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POTENTIOMETERS

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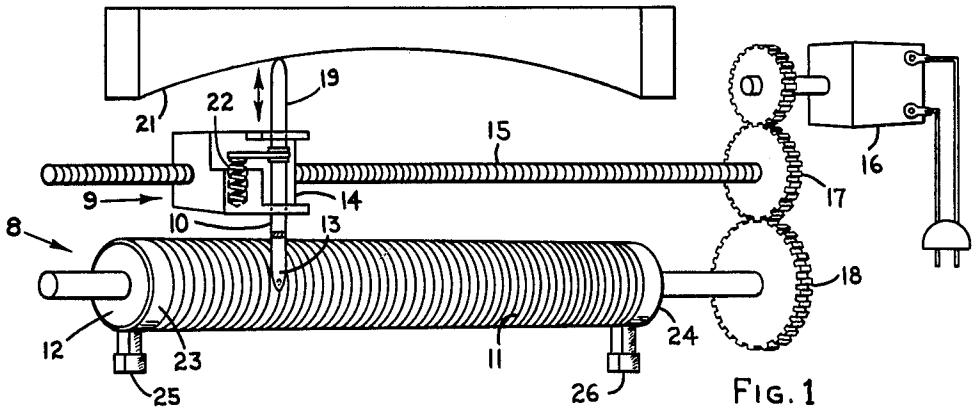


FIG. 1

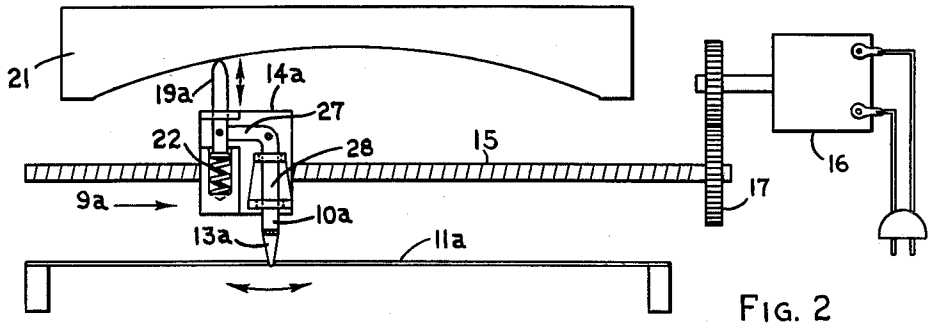


FIG. 2

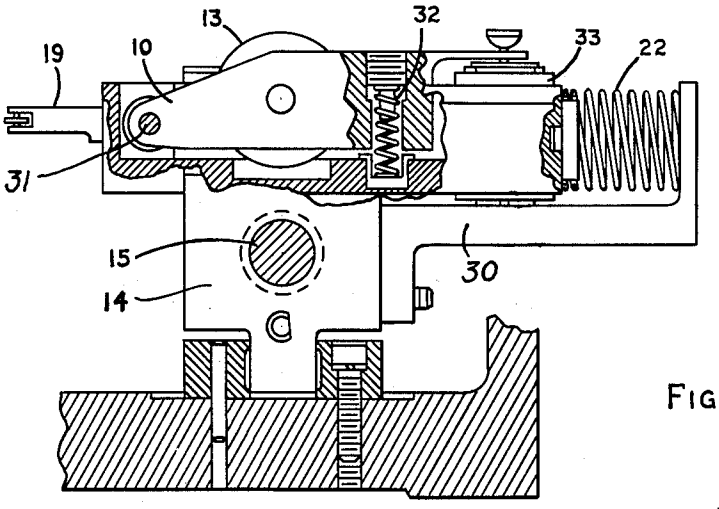


FIG. 3

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POTENTIOMETERS

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The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royaltis thereon or therefor.

The present invention relates to a potentiometer which is constructed to acheive a very high degree of linearity in response over its complete range, such as would be suitable for use as a comparison standard.

In the prior art such standards were corrected at specific points so that it was necessary in use to adjust the standard and the potentiometer under comparison to those specific points. Such a procedure made the process of comparison both long and tedious and also limited the test to those fixed points.

The present invention provides a potentiometer having means for producing a continuous response which has been corrected to achieve the degree of linearity required in a comparison standard. Such linearity of response permits the comparison test to be continuous rather than a step by step test.

The objects of the present invention are:

(*a*) To provide a potentiometer having a linear response.

(*b*) To provide a potentiometer whose response is corrected for deviation from a linear response.

(*c*) To provide a potentiometer suitable as a test standard.

(*d*) To provide a potentiometer whose change in resistance is continuously variable, as distinguished from a step by step change in resistance.

Other objects and features of the invention will become apparent to those skilled in the art as the disclosure is made in the following detailed description of a preferred embodiment of the invention as illustrated in the accompanying sheet of drawing in which:

Fig. 1 is a diagrammatic plan view of the invention,

Fig. 2 is a modification of Fig. 1, and

Fig. 3 is a detail view of the pick-up and cam follower used in Fig. 1 with parts broken away.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in Fig. 1 a resistance winding **11** of a potentiometer **8** which is spirally wound on a drum **12**. A contact member **13** carried on an arm **10** which is mounted on a carrier **14**, which in turn is carried by a lead screw **15**. The lead screw **15** is made to have the same pitch as the winding **11**. The lead screw **15** and drum **12** are driven from a common source of power **16** and are so geared together by gears **17** and **18** that as the drum **12** rotates contact **13** is maintained in engagement with winding **11**. The contact **13** is movably mounted on carrier **14** and has associated with it a cam follower **19** which is spring pressed into engagement with a cam **21** by a spring **22**. The cam **21** is empirically contoured to vary the position of the contact **13** as it moves from one end to the other of the potentiometer winding to correct the response of the potentiometer for deviations from a linear response. To provide for the electrical

circuit, drum **12** is covered with an insulated material to receive winding **11** and is provided with slip rings **23** and **24** which make contact to stationary leads through brushes **25** and **26**. The contact **13** is insulated from the arm **10** on which it is carried.

In the modification as shown in Fig. 2 the drum and spiral winding has been replaced by a straight wire **11***a*. The contact mechanism has been changed to convert the reciprocating motion of cam follower **19***a* to reciprocate motion at right angles thereto by introducing a bell crank having an arm **27** pivotally attached to cam follower **19***a* while the other arm **28** is fixed to the contact arm **10***a*. The juncture of the arms **27** and **28** is pivoted to the carrier **14***a* at **29**. In Fig. 2 the numerals **16**, **17**, **21** and **22** refer to the same components as in Fig. 1 while **9***a* and **13***a* refer to the modified contact mechanism and the modified contact respectively.

The form of Fig. 1 is the preferred form because the length of the wire for a given size device is greater thus allowing greater accuracy in a reasonably compact instrument.

Referring now to Fig. 3 for a more detailed description of the contact mechanism **9**. The carrier block **14** is threadedly engaged on lead screw **15** and carries a sliding member **30**. Member **30** has at one end the cam follower **19** and carries the contact arm **10**. Contact arm **10** is pivoted to the mounting at **31** and carries the contact **13** in the form of a pivoted wheel. The contact arm **10** is biased to maintain engagement between the contact **13** and the winding **11** by a spring **32**. Optionally, there may be provided a solenoid **33** for retracting the contact **13** out of engagement with the winding **11**.

In operation, as drum **12** is rotated lead screw **15** advances the contact along the winding **11** while the cam follower **19** acts to vary the position of the contact **13** to continuously compensate for deviations of the potentiometer response from linearity.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A potentiometer comprising, a resistance element, a linearly slidable contact member having a contact in slidable engagement with said resistance element, a lead screw in threaded engagement with said slidable contact member carrying said slidable contact member for positioning the contact thereof, a cam surface in parallel relation to the linear motion of said slidable contact member, and a cam follower means on said slidable contact member in following engagement with said cam surface for producing a motion transversely to the linear motion of said slidable contact member for introducing a variation in positioning the contact of said slidable contact member with respect to said resistance element to correct for nonlinearity of said potentiometer response.

2. A potentiometer as set forth in claim 1 wherein said cam follower means is spring biased into engagement with said cam surface.

3. A potentiometer as set forth in claim 2 wherein said cam follower means includes a follower member reciprocable with respect to said slidable contact member.

4. A potentiometer as set forth in claim 1 wherein said resistance element consists of a resistance winding on a rotatable drum being driven in direct relation with said lead screw in which said lead screw has the same pitch as the resistance winding.

5. A potentiometer as set forth in claim 1 wherein said resistance element consists of a straight wire parallel to the linear motion of said slidable contact member and said cam follower means includes a cam follower coupled

to the contact of said slidable contact member through linkage to vary the motion of said contact longitudinally of said straight wire.

6. A potentiometer comprising, a resistance element, a linearly slidable contact member having a contact in slidable engagement with said resistance element, a lead screw in threaded engagement with said slidable contact member carrying said slidable contact member for positioning said contact thereof, power means coupled to said lead screw for driving said slidable contact member along said screw, a cam surface in parallel relation to the linear motion of said slidable contact member, and a cam follower means on said slidable contact member in following engagement with said cam surface for producing a motion transversely to the linear motion of said slidable contact member for introducing a variation in positioning said contact of said slidable contact member with respect to said resistance element to correct for nonlinearity of said potentiometer response.

7. A potentiometer comprising; a rotatable drum having a resistance wire wound helically thereon; a contact member having a contact element thereon engaging said

resistance wire; a lead screw threaded through said contact member lying parallel to the axis of said rotatable drum for threadedly carrying said contact member along said rotatable drum, said rotatable drum and said lead screw having the same helical pitch and being rotated in unison for continuously positioning said contact element along said resistance wire; a cam surface in parallel relation with said rotatable drum axis; and a reciprocable cam follower means carried by said contact member coupled to said contact element and engaging said cam surface for reciprocating said contact element normal to the direction of motion of said contact member whereby said contact element is deviated along said resistance wire in accordance with linearity corrections of potentiometer response.

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