Improvements in the Manufacture of Telephone Cords.

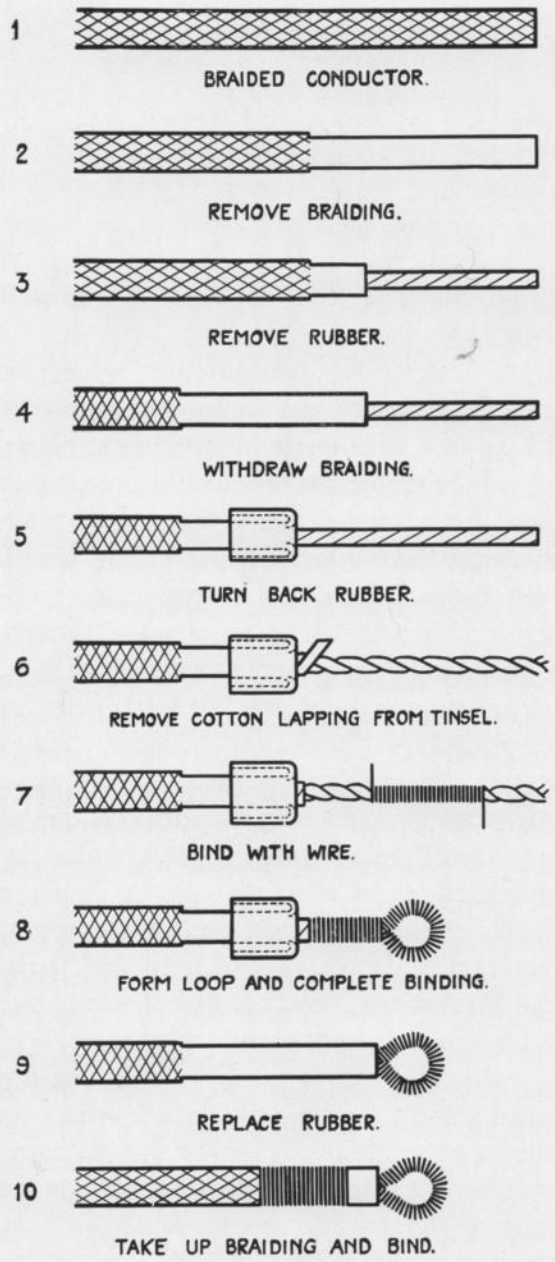
THE introduction some years ago of The General Electric Company's Long-Life Tinsel was a subject of comment in a recent issue of this Journal when a comparison was drawn between alternative types of conductors used in the manufacture of selector switch wiper cords. It may be remembered that the various qualities of tinsel were examined and the reasons stated for the adoption of the well-known long-life type to replace the former standard conductor consisting of fine copper wires stranded together

At that time the majority of specifications relating to ordinary instrument and switchboard cords were still calling for tinsel conductors of a quality which was considered satisfactory if they would withstand 2,000 reciprocations without showing evidence of fractured threads. This flexibility test originated long before any attempt was made to produce an improved tinsel, but even ten years after the superiority of the long-life type had been demonstrated, the test figures specified by most of the large users had not been amended. The British Post Office has, however, now commenced to purchase cords having tinsel conductors which will withstand 50,000 reciprocations, and it is expected that in a very short time this standard will be adopted by all Administrations. When the longer service given by a cord made up from the best materials is taken into consideration, the slight increase in cost is negligible, and it would appear that the use of the cheaper varieties is now definitely admitted to be false economy.

Immediately following this acceptance of an improved quality of tinsel comes a further development which will be of particular interest to engineers abroad since it has finally solved the problem of producing a cord capable of withstanding the severe conditions encountered in tropical countries. The result is to be seen in an entirely new series of instrument cords of the waterproof type, manufactured by the G.E.C. and standardised by them for all tropical work.

Hitherto there has been no really satisfactory method of giving the added protection necessary to cords which are exposed to severe climatic conditions and it is partly on this account that the general adoption of long-life tinsel has been delayed. It was often stated by overseas users that an improved conductor was of no advantage when the life of the complete cord was already very limited owing to the rapid deterioration of the covering or its failure to maintain a reasonably high insulation resistance when subjected to humid atmospheres. For a considerable time attention has therefore been directed to possible improvements in the methods of insulating tinsel, so that there would not be such a disparity between the life of the conductor and that of the covering.

To examine the position briefly, the point was reached where the most suitable types of both conductor and covering were known, but no method had been devised whereby one could be used with the other It was clearly proved that a cord constructed of stranded copper wire with a vulcanised rubber covering could not be equalled if the life of the con-



ductor were ignored. On the other hand, tinsel, although infinitely superior as a conductor, could not be protected in the same way owing to the damaging effect of the vulcanising process on the metal tape, and consequently it could only be treated with moisture-proof compound or lapped with rubber tape. Neither of these methods gave full satisfaction.

The outcome of recent experimental work is a new process by which a continuous sheath of rubber can be applied to tinsel and vulcanised to a sufficient degree without producing any effect on the conductor As a result an entirely new standard is reached and the new types of instrument cords render obsolete the impregnated and rubber-lapped varieties formerly chosen for service in tropical countries.

At the same time improved methods of finishing have been introduced, the principal alteration being in the termination and binding of the "ends." This is illustrated in the accompanying diagrams which show the final operations in the manufacture of a cord of the new waterproof type. It will be seen that the V I.R. sheath is left uncovered by the cotton braiding after the tinsel conductor has been wired and looped. The advantage will be obvious, for along the whole length of the cord there is no contact between the tinsel and the outside cotton braiding. Leakage, which might otherwise take place when the cotton is laden with moisture, is thus prevented.

With regard to textiles employed for braiding it may be of interest to note that the adoption is contemplated of a new class of dyes claimed to give colours which are fast to intense sunlight. Comparative tests are at present being carried out in order to ascertain whether such dyes are definitely superior to those now used.