Feb. 28, 1939. H. E. METCALF 2,148,489

ROTATION INDICATING SWITCH

Filed May 31, 1938

Fig. 1.

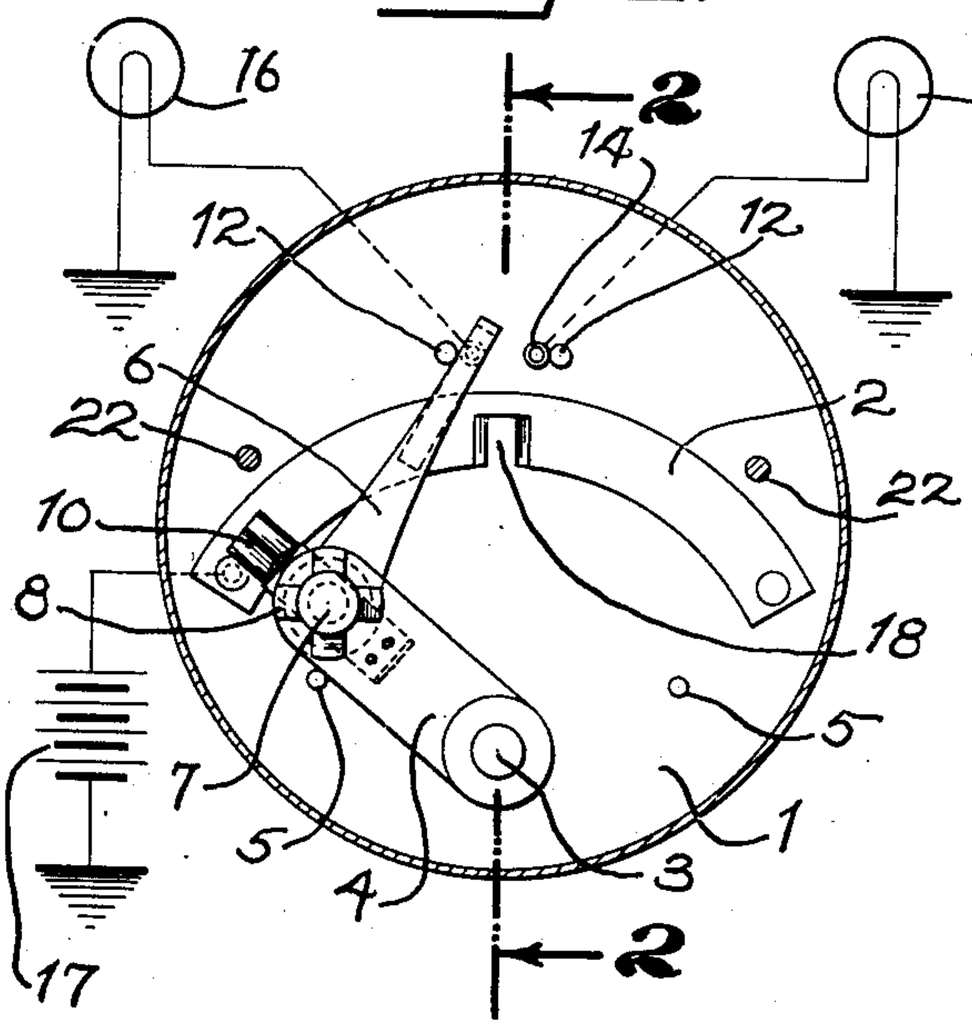


Fig. 2.

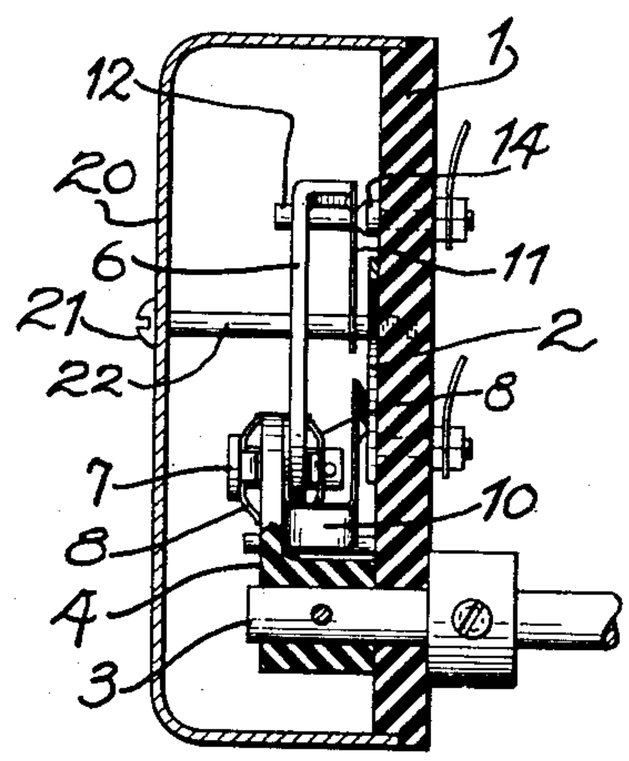


Fig. 3.

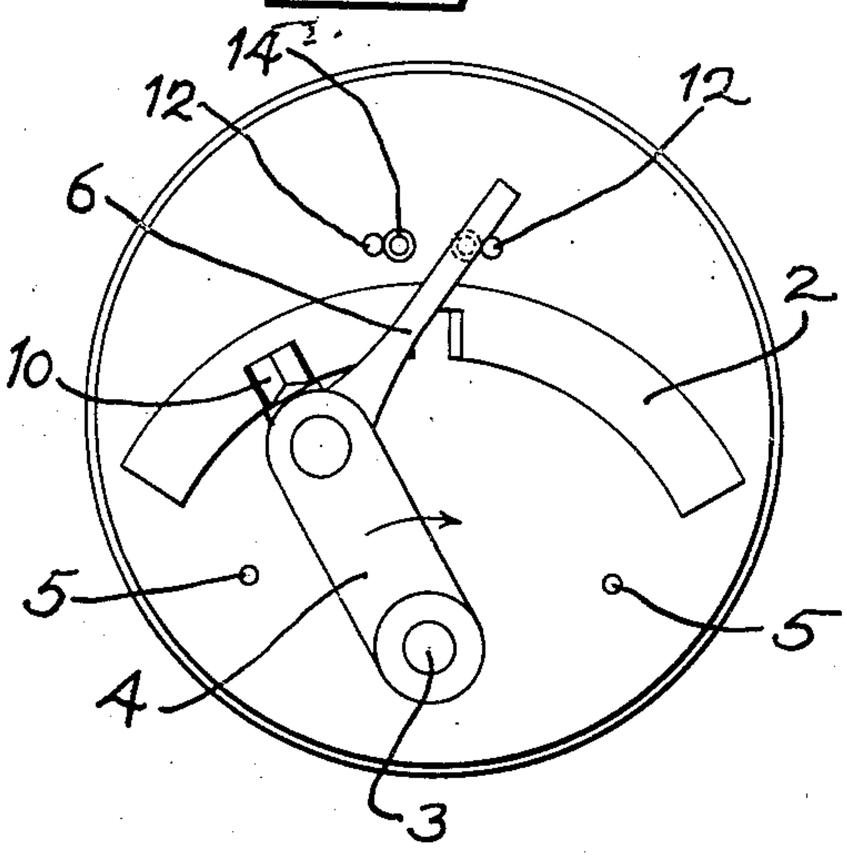
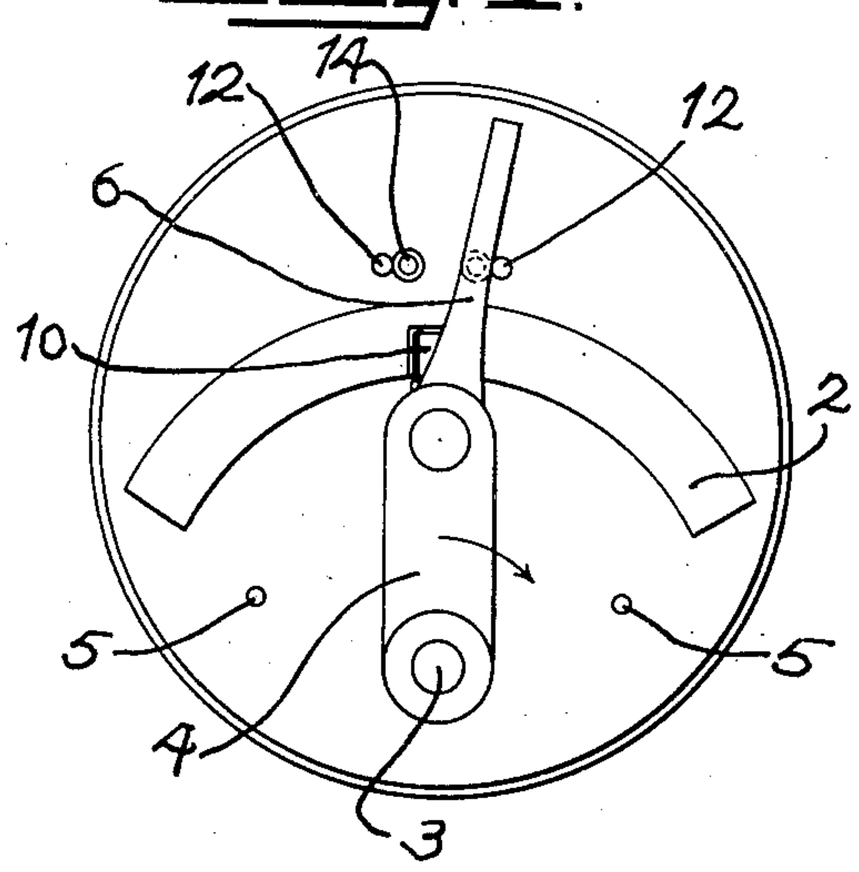


Fig. 4.



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Patented Feb. 28, 1939

2,148,489

UNITED STATES PATENT OFFICE

2,148,489

ROTATION INDICATING SWITCH

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Application May 31, 1938, Serial No. 210,837

4 Claims. (Cl. 200—6)

My invention relates to rotation indicating switches, and more particularly to switches wherein contacts are made and broken in accordance with the direction of rotation of an element.

Among the objects of my invention are: To provide a rotary switch operating only upon change of direction of rotation; to provide a switch member having a limited path of movement, driven by a member having a larger path of movement; to provide a switch having a continuous wiping contact; and to provide a rotation indicating switch suitable for use in signalling systems such as, for example, direction indicating systems for vehicles.

Other objects of my invention will be apparent or will be specifically pointed out in the description forming a part of this specification, but I do not limit myself to the embodiment of the invention herein described, as various forms may be adopted within the scope of the claims.

Referring to the drawing:

Fig. 1 is a face view partly in section and partly in elevation of one preferred form of switch embodying my invention, together with a circuit such as might be used to indicate vehicle direction.

Fig. 2 is a sectional view, taken as indicated by the line 2—2 in Fig. 1.

Figs. 3 and 4 are diagrams showing the switch in different positions during its operational cycle.

In vehicle signalling systems it is common practice to attach a vehicle signalling switch to the quadrant axle of the vehicle steering gear, and this axle, during the steering cycle, rotates over an arc of approximately 60°. In such a system it is desirable that signals be changed upon any reversal of motion of the steering gear, and furthermore, that signals be entirely eliminated in the straight-ahead position of the steering gear. The switch herein to be described is modified to accomplish these latter purposes, but it will be apparent to all those skilled in the art that it can be utilized to indicate any change in direction of rotation of a member where that member has a total arc of rotation of somewhat less than 180°.

Referring directly to the drawing for a more detailed description of my invention in its preferred illustrative form, a foundation block 1, preferably of insulating material, is provided with a sector contact 2 positioned in an arc of a circle inscribed around the axis of a shaft 3, and this shaft 3 is to be rotated by the driving mechanism, whatever it may be, in this instance the quadrant axle of a vehicle steering gear, or any other geared down connection to the steering mechanism, so that the shaft 3 will not rotate over more than approximately 90°.

In this particular instance I have shown a rotating arm 4 of insulating material, rigidly rotated by shaft 3 within a 90° arc, as determined by stop pins 5, this arm having pivoted thereto, near the end thereof, a contact arm 6, by the use of a pivot pin 7. This pivot pin passes through both the rotating arm and the contact arm, and is provided above and below with spring washers 8, thereby forming a frictional connection between rotating arm 4 and contact arm 6.

Rotating arm 4 has attached thereto, between the pivot pin 7 and the axle 3, a reflexed brush 10 extending beneath the pivot pin and terminating on contact sector 2. The end of contact arm 6 is provided with a contact brush 11, reflexed beneath the contact arm and elongated toward the pivot pin 7 for approximately half the length of arm 6, in accordance with the travel required.

With the axis of shaft 3 as a center, arm 6 is maintained within a limited arcuate path by contact arm pins 12, each one having adjacent thereto a contact 14, so that as arm 6 strikes pins 12, brush 11 will ride upon contacts 14.

In the preferred circuit shown in Fig. 1, I connect contact 14 on the right side of the switch to a right indicating lamp 15, and connect contact 14 on the left side of the switch to a left indicating lamp 16. I then connect conductive sector 2 to a source of electrical energy 17, the circuit to the signal lamps being completed through ground, if desired.

If the switch is to be used simply to indicate direction of rotation of the draft, sector 2 remains uninterrupted. However, if it is desired to use the switch in conjunction with a vehicle signalling system wherein it is desired to completely shut off current to the signal lamps in the straight-ahead position, I provide, in the latter instance, a gap 18 in the sector so that in one certain position of arm 4, reflexed brush 10 will not make contact with sector 2, and it is obvious that this gap 18 may be made of any arcuate extent required.

In order to make the switch dust proof, I prefer to provide the switch with a cover 20, held to base 1 by screws 21 connected to cover pins 22.

The operation of the switch depends upon the change of angle between rotating arm 4 and contact arm 6, this change in angle, however, taking place only after rotation of contact arm 6 has been impeded by stop pin 12 in either direction.

The first motion of shaft 3 causes the rotating arm 4 and contact arm 6 to rotate as a unit.

Starting with the position of the arms shown in Fig. 1, where the contact arm 6 is on left hand contact 14 and against left hand pin 12, with the rotating arm 4 in its extreme left position, and then rotating shaft 3 clockwise, the two arms will move as a unit, and brush 11 will pass off of left hand contact 14 and make contact with right hand contact 14, thus de-energizing left signalling lamp 16 and energizing right signalling lamp 15. This next position is shown in Fig. 3.

Continued rotation of shaft 3 causes the angle of arm 6 with arm 4 to straighten out and approach 180°, due to the slippage in the clutch joining the arms. Brush 11 will in the meantime, slide over right hand contact 14 and arm 6 will slide against pin 12. The contact, however, is maintained at all times.

As arm 4 reaches the center position, reflexed brush 10 will ride off sector 2, into gap 18, and current to whichever lamp is lit will be broken. As arm 4 passes center, current will be re-established to the lamp, and as rotation is continued to the right, continuous connection will be made between brush 11 and right hand contact 14 until the extreme right position of arm 4 is reached, when the condition of the switch will be exactly opposite to that shown in Fig. 1.

Thus, over the entire operating arc of arm 4 one lamp is energized while the shaft is being rotated in one direction, and the other lamp is energized when the shaft is rotated in the opposite direction, irrespective of where the change of rotation occurs, within the operating arc of arm 4, except for the crossing of gap 18. The sliding contact between brush 11 and either one of contacts 14, at all times ensures a clean contact therewith.

The device therefore consists essentially of a switch having an arm which is capable of having the terminal thereof limited in its arcuate movement to a short path, while the remainder of the arm continues over a longer path.

It should also be noted that in case it is desirable to have the shaft itself carry current, sector 2 and brush 10 may be done away with. This latter arrangement, however, would not allow, without extra parts, the complete cutting off of current at any given position within the operating arc of arm 4.

My invention is described herein as showing a permissible arc for arm 4 of 90°. However, it is obvious that the arc may be extended up to an arc somewhat less than 180°, provided lever couplings are used which will not hang up at dead center at the extreme ends of this arc.

It also will be obvious to those skilled in the art that if the driving member makes more than one revolution during its complete operational cycle, but not an unlimited number of revolutions, then it will be possible to operate the switch of my invention by gearing shaft 3 to the driving member, so that for the complete cycle of the driving member, arm 4 rotates only over its permissible arc.

I claim:

1. A rotation indicating switch comprising a shaft, an arm to be rotated by said shaft over a predetermined arc less than 180°, a contact arm pivoted to the end of said rotating arm means providing a friction clutch at said pivot, stops in the path of said contact arm limiting the movement of said arm to a contact arc less than said predetermined arc, and stationary contact points adjacent said stops connected and disconnected by motion of said contact arm.

2. Apparatus in accordance with claim 1 wherein an elongated resilient brush is provided beneath and parallel to said contact arm said brush making connection to said contact points and sliding thereover as said switch is operated.

3. Apparatus in accordance with claim 1 wherein an elongated resilient brush is provided beneath and parallel to said contact arm said brush making connection to said contact points and sliding thereover as said switch is operated, and a second brush connected to said resilient brush, said second brush being moved by said rotating arm over a conductive sector having an arcuate length equal to the predetermined arc.

4. Apparatus in accordance with claim 1 wherein an elongated resilient brush is provided beneath and parallel to said contact arm said brush making connection to said contact points and sliding thereover as said switch is operated, a second brush connected to said resilient brush, said second brush being moved by said rotating arm over a conductive sector having an arcuate length equal to the predetermined arc and a gap in said sector in the path of said second brush at a predetermined point within its arcuate length.

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