

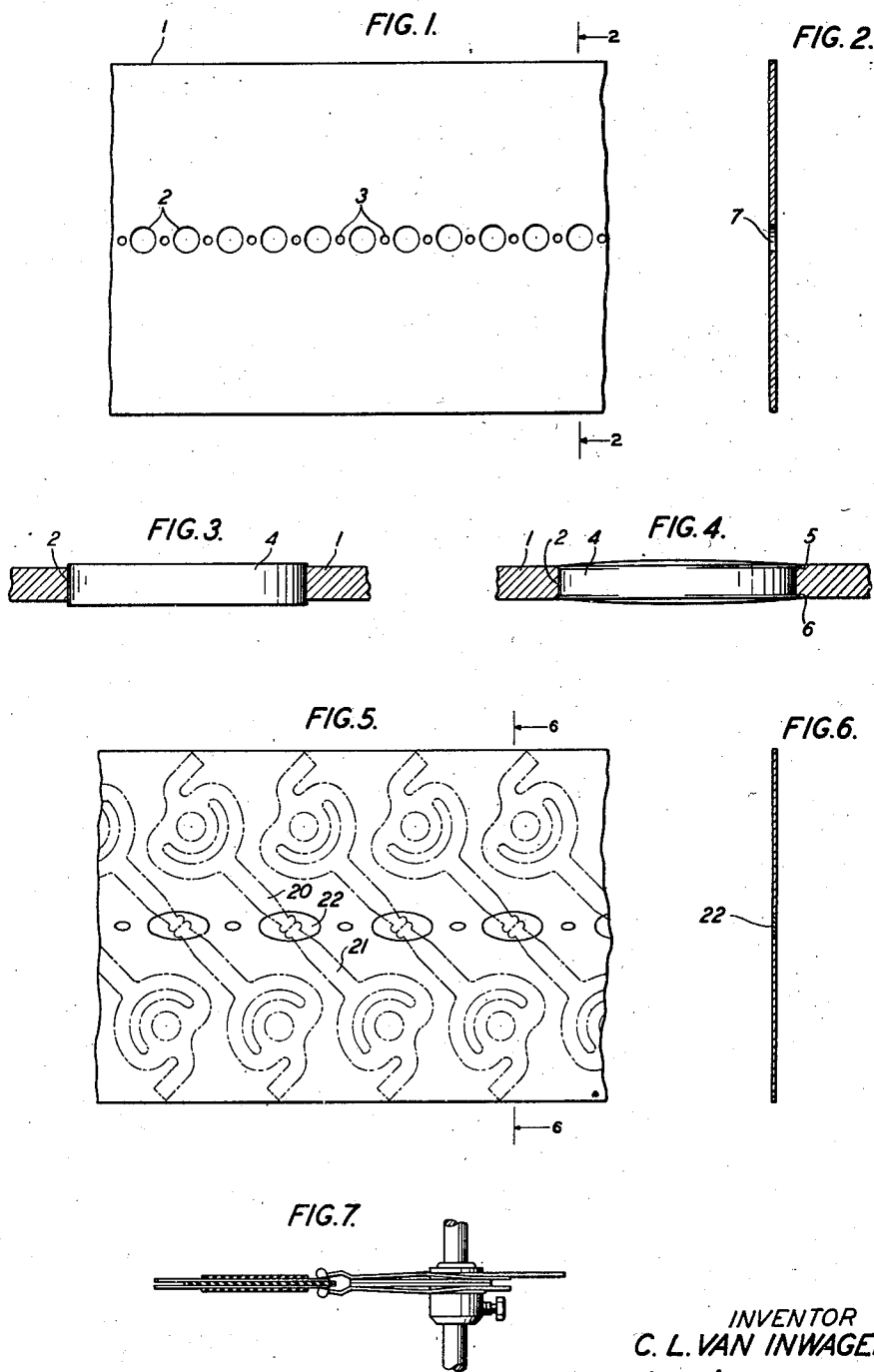
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METHOD OF MAKING CONTACT WIPER SPRINGS

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METHOD OF MAKING CONTACT WIPER SPRINGS

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This invention relates to improvements in electrical contacts and particularly to contact members used in switching mechanisms in the telephone art.

An object is to save precious metal in the manufacture of such contact members and to effect other improvements therein.

Heretofore contact members such as relay springs and switching springs have been made, with precious metal inserts or inlays serving as contact points, providing a precious metal strip along the center of a base metal strip and rolling or otherwise securing the two members together and then punching out the springs with the contact ends of two opposite springs registering end to end on the precious metal portion. Other methods of manufacturing springs having precious metal inlays may consist of assembling a plurality of base metal bars and a plurality of precious metal bars in a desired formation, brazing these parts together and cold-rolling the component bars into a thin sheet from which springs may then be punched out having precious metal inserts at the contacting ends thereof.

The present invention relates to improvements in these prior methods, and a feature thereof is a more efficient method of manufacturing base metal springs or wipers having contacting ends consisting of a solid tip of precious metal. More specifically, this method consists of inserting billets of precious metal at intervals in a strip of base metal, riveting and welding these billets to the base metal strip and then cold rolling the strips without annealing to give the required spring temper and thickness for the wipers. Out of these strips may then be punched a series of wipers with the tips of two opposite wipers meeting in a corresponding separate precious metal insert so that each wiper will be provided with a solid precious metal contact tip and so that there will be very little waste of the precious metal in the scrap material after the wipers are punched out. An advantage of this method is that wipers of widely different shapes may be punched out from these strips without increasing the waste of the precious metal inserts.

The invention has been illustrated in the accompanying drawing in which:

Fig. 1 shows a base metal strip with apertures in a row and along the central line of the strip.

Fig. 2 is a cross-section taken on line 2—2 of Fig. 1.

Figs. 3 and 4 show enlarged cross-sections of individual billets in the base metal strip.

Fig. 5 is a front view of the base metal strip and inserts rolled out to a desired thickness with a particular type of wipers indicated for punching out of the strip.

Fig. 6 shows a cross-section taken on line 6—6 of Fig. 5; and

Fig. 7 shows a wiper assembly on a shaft associated with terminals in a switch band.

The method of manufacturing these wipers as illustrated in the drawing may be described as follows:

In the base metal strip 1, a series of holes such as 2 may be punched through the central line of the strip and intermediate these holes may be punched smaller holes such as 3. These holes 3 may be used as guide holes as will be described hereinafter. In the holes or openings 2 are inserted billets 4 of precious metal which are slightly thicker than the base metal sheet 1 as shown in the enlargement of Fig. 3. The next step will be to rivet this billet 4 as shown in Fig. 4 to the base metal sheet 1 to provide a slight overlap of the enlargement of the rivet on each side of the sheet as shown for example at points 5 and 6 on opposite sides of the rivets. These riveted billet may then be welded to base metal sheet by heating the assembly to a critical temperature suitable to the character of the insert material so that this billet will unite with the base metal sheet in a perfect weld. This welding or bonding of the billet to the base metal sheet may be accomplished, for example, by the method disclosed in the Patent 2,226,944 of December 31, 1940 to H. T. Reeve. This strip of material may now be rolled down to the required thickness, that is, it may originally be of such thickness that when it is rolled down without annealing to a desired thickness the right spring temper required for the wipers will be obtained. An approximate indication of the relative size and thickness of the original sheet as compared with the sheet as rolled out may be had by comparing Fig. 2 with Fig. 6. As shown in Fig. 5 wipers may be punched out from this rolled out sheet arranged in the manner indicated. Wipers having this particular shape may be employed in telephone switches in pairs as shown for example in Fig. 7 where they are assembled with an intermediate insulation plate on a bushing which is secured to a shaft. These wipers may engage terminals on opposite sides of an insulation sheet in a bank. It should be noted in Fig. 5 that due to this shape, a convenient way of saving as much as possible of the precious metal inserts and the base metal sheet, a pair of wipers such as are indicated for example at 20 and 21 may be punched out with the tips meeting end to end on a precious metal insert 22 which has been shown as slightly elongated due to the rolling out of the strip. The intermediate holes between these precious metal inserts may serve as guide holes to locate the sheet when it is passed in the punch press and the punches may be of any suitable arrangement for example there may be two punches along side of each other for punching out the two wipers 20 and 21 or a gang of punches may be arranged side by side to punch

out simultaneously a large number of wipers. It is immaterial how this punching is done as long as the tips of the wipers are located in succeeding precious metal inserts and the wipers are so located on the strips as to leave very little scrap material after the wipers have been punched out.

While a particular form of wiper has been shown suitable for use in switching apparatus of the telephone art, it is to be understood that this method of punching out wipers or springs may be applied to other forms without departing from the spirit of the invention as long as the contact tips consist of solid sections of precious metal punched from individual billets as inserted and formed in the base metal sheet and as long as the size of the precious metal inserts are adjusted to secure minimum amount of waste material.

What is claimed is:

1. The method of making contact wiper springs comprising welding inserts of a precious metal at intervals in apertures in a base metal strip, cold-rolling the strip to a thin elongated strip having a desired spring temper, punching wiper springs in pairs from the strip with the tips of each pair of wipers registering end to end on a separate precious metal insert to provide each wiper with a precious metal contacting tip.

2. The method of making contact wiper springs comprising welding inserts of a precious metal at intervals in apertures in a base metal strip, cold-rolling the strip to a thin elongated strip having a desired spring temper, punching wiper springs from this strip in pairs with the center line of each pair of wipers running diagonally across the strip and the central lines of two adjacent pairs running parallel so that the contact tips of each pair register end to end and include a portion of the same precious metal insert.

3. The method of making contact wiper springs comprising welding inserts of precious metal in individual apertures in a base metal strip with the apertures located equidistant apart along the longitudinal center line of said strip, cold-rolling said strip to a desired thickness and spring temper, punching wiper springs from said strip with the center line of each pair of wipers running at an angle to the said longitudinal central line of the strip and in parallel relation to each other and with the tips of the wipers of each pair registering end to end on a corresponding precious metal insert so that each tip will contain an equal portion of said insert.

4. The method of making contact wiper springs having comparatively large surface areas at their supporting ends as compared with their contacting ends, comprising riveting and welding rivets of a precious metal of a desired cross-sectional area at predetermined intervals in apertures in a base metal strip, cold-rolling this strip lengthwise without annealing to a thickness and extent until the strip has acquired a desired spring tension and then punching said wiper springs in pairs from the strip with the contact ends of each pair located in the area of a separate precious metal insert, the inserts being so placed that the wiper pairs may be located side by side as close together as the enlarged areas of the supporting ends of the wipers permit and with the areas of the inserts and base metal strip of such size that the areas of the scrap or waste material both of the precious metal inserts and of the base metal are reduced to a minimum.

5. The method of making contact wiper springs

having their supporting ends of approximately six to seven times larger surface areas than the surface areas of the contacting ends, comprising riveting and welding rivets of a precious metal of a predetermined cross-sectional area at certain fixed intervals in apertures in a straight line along the center of a base metal strip, cold-rolling this strip in the direction of said center line and without annealing the strip until it acquires a desired thickness, surface area and spring temper and then punching said wiper springs from this strip with the wipers arranged in pairs having their contacting ends abutting each other and with said contacting ends of each pair located in a separate precious metal insert and containing when punched out the major portion of the enlarged surface area of said insert and having their supporting ends located in the base metal sections on opposite sides of the said center line at an angle and closely fitted together so that when a series of said pairs are punched out they contain the major portion of the material of said sections.

6. The method of making contact wiper springs having their supporting ends of comparatively large surface areas as compared with the surface areas of the contacting ends comprising riveting and welding billets of a precious metal of a cross-section of the desired configuration at certain fixed intervals in apertures in a straight line through the longitudinal center of a base metal strip, cold-rolling the strip in the direction of said center line without annealing the strip to a desired thickness and spring temper and then punching said wiper springs from said strip in pairs with the contacting ends of each pair punched out of a separate precious metal insert and occupying close to the entire cross-sectional area of said inserts with the contacting ends and supporting ends of each pair located in a straight line at an angle to the longitudinal center line of the strip and through the center of the associated insert and with the enlarged supporting ends of adjacent pairs of wipers occupying a major portion of the base metal surface of the strip on both sides of the center line of the strip.

7. The method of making contact wiper springs having large surface areas at their supporting ends as compared with their contacting ends comprising riveting and welding a series of billets of a precious metal of a suitable cross-sectional area in apertures at equal distances apart along the center line of a base metal strip, cold-rolling said strip lengthwise without annealing until the desired thickness and spring temper has been obtained and the billets have been elongated to a certain size and punching out from said strip wipers of the above-mentioned configuration and arranged in pairs with the contacting ends of each pair abutting and located in separate elongated billets so as to consume all but a minor portion of said elongated billet and further arranged so that the central line through the wipers of a pair is located at an oblique angle across the strip and the elongated surface of the corresponding billet with the enlarged supporting ends of each pair nesting close between the contacting and the supporting ends of adjacent pairs on opposite sides of the associated billets and close to the outer edge of the strip so that the wiper portions punched out of the base metal strip, consume all but a minor portion of said strip.

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