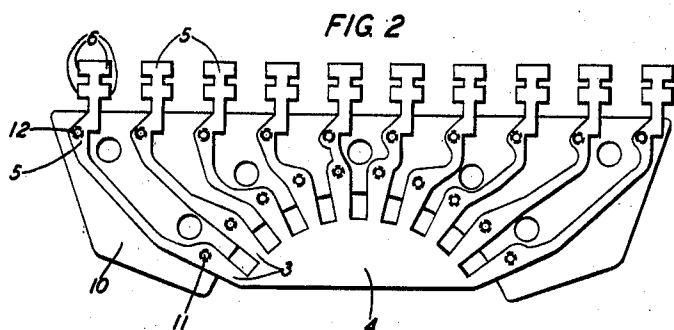
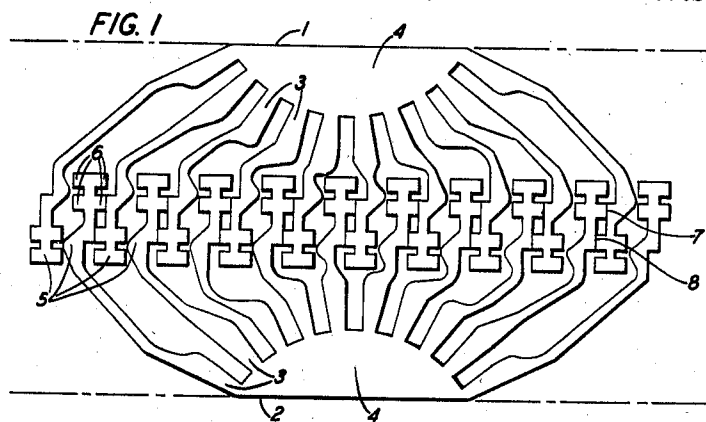
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2,342,552

SWITCHING APPARATUS

Filed Feb. 20, 1943

2 Sheets-Sheet 1



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FIG. 4

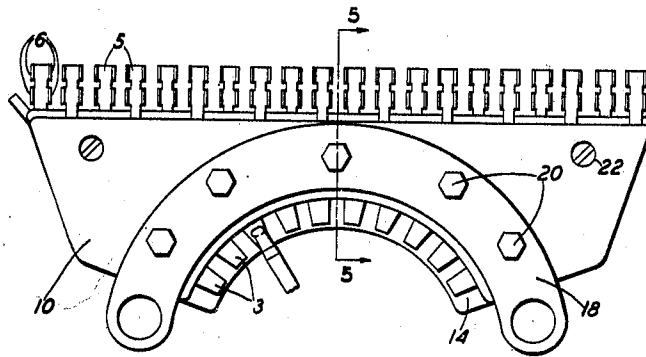
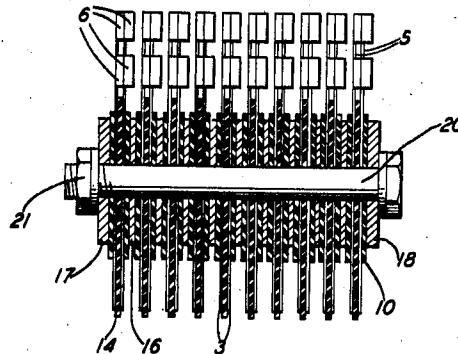


FIG. 5



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SWITCHING APPARATUS

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Application February 20, 1943, Serial No. 476,511

5 Claims. (Cl. 164—17)

This invention relates to telephone apparatus and particularly to terminal banks for use in switching apparatus.

An object is to reduce waste material and to effect economies in the manufacture of switching apparatus.

Heretofore metal terminals for use in making switching banks have been punched out individually from a metal strip and then placed in radial relation to form semicircular complete switching banks. Terminals for this use have also been punched out in groups with the terminals arranged radially in proper relation which they will occupy in the switching bank and held together with suitable temporary binding strips to maintain this relationship while building the bank. In punching out such groups of terminals it is evident that a considerable amount of scrap material is wasted due to the required spacing of the terminals.

It is a feature of the applicant's invention to provide a method of punching out such prearranged groups of terminals with temporary binding strips which will reduce to a great extent the amount of scrap material. The applicant's invention is applicable to the punching out of terminal groups in which the terminals are arranged radially in a semicircle and connected at their inner ends with a temporary binding strip to maintain them in proper relation to each other while assembling in banks and in which the outer ends of the terminals are arranged in parallel relation to each other with their free tips forming a straight line. With this type of terminal the method of punching consists of arranging two such groups of terminals for simultaneously punching from a single sheet of material with the parallel outer ends of one group extending in between or telescoping the parallel outer ends of the other group so that a minimum amount of scrap material will remain between adjacent parallel portions of the outer ends of the two groups of terminals.

Referring now to the drawings:

Fig. 1 shows a punching in which two groups of terminals are arranged in accordance with the applicant's invention.

Fig. 2 shows a single group of terminals attached to an insulation plate for the building of banks.

Fig. 3 shows the arrangement shown in Fig. 2 with the binding strip removed and the outer ends of the terminals formed for the reception of conductors.

Fig. 4 shows a top view of a completely as-

sembled switching bank in which the applicant's groups of terminals have been used; and

Fig. 5 shows a cross section taken on line 5—5 of Fig. 4.

Fig. 1 shows a typical arrangement of the applicant's invention in which the two sets 1 and 2 of ten terminals each have been punched out simultaneously from a single strip of metal. The terminals in each group have their inner ends 3 arranged radially and held together with a connecting strip 4 to maintain them in proper relation to each other when assembled in a switching bank. The outer ends 5 are arranged in parallel relation to each other and terminate in a straight line tangential to a circle concentric with the semi-circle formed by the inner ends of the terminals. It should be noted that these parallel end sections of the terminals are provided with four transverse tabs 6 which may be folded together to enclose conductors for extending connections from the terminals. With these formations on the parallel end sections, it is possible to telescope the end sections of group 1 with the end sections of group 2 so that very little waste material is cut out between the intersected telescoped terminal ends. In fact at some points such as 7 and 8 there may be no waste material whatsoever, but the material is merely sheared through to separate one terminal end from the other. In the particular form of terminals disclosed the width of each end between the opposite tips is equal to the distance between two adjacent terminals. It should also be noted that the width of the intersection of the two groups of terminals is considerably larger than half of the total length of the shortest terminals. That is the two groups have been shaped so that they telescope each other as far as possible without interfering with the radial placements of the contact ends of the terminals.

To build terminal banks from these banks of ten terminals each, if one of these groups is placed on an insulation sheet 10 as shown in Fig. 2, and each terminal is secured at two places 11 and 12 to the insulation sheet while the connecting strip 4 remains the terminals will be maintained in the exact relationship to each other in which they were punched out, the next step would be to remove the section 4 and bend up the tabs 6 as shown in Fig. 3. It should be observed that in building up a bank of terminals usually the tip and ring levels of a line are placed on opposite sides of an intermediate insulation sheet as shown in Fig. 5. To this end two groups of terminals with attached insulation

sheets such as is shown in Fig. 3, are placed with the terminals of one group facing the terminals of the other group with an insulation sheet 14 inserted between them. It should now be observed that the straight terminal ends 5 of these two groups of terminals are so shaped that by placing them face to face, they will form a straight line with every other terminal from one group interspersed by the corresponding terminals of the other group as shown in Fig. 4. The straight outer ends of these two groups will therefore lie parallel to each other to form a group of twenty terminals. Then between each such set of two groups of terminals each an intermediate metal plate 16 is inserted and on the outside of a group of ten such groups an upper plate 17 and a lower plate 18 is provided and the whole structure clamped together by means of bolts such as 20 having nuts 21 and other bolts 22 clamping together the insulation plates and intermediate spacers only. The completed bank as shown in Figs. 4 and 5 is now ready for wiring to individual conductors for the twenty terminals. These conductors may be secured in any suitable manner by the further folding of the tabs 6 over the conductors and one set of the tabs electrically welded to the conductors.

It should be understood that the method of telescoping two groups of terminals of this kind is not confined to particular shapes and forms of the outer parallel ends of the terminal groups but that other forms and shapes may be applied and still enable the telescoping of two groups of terminals to save waste materials.

What is claimed is:

1. The method of blanking out groups of terminals in which the terminals in each group are arranged radially in a semicircle and connected at the inner ends with a binding strip to maintain the terminals in fixed relation to each other and in which the outer ends of the terminals are arranged in parallel relation to each other with their tips forming a straight line and of a width greater than the inner ends comprising punching out two such groups simultaneously from a single sheet of metal with the parallel outer ends of one group extending in between the parallel ends of the other group so that the wide outer end portions of one group are telescoped beyond the wide outer end portions of the other group and so that a minimum amount of scrap material remains between the adjacent parallel outer ends of the two groups.

2. The method of blanking out groups of terminals in which the terminals in each group are arranged radially in a semicircle and connected at the inner ends with a binding strip to maintain the terminals in fixed relation to each other and in which the outer ends of the terminals are provided on their opposite sides with tabs and arranged in parallel relation to each other with the tips forming a straight line comprising punching out two such groups simultaneously from a single sheet of metal with the outer ends of one group extending in between the outer ends of the other group with the distance between these ends being equal to the width of the ends including the tabs and with these outer ends including the tabs of one group telescoped beyond the corresponding outer ends of the other group so that the minimum of waste material remains between the adjacent outer ends.

3. The method of blanking out groups of terminals in which the terminals in each group

are arranged radially in a semicircle and connected at their inner ends with a temporary binding strip to maintain the terminals in fixed relation to each other and in which the outer ends of the terminals are arranged in parallel relation to each other with their tips forming a straight line, comprising punching out two such groups simultaneously from the same sheet of metal with the outer ends of the two groups intersecting each other with the width of the intersection longer than one-half the length of the shortest terminal so as to reduce waste material remaining after the terminals have been punched out to a minimum.

4. The method of blanking out groups of terminals in which the terminals in each group are arranged radially in a semicircle and connected at their inner ends with a binding strip to maintain the terminals in fixed relation to each other and in which the outer ends of the terminals are provided with a plurality of pairs of opposite tabs and arranged in parallel formation to each other and with the extreme tips of these ends arranged in a straight row, comprising punching out two such groups simultaneously from a single strip of metal with the outer ends of one group interposed between the other ends of the other group so that the width of the portion of the sheet where the outer ends are interposed is greater than the length of the shortest terminal and the distance between the outer ends of each group is equal to the width of said outer ends including the opposite tabs and with some of the tabs abutting against the shanks of the outer ends of these interposed terminals so as to reduce the waste material to a minimum between the interposed portions of the terminals and to eliminate waste material entirely at certain points between adjacent terminals.

5. A method of blanking out two groups of terminals in which the inner ends of the terminals in each group are arranged in a semicircle and connected by a binding strip to maintain the terminals in fixed relation to each other and in which the other ends of the terminals are provided with a plurality of opposite tabs arranged in parallel relation to each other and in a straight line formation tangential to a circle concentric to the semicircle formed by the inner ends, said outer and inner ends of said two groups being so arranged that when one group is turned over and laid on top of the other group the inner ends of the two groups will match and coincide with each other and the individual outer ends of the two groups will occupy alternate spaces in a single straight line with the tabs of adjacent outer ends of the two groups abutting each other and thereby having the outer ends of the two groups occupy the minimum possible space in a straight line direction, comprising punching out two such groups simultaneously from a single sheet of metal with the outer ends of the two groups telescoping each other and the outer ends of one group lying between corresponding outer ends of the other group and the tabs of one group located beyond the tabs of the other group and in the field between the outer and inner ends of said group, and so that some of the tabs of one group abut the shanks of the other group connecting the outer and inner ends of the individual terminals thereof.

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