

March 24, 1936.

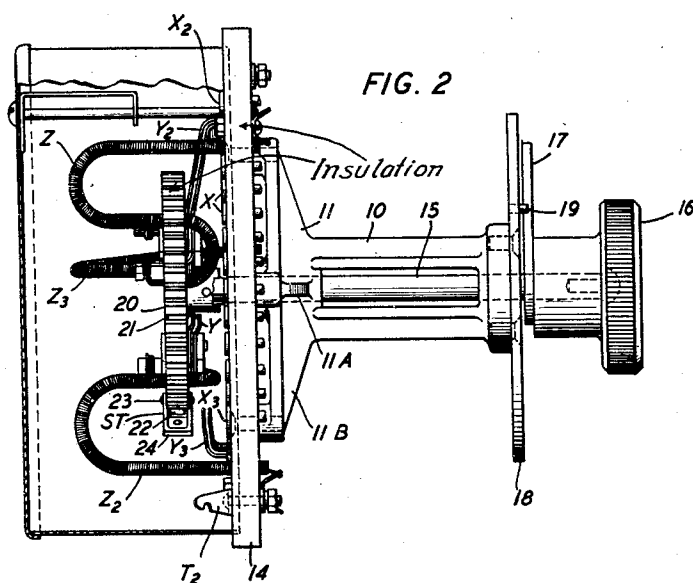
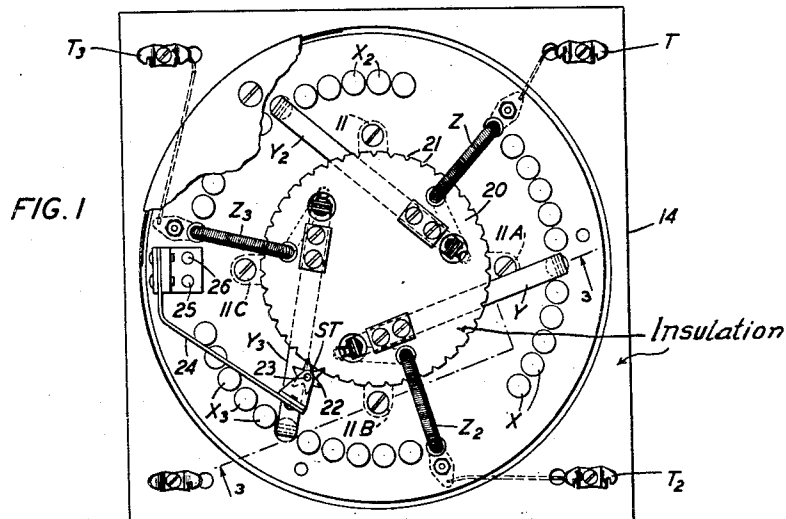
W. H. HARVEY

2,034,866

SWITCHING DEVICE

Filed May 25, 1935

2 Sheets-Sheet 1



INVENTOR
W. H. HARVEY
BY *J. MacDonald*
ATTORNEY

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FIG. 4

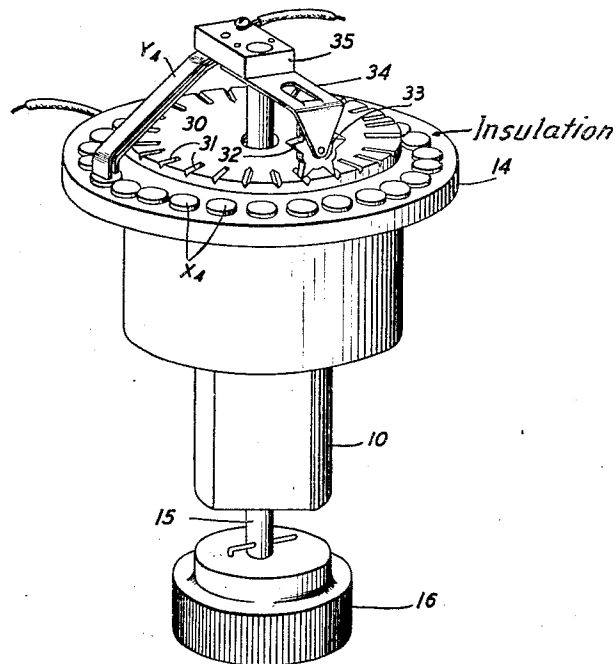
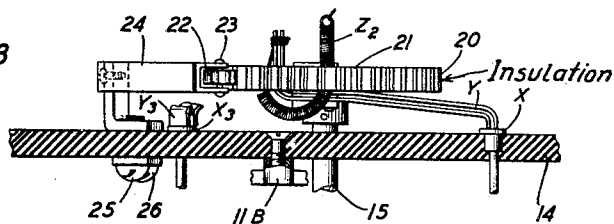


FIG. 3



INVENTOR
W. H. HARVEY
BY *J. MacDonald*
ATTORNEY

UNITED STATES PATENT OFFICE

2,034,866

SWITCHING DEVICE

William H. Harvey, Brooklyn, N. Y., assignor to
Bell Telephone Laboratories, Incorporated,
New York, N. Y., a corporation of New York

Application May 25, 1935, Serial No. 23,354

6 Claims. (Cl. 200—11)

This invention relates to improvements in switching devices of the potentiometer type, for example, in which a wiper is moved in engaged relation with associated contacts through the movement of a manually rotatable shaft and the object of this invention is to provide a centering mechanism whereby the wiper is moved in adjusted position with respect to associated contacts in a simple and positive manner, such mechanism maintaining its adjustment after a relatively great number of switching operations.

In accordance with this invention the shaft of the switching device is provided with a resilient arm which serves to hold a star wheel in operative relation with a notched member in which the teeth of the star wheel engage in its planetary movement upon the operation of the switch shaft, the angular movement of the star wheel within the limits determined by the spacing of its teeth being effective to tension its supporting arm to a point where the tension of this arm tends to impart motion to the star wheel to a stop afforded by the engagement of two adjacent teeth of the star wheel on the surface of the toothed member, thus automatically moving the switch shaft for centering the wiper carried thereby on its adjacent contact.

Other features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawings in which:

Fig. 1 is a plan assembly view;

Fig. 2 is a side view showing the casing with portions cut away;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1; and

Fig. 4 is a modification of the centering device shown in Fig. 1.

The switching device to which the centering mechanism of the invention is adapted for use may consist of a bracket 10 terminating at one end with a plurality of spider arms such as 11, 11A, 11B and 11C provided for mounting an insulating disc member 14 having a plurality of sets of contacts X, X1, and X2 disposed in arcuate rows as shown in Fig. 1.

In bracket 10 there is journaled a shaft 15 having at one end a knob 16 to which is secured a pointer 17 movable in juxtaposition to a dial 18 secured to the end of bracket 10 opposite the disc 14. A pair of pins such as 19 mounted on dial 18 cooperate with the pointer 17 for limiting the angular movement of shaft 15 and on the other end of this shaft is securely mounted a disc 20 of insulating material. On disc 20 is mounted

a plurality of tangentially disposed wipers Y, Y2 and Y3, provided for engaging the rows of contacts X, X2 and X3, respectively upon a movement of the knob 16. This disc is provided at its periphery with a plurality of substantially V-shaped grooves or notches 21 for engaging the teeth 22 of a star wheel ST rotatably mounted on pivot 23 at the free end portion of a spring member 24, this member being secured on the insulating disc 14 as by screws 25 and 26 and is normally tensioned for holding the star wheel ST with a predetermined pressure against the periphery of disc 20.

Wipers Y, Y2 and Y3 adjacent their secured ends connect with the wires Z, Z2 and Z3 having their other ends connected to respective terminals T, T2 and T3, shown in Fig. 1, the contact members X, X2 and X3 having reduced portions as shown in Figs. 2 and 3 extending to the front side of their supporting disc 14 for connection with resistance or any other electrical devices the operation of which it is desired to control.

In the modification of the centering device shown in Fig. 4 a metallic disc 30 is securely mounted on the insulating disc 14 and is provided with a plurality of radially disposed notches 31 for engaging the teeth 32 of a star wheel 33 rotatably mounted at the end of a spring arm 34 carried by an insulating block 35 at the end of shaft 15. This spring arm is normally tensioned for holding the wheel 33 with a predetermined contact pressure on the face of notched disc 30 and on the block 35 is also mounted a wiper Y4 provided for engaging the contacts X4 disposed in a circular row on the insulating disc 14.

In the operation of the switching device shown in Figs. 1, 2 and 3 a turning movement of knob 16 is effective to rotate the insulating disc 20 and the wipers Y, Y2 and Y3 carried thereby for successively engaging the contacts X, X2 and X3 within the limit determined by the stops afforded by the cooperation of pins 19 and the pointer 17. The turning movement of disc 20 is effective to rotate the star wheel due to the engagement of its teeth 22 with the notches 21 at the periphery of disc 20 whereby the passing of any one of the teeth 22 to a point radial to the disc 20 is effective to further tension the spring arm 24, the release of which upon a continued movement of disc 20 is effective to impart a rotary movement to the star wheel and to the disc 20 due to its one point contact with this disc for moving the wipers Y, Y2 and Y3 in centered relation on their associated contacts X, X2 and X3 which correspond to a point wherein two adjacent teeth 22

engage adjacent notches 21 in the disc 20, such position being indicated by the position of pointer 17 and the cooperating marks (not shown) appearing on the face of the disc 18.

5 Similarly in the modification shown in Fig. 4 the rotative movement of knob 16 is effective to move the wiper 14 on the contact X4 and the spring arm 34 for rotating the star wheel 33 through its engagement with the radial slots 31 in the face of the disc 30 the movement of the star wheel 33 being effective to successively tension the spring arm 34 upon the passing of each tooth in line perpendicular to the plane of the disc 30 wherein the tension of arm 34 is effective to impart a continued movement to the star wheel due to a one point contact of this wheel on the face of disc 30 and thereby causing a further movement to the switch shaft for positioning the wiper Y4 in centered relation on its associated contacts X4 where the shaft 15 is brought to rest through the stop afforded by the engagement of two adjacent teeth of star wheel 32 in adjacent slots in the disc 30.

While the centering device of this invention is described in connection with a switching device in which a wiper shaft is rotated as to impart a planetary movement to the star wheel it is understood that this centering device may be used where the wiper is operated in a rectilinear movement which may be reciprocatory or continuous and that minor other changes may be made in the device of this invention without departing from the scope of the appended claims.

What is claimed is:

35 1. In a centering device for two relatively movable elements, said device comprising a member having notches, a star wheel, spring means for yieldably holding said star wheel in engaged relation with said member, and means for operating said member and said wheel relatively for successively tensioning said spring, the release of which is effective to position said elements with reference to stops afforded by the engagement of two adjacent teeth of said star wheel with two adjacent notches in said member.

45 2. In a switching device, the combination with a mounting having a plurality of contacts and a wiper for engaging the contacts of means for centering said wiper on said contacts, said means comprising a member having notches, a star wheel, and spring means for yieldably holding said star wheel in engaged relation with said member whereby the operation of the switching device is effective to successively tension said spring means, the release of which is effective to impart a further turning movement to said star wheel and the switching device for centering the wiper on the contacts.

3. A switching device comprising a mounting, a rotatable shaft, a plurality of contacts disposed in row on said mounting, a wiper carried by said shaft and movable for engaging said contacts, a resilient arm carried by said shaft, a star wheel mounted on said arm and a disc having notches engaged by said wheel, the movement of said wheel being effective to successively tension and release said arm for causing the operation of said star wheel and said shaft at each release for centering said wiper on said contacts.

4. A switching device comprising an insulating mounting, contacts disposed in row on said mounting, a rotatable shaft, a wiper carried by said shaft for engaging said contacts successively, a notched disc carried by said mounting, a spring arm carried by said shaft, a star wheel rotatably mounted on said arm and held in engaged relation with said disc through an initial tension of said arm, and means for moving said wheel on said disc for successively imparting further tension to said arm, the successive release of which being effective to automatically impart movement to said star wheel and said shaft for adjustably positioning said wiper on said contacts.

5. A switching device comprising a mounting of insulating material, a shaft journaled in said mounting, a wiper carried by said shaft, a plurality of contacts disposed in row on said mounting in engageable relation with said wiper, means for moving said shaft and said mounting relatively for moving said wiper successively on said contacts, a notched member secured to said mounting, a spring arm carried by said shaft, a toothed wheel carried by said arm and engaging said member, means for operating said shaft to cause the operation of said wheel in a planetary movement on said disc for successively tensioning said arm, the tension of said arm being effective to impart movements to said wheel and said shaft for adjustably positioning said wiper on said contacts.

6. A potentiometer comprising a circular row of contacts, a wiper, a shaft for moving said wiper in engaged relation with said contacts successively, a disc secured on said mounting in position concentric with respect to said contacts, said disc having notches, a star wheel disposed at right angles with respect to the plane of said disc and a spring arm for resiliently holding said star wheel in engaged relation with said disc, the movement of said shaft causing said star wheel to engage the notches in said disc to successively tension said arm for adjustably positioning said wiper on said contacts.

WILLIAM H. HARVEY.