Aug. 24, 1948. R. I. ROTH 2,447,819

COMMUTATOR

Filed July 11, 1945

FIG. 1.

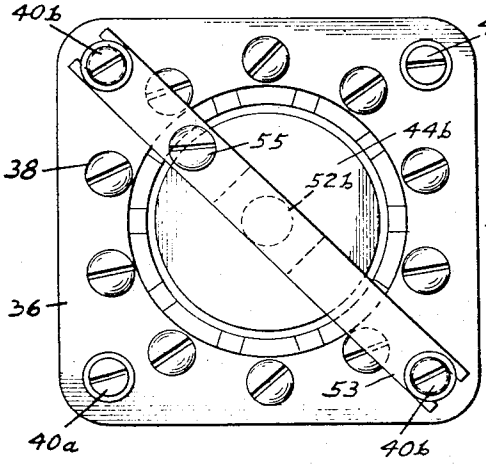


FIG. 2.

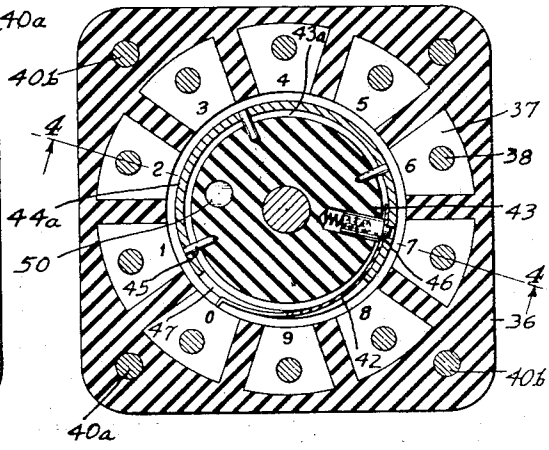


FIG. 3.

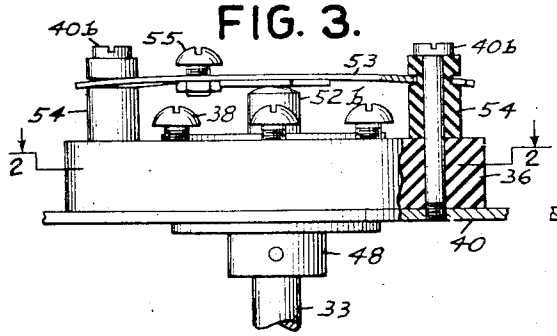


FIG. 4.

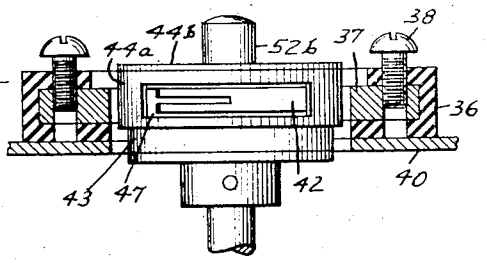
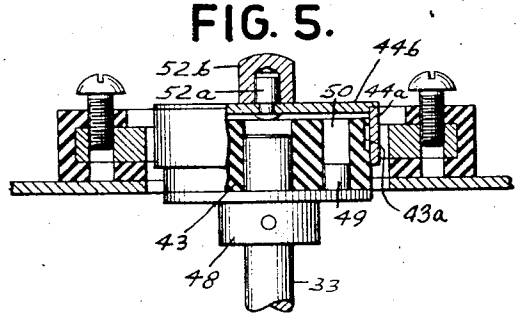


FIG. 5.



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COMMUTATOR

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Application July 11, 1945, Serial No. 604,484

2 Claims. (Cl. 200—8)

1

This case relates to the value readout commutator per se shown, but not claimed, in application Serial No. 585,996, filed March 31, 1945, and of common ownership with the present case.

A value readout commutator is used in the denominational order of a value register, which may be a counter or totalizer, to provide for selectively closing a readout circuit in accordance with the digit standing in the register order. The readout circuit may operate a relay which itself may store the digit or which may control the setting of a type bar, punch interposer bar, or lamp indicator, etc.

The object of the present invention is to provide a novel value readout commutator which may be assembled and removed readily from a denominational order shaft of a value register.

The object of the invention is, also, to provide a value readout commutator which has a rotor movable in either of opposite directions and mounting a brush which may wipe the commutator segments with equal facility while the rotor is moving in either direction.

While a value readout commutator has been referred to above, it is understood that the invention applies to commutators or the like generally.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which disclose, by way of examples, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a plan view of the readout commutator.

Fig. 2 is a horizontal section through the commutator taken generally along line 2—2 of Fig. 3.

Fig. 3 is a side view, partly sectioned, of the commutator.

Fig. 4 is a section through the commutator moulding and taken generally along line 4—4 of Fig. 2 but showing the rotor in full.

Fig. 5 is a similar section through the commutator moulding but with the rotor partly in section.

In detail, the readout commutator comprises a moulding 36, of insulating material, fixed to the frame plate 40. Imbedded in the moulding 36 are ten equally spaced, conductive value segments 37 corresponding to values 0 to 9. Threaded into each segment is a terminal screw 38 which is wired into an individual value readout circuit (not shown). The rotor of the commutator comprises a brush carrier including a collar 43, of insulating material, which fits freely

2

over the end of the operating shaft 33, and rests on top of a flange formed on a metal collar 48 which is pinned to the shaft 33. An off-center pin 49 projecting from the flange of collar 48 fits into a hole 50 in the collar 43, whereby the collar 43 and the shaft 33 are coupled for common turning. Surrounding the upper portion of collar 43 is a band 44a of conductive metal. Three pins 45 connect the collar 43 and band 44a, forcing them to turn as a unit. It is seen that band 44a forms a conductive rim of the brush carrier 43—44a. Collar 43 has a circumferential groove 43a which faces the inside of band 44a. The band 44a is provided with a segmental slot 47 for a purpose which will soon be clear. Groove 43a is thus a substantially completely enclosed internal arcuate channel in the brush carrier 43—44a. The commutator brush 42 is made of conductive, spring metal and is curved to roughly approximate the circumference of the collar 43. Brush 42 has a thickness slightly less than the depth of the groove 43a. The rear portion of the brush is placed in the groove 43a so that a hole therein is alined with a hole in the band 44a. The reduced end of a spring-pressed plunger 46, carried by collar 43, passes through the hole in the brush and into the hole in the band 44a, thereby securing the brush to the rotor for common turning. The shoulder of the plunger, behind its reduced end, presses against the brush to restrict its play inside the groove. The greater portion of the brush, extending forwardly from its rear portion, passes outwardly through the slot 47, and the brush is so flexed that its wiping end presses against the inner surfaces of the moulding 36 and of the value segments 37 which end flush with the inner circumference of the moulding. Further, the wiping end of the brush is bent in a radial direction to enable it to wipe the segments and moulding with equal facility whether the rotor is moving clockwise or counterclockwise. It will be seen that the curve of the brush, its retention at the rear in the circumferential groove 43, and its mounting is such that any frictional resistance to its turning, in either direction, imparts a substantially circumferential thrust to the brush. This thrust is taken up by the reduced end of the plunger 46. Thus, in the turning of the brush in either direction, there is no tendency for the brush to be swung bodily about its point of support on the rotor, whereby the brush does not impede turning of the rotor in either direction except for such slight resistance as may be due solely to the friction between

its wiping end and the inner surfaces of the moulding and the value segments.

Freely fitted onto the upper rim of the band 44*a* is a cover 44*b* of conductive metal and which is provided, at its center, with a conductive metal pin 52*a* which extends upwardly. A cup-like bushing 52*b* of conductive material, such as carbon, freely fits over the pin 52*a*. The moulding 36 is secured at the four corners to the plate 40 by four screws, each of which passes freely through the moulding and is threaded into the plate 40. Two of these, diagonally opposite screws are designated 40*a* and are short. The other two, diagonally opposite fastening screws are designated 40*b* and are long so as to provide portions extending a distance above the moulding 36 and freely carrying insulating posts 54. These posts are grooved to receive the open-slotted ends of a bridging piece 53. The piece 53 is a metallic, conductive leaf spring and is thickened at the middle where it presses down on the cup 52*b* so as to serve as a contact strap. A terminal screw 55 is fastened to the bridge piece 53 and may be wired into a common side of the value readout circuits. Thus, when the brush 42 engages a value segment, a conductive connection is made from the value segment through the brush to the band 44*a*, thence to the cover 44*b*, cup 52*b*, bridge piece 53 and terminal screw 54.

The readout commutator may readily be attached or detached. To remove the moulding 36, the screws 40*a* and 40*b* are released from the plate 40. The posts 54 and bridge piece 53 also are lifted by removing the moulding. The cover 44*b* and cup 52*b* may then be freely lifted off the band 44*a*. Thereafter, the rotor, together with brush 42, may be freely lifted off the flange of the collar 48. It should be noted, when the readout commutator is attached to the machine in operative condition, that the bridge piece 53 is so located as to press firmly on the top of cup 52*b*. Such pressure engagement, however, does not interfere with the turning of the rotor of the value readout commutator. At the same time, the bridge piece 52 retains the cover 44*b* in operative position on the upper rim of band 44*a* of the rotor and also retains the rotor in operative position on shaft 33. To enter a value in the register order of which the commutator is a part, the shaft 33 is turned in proportion to the value to be entered. The rotor, along with brush 42, turns with the shaft 33 and the brush engages a value segment at the end of the entry movement. A readout circuit may thereafter be established through the readout commutator for reading out the value which is represented by the value segment engaged by the brush.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A commutator comprising a round, turnable brush carrier constructed along a portion of its periphery with a substantially completely enclosed internal, arcuate channel, a ring of contact segments surrounding the carrier, a flexible, single-piece plate brush having a curvature approximating the curvature of the channel and fitting at the rear into the channel, the forward integral portion of the brush extending outwardly past an end of the channel and terminating in an integral wiping tip bent radially, whereby the tip wipes the segments with equal facility when the carrier turns in either direction, the wiping resistance, owing to the curvature of the brush and its confinement in said channel imparting a thrust lengthwise of the brush whereby tendency of the brush to shift radially of its length, relative to the carrier, is avoided, and a spring-pressed plunger mounted on the brush carrier so as to releasably engage its outer end in a hole in the rear portion of the brush for releasably pinning the brush to the carrier to retain it in fixed position on the carrier and to take up the aforesaid thrust.

2. A commutator comprising an insulating block formed with a circular opening and mounting a ring of contact segments terminating flush with the wall of the circular opening, a turnable brush carrier surrounded by said wall and carrying a brush to wipe the contact faces of the segments, said carrier being constructed with a conductive rim in engagement with the rear portion of the brush, a conductive cap freely, loosely and removably sitting on the conductive rim and provided with an outside knob, insulating posts provided at diametrically opposite sides of the block, and a contact strap, of spring metal, bridging said posts and having frictional, pressure engagement with the top of said knob, whereby potential may be applied to the brush by way of the contact strap, the knob, the cap, and the conductive rim, the contact strap, by pressing on said knob, also maintaining said cap firmly seated on said conductive rim.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
746,770	Wilson	Dec. 15, 1903
1,195,063	Moeller	Aug. 15, 1916
1,522,455	Hougen	Jan. 6, 1925