Twin Potentiometers

Invented by Ákos Kun, Electr. Eng., Budapest

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The twin potmeters embodied in the invention represent a novel compound layer-type passive circuit element, suitable for not only performing the control tasks usually met in telecommunication and instrument engineering, as well as in automatics, better and more simply than the previous devices, but also accomplishing more complex control functions.

Rheostats are used almost everywhere in electronics. Rheostats are mostly potentiometers, having the most diverse functions and designs. Of these, the lacquer film-type potmeters have gained the greatest popularity, due to their properties offering special advantages in electronics. Irrespective of their design, the models of such potmeters used so far could be divided to three main sections: resistance path, limit position outlets located at both ends of resistance path, and slide contact. The latter usually consists of a flexible metal plate, with one endfastened to a rotating shaft or slide shaft, and the other end carrying a contact point, either formed out of the plate itself by pressing, or made out of

a graphite pin. In most fields of electronics, and mainly in telecommunication engineering, it is absolutely essential to keep noise level as lowe as feasible. Since friction noise can be cut most effectively by using graphite insert contacts instead of metallic ones, the potmeters used in Hi-Fi engineering are almost invariably lacquer film-type models, with graphite inserts.

In view of the fact that twin potmeters are used in telecommunication engineering first of all in Hi-Fi amplification engineering and studio equipment in general, the slide contact of the twin potmeters embodied in the invention is also fitted with a graphite contact point. The contact armament and resistance path of the twin potmeters have, however, been designed along other lines /Fig. 1/.

By following the two overlapping resistance paths with attention, it is apparent that the twin potmeters dealt with here actually are two potmeters of the traditional design, assembled into a single unit. As a result, also a third outlet is established beside the two limit position outlets. The thirrd outlet is a common earth terminal outlet for the twin potmeters. On the potmeters generally used at present, residual resistance is reduced by a thin layer of silver applied

on the contact surface of the resistance path. In our case, the silver coating can be applied only at the two limit position outlets, or maximum outlets, but not at the earth outlet. Thus in order to eliminate interference between the two channels, the common earth armament of the twin potmeters embodied in the invention need be designed along other lines.

So as not to let the adjoining layers be sharply separated from each other, it is advisable to apply a narrow silver coat on the common earth connection of the two resistance paths of the assembly. As the following step, a border layer of silver, amounting to only a few microns in thickness, should be applied on the entire cross-sectional area between the resistance paths. Directly based on the insulating base plate, that layer of metal, along with the surface layer of silver, forms the common earth terminal outlet of the twin potmeters.

Similarly to the traditional potmeters, the invention can also be made with a resistance path of linear, logarythmic, negative logarythmic or any other type of characteristic /Fig. 2/. In our case, following from the twin character of the unit, a special /e.g. logarythmic/ resistance path would result in obtaining a parabolic characteristic curve. Since

these characteristic curves cannot be compared to the control characteristic of any potmeter used at present, on Fig. 1 a practicable legend is given for the twin potmeters, whereas Fig. 2 shows markings of the characteristic curve, based on the Latin letters bearing some resemblance to them.

Similarly to the sliding or shaft-mounted potmeters of traditional designs, the twin potmeters embodied in the invention can also be made in stereophonic or quadrophonic design. The type marks recommended for the models are shown on Fig. 2, with the first figures standing for the rating of the first resistant path in question, and the second figure for the other one.

By putting the design of the twin potmeters of the invention into practice, the individual control tasks can be performed more simply and reliably, and at a higher quality, than with the potmeters known so far. E.g. in studio engineering, when several programme sources are received simultaneously, the use of a twin potmeter unit renders the application of galvanic separator units unnecessary at the inputs of output amplifier stages. This is so because the slide contact-type output of the twin potmeters can be directly coupled to the input of the amplifier stage, and for

changing over from the reception of one programme to another /input of connection "A", input of connection "B"/ it is sufficient to merely flick over the slide of the device. The method can be adopted to advantage to a number of special fields, e.g. on disco desks. In order to render the controlling of the unit more easy, a central position arrester illustrated on Fig. 1 can be mounted, which greatly facilitates controlling down of a programme previous to gradually changing over to another programme.

However, the twin potmeters embodied in the invention can be used not only in telecommunication engineering, but also in automation, where a variety of novel control tasks can be solved by them. On Figs. 3/a - b - c the fundamental circuit and control characteristic of fundamental automatic control element are shown; the element can be made up of twin potmeters with linear, logarythmic and negative logarythmic characteristic curves.

Being highly suitable for meeting the highest requirements made with Hi-Fi equipment, the twin potmeters embodied in the invention, can be very well used as a balance potmeter as well. The fundamental circuitry of a completely interference-free balance potmeter is shown on Fig. 3/d.

Claims of patent:

1./ Twin potmeters, characterized by two overlapping resistance paths /1, 2/, two independent limit position outlets /3, 4/, a common earth terminal outlet /5/ made out of a metal layer on the matching surfaces of two resistance paths, a mechanical retaining lock at central position /6/ and the symbol marks /7/ recommended.

2./ A practical variant of the design claimed under Para. 1, characterized by a pair of straight or circular resistance paths with linear characteristics /1, 2/ and the type mark recommended /8/.

3./ A practical variant of the design claimed under Para. 1, characterized by a pair of straight or circular resistance paths with logarythmic characteristics /1, 2/ and the type mark recommended /9/.

4./ A practical variant of the design claimed under Para. 1, characterized by a pair of straight or circular resistance paths with negative logarythmic characteristics /1, 2/ and the type mark recommended /10/.

Ákos Kún

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The twin potmeters embodied in the invention represent a compound layer-type passive circuit element of a novel design suitable for not only performing the control tasks usually met in telecommunication and instrument engineering, as well as in automatics, better and more simply than the previous devices, but also accomplishing more complex functions. By means of the twin potmeters the use of galvanic separator units can be disposed with in studio engineering, whereas in Hi-Fi amplifying engineering the invention can be used also as a balancing potmeter ensuring complete interference-free reception between the channels to be controlled.