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COUNT CONTROL SWITCH

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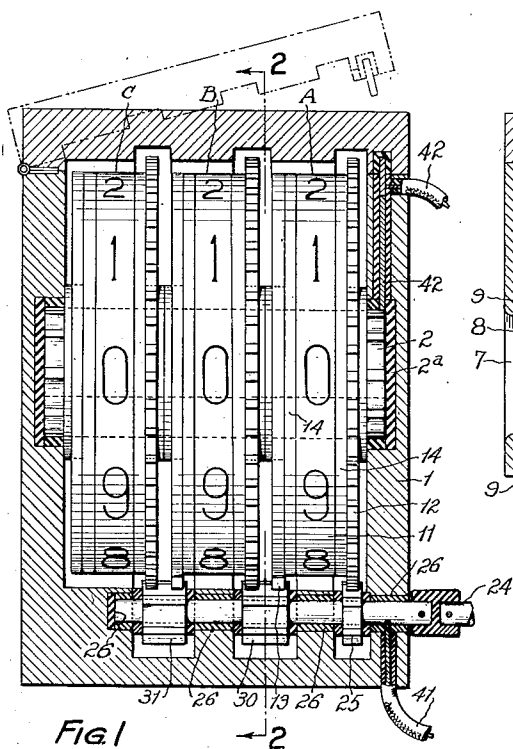


Fig. 1

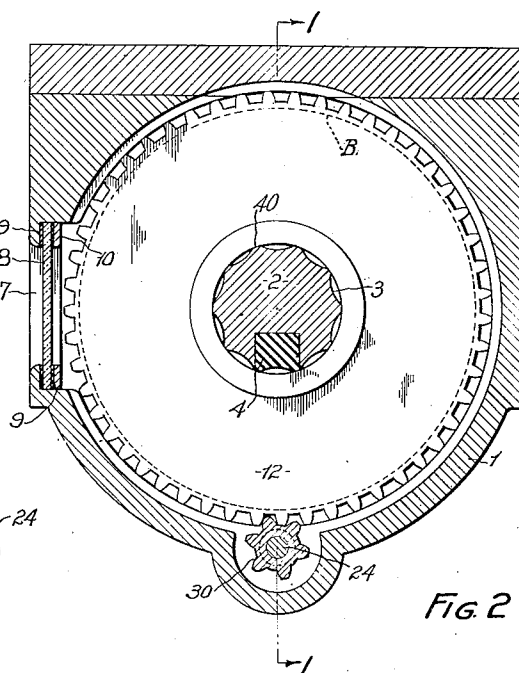


Fig. 2

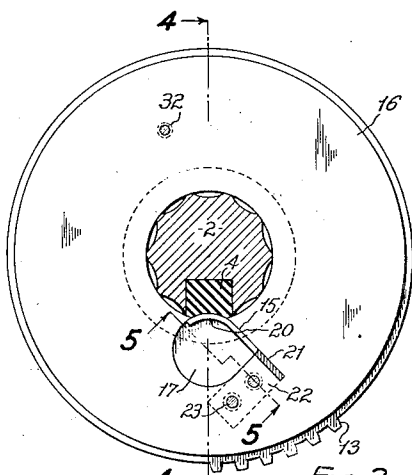


Fig. 3

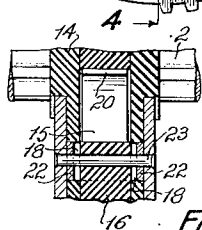


Fig. 5

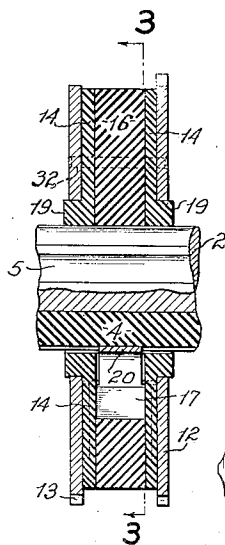


Fig. 4

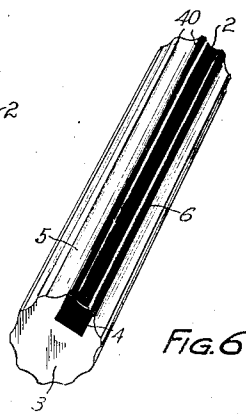


Fig. 6

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UNITED STATES PATENT OFFICE

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COUNT CONTROL SWITCH

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10 Claims. (Cl. 200—56)

My invention is an improvement in count control switches, and relates more particularly to a device of this character which may be pre-set to a given total, then operated to a zero indication to open or close an electrical circuit, as desired, or to perform some predetermined mechanical function.

One of the objects of my invention resides in the provision of a count control switch, which, by virtue of the fact that it operates from a pre-set position to a zero position, eliminates the necessity of employing a complicated re-set mechanism.

A further object of the invention is a count control switch of the type described which includes a stationary axial shaft on which one or more interconnected indicator wheels are rotatably mounted, said shaft having a plurality of wheel alignment faces.

Another object consists in providing a stationary axial shaft polygonal in cross-section and having at least one face thereof formed of an electrical insulating material and a plurality of other faces formed of electrical conducting material.

A still further object of the invention resides in providing a device of the type mentioned, which is fire-proof and explosion-proof, so as to permit its use in controlling the operation of a motor, such as may be employed for operating a gasoline dispensing pump, due to the fact that the device is so constructed that vapors from volatile liquids are prevented from having access to the interior of the device, and particularly in the vicinity of the circuit making and breaking parts.

Another object of my invention is to construct a device of this character which is compact, simple of construction and operation, and inexpensive to manufacture.

Other objects and advantages of the invention will become more apparent from the following description of an embodiment thereof, reference being made to the accompanying drawing, in which like reference characters are employed to designate like parts throughout the same.

In the drawing,

Figure 1 is a section taken on the line 1—1 of Figure 2 through a device embodying my invention;

Figure 2 is a section taken on line 2—2 of Figure 1;

Figure 3 is a vertical section taken on line 3—3 of Figure 4;

Figure 4 is a vertical section taken on line 4—4 of Figure 3;

Figure 5 is a fragmentary section taken on line 5—5 of Figure 3; and

Figure 6 is a perspective detailed view of a stationary shaft upon which the indicating units are mounted.

In carrying out my invention, I have illustrated one embodiment thereof in the accompanying drawing. This embodiment is particularly adapted for use on gasoline pumps since it is encased in a sealed casing and is further designed to eliminate the presence of gases from volatile fluids and to prevent the presence of such gases in the vicinity of the stationary axial shaft and indicator wheels.

However, it is to be understood that I do not intend by such illustration to limit my invention to the precise details or embodiment shown, since it is apparent that several modifications may be made without departing from the spirit of the invention or the scope of the annexed claims.

My invention has particular reference to a count control switch, in which the operation of the device counts backwards, or indicates from a pre-set figure to zero. For instance, where the device is used to control the prime mover of a gasoline dispensing pump, or to count other operations, such as those of a printing press or the like, the indicating wheels are pre-set to indicate the desired number of units dispensed or operations performed.

When the machine to which it is operatively attached has performed the deliveries or operations equal to the pre-set figure and the indicating wheels have thus all indicated zero position, the switch automatically opens or closes a control circuit, as desired.

In the embodiment illustrated, the zero position of the indicating wheels open the control circuit through the stationary shaft, thus immediately stopping the mechanism of the machine.

It is understood that by "control circuit" I mean either a direct or relay control circuit.

Referring now more particularly to the accompanying drawing, the embodiment illustrated includes a casing 1 for the count control switch assembly.

This casing is preferably designed to effectively seal the count control switch therewithin from contact with such fumes as may be present in the vicinity of the casing.

Within the casing 1 is mounted a stationary axial shaft 2 which is sealed at its ends in the casing bearing 2a of insulating material.

The stationary axial shaft is composed of electric conductor and non-conductor materials, respectively, at 3 and 4, and is fluted longitudinally as at 5 and 6 for the purposes which will be more fully described hereinafter.

The casing 1 is provided with a window 7 in one face thereof and a transparent pane 8 is sealed in the opening by gaskets 9 and supporting member 10.

In the embodiment illustrated, I have shown three rotatable indicating units on the shaft 2, each of which includes a body or indicating wheel of insulating material 11, a driven gear 12, a gear segment 13, and a pair of insulating washers 14.

The three indicating wheel units A, B and C represent the units wheel, the tens wheel, and the hundreds wheel, respectively. These wheel units are identical, except the unit C, which is not equipped with a gear segment 13, since, in the illustration, there is no transfer of power from this wheel to a fourth wheel.

The indicator wheels serve the same purpose which they perform in the usual revolution counter, but in accordance with the present invention they further serve as a carrier for a brush or alignment spring 15, which contacts the flutes of the stationary axial shaft as the respective units revolve about the shaft.

With the exception of the gear 12, the gear segment 13, and the contactor alignment brush 15, the indicator wheel unit is constructed entirely of electrical insulating material.

The body portion of each unit comprises a disk 16 of insulating material and is provided with openings 17 and 18 which are for the purpose of accommodating the contactor brush 15 within the said body portion.

Spacer washers, also of electrical insulating material, are provided at 14, and lie flat against the opposite faces of body portion 16. Each of the spacer washers is provided with a hub-like portion 19 extending outwardly from the body portion, and are adapted to bear against the stationary axial shaft and also against the hubs of adjacent units to thereby seal the spaces between the flutes and the wheels against communication with the interior of the casing or with the outside atmosphere when the unit is assembled thereon.

A driven gear 12 is assembled on one of the spacer washers 14 as indicated more clearly in Figure 4, and telescopes the hub portion 19 of the spacer washer, so that the gear may lie flat against it.

A gear segment 13 is assembled on the other spacer washer 14 to the left in Figure 4 in the same manner as the gear 12 is assembled.

The contactor alignment brush 15 comprises a contactor portion 20 curved to conform to the curvature of the respective flutes 5 and 6 of the stationary axial shaft 2.

Formed integral with the brush are a transverse portion 21 and side portions 22. The arm 15 and the end 20 of the brush fit within the opening 17 of the insulating wheel body, while the portion 21 and the side portions 22 extend through the opening 18 in the member 16. The side members 22 of the brush are adapted to lie flat against the gear 12 and the gear segment 13, respectively, in electrical contact therewith, and one or more pins or rivets 23 are inserted through the members 12, 13, 22 and 16 to securely bind the same together.

In this manner, electrical current may be

transmitted from the shaft through the alignment contacting brush and the gear and gear segment 12 and 13 to the transfer gears which interconnect the several units of the device.

From the above description, it will be evident that the alignment contactor brush serves two purposes. It tends to force the indicator wheel unit to align itself into one of a plurality of positions, thus always assuring the centering of the indicia carried by the unit in the window provided in the casing. Electrically, its position determines whether or not an electrical current may flow from the stationary axial shaft to the transfer gears.

I have provided means for imparting rotation to the unit A and for transferring such motion, respectively, to the units B and C in a pre-selected manner.

This means includes a driven shaft 24 entering the casing 1 but insulated therefrom, and a drive pinion 25 keyed to the shaft and in mesh with the driven gear 12 of the unit A. The shaft 24 extends into the casing and is mounted to rotate in the insulated sleeves 26.

Transfer gears 30 and 31, respectively, are mounted to freely rotate on the shaft 24, gear 30 being in mesh with the gear 12 of the unit B and is adapted to be driven by the teeth of the gear segment 13 of the unit A.

Likewise the transfer gear 31 is always in mesh with the gear 12 of the unit C and is engageable by the teeth of the gear segment 13 of the unit B.

The members 12, 13, 14 and 16 may be secured together by means of transverse pins or rivets 32.

The stationary axial shaft 2 is constructed primarily of metal and in the present case is represented as having nine flutes or grooves, one of which is indicated at 5, there being a tenth groove or flute 6 in the form of an insert of electrical insulating material.

It is to be noted that the ribs 40 separating the several fluted portions of the shaft are rounded so as to present a smooth bearing surface to the inner walls of the spacer washer 14 and the disk 16 defining the central opening therethrough and through which the stationary axial shaft passes. In this manner, the units A, B and C can be rotated freely about the axis shaft by means of the driving gear and the transfer gears interconnecting the said units.

The entire device is connected in an electrical circuit by means of a conductor 41 having contact with the drive shaft 24 but insulated from the casing 1, and by means of a conductor 42 having contact with the stationary axial shaft 2 and likewise insulated from the casing 1.

It will be evident from the above description that when the units A, B and C are pre-set to represent a given number of operations to be performed, or revolutions to be counted, as, for example "531" the individual contactor alignment brush 15 carried by the respective units will all be in electrical contact with certain of the respective flutes 5 of the shaft, since the number 531 or any other number, not including zero, will cause these brushes to contact only the metal portion of the shaft.

If the number selected is "530," then the contactor brush on unit A will rest in the insulated flute 6, while the contactor brushes for the units B and C will rest in the respective metallic flutes of the shaft. In either of the above examples mentioned, the electrical circuit is closed through the conductors 41 and 42, and it can only be when the units A, B and C have all reached a

position where the total of zero is indicated in the window 7 that all of the contactor alignment brushes 15 will rest in the insulated flute 6, thus breaking the circuit through conductors 41 and 42.

It will be seen that in the operation of the device, it is possible to pre-set the same to a predetermined number of operations or revolutions count, and when these operations or revolutions have been performed in accordance with the pre-set figure and the units A, B, and C finally come to rest to indicate "000", the circuit, of which the device is a part, will have been broken, and the operations and counts will have been terminated.

The units A, B and C may be re-set after reaching the combined zero position to any other predetermined figure by merely turning the individual units by hand until the desired indicia appear in the window 7.

Various changes in the details of construction and arrangement of parts may be made without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. A count control switch comprising a stationary axial shaft having an outer surface composed of electric conductor and non-conductor areas, an indicator wheel rotatably carried on the shaft, means for progressively rotating said wheel, and a contactor on said wheel and having wiping engagement with the outer surface of said axial shaft upon rotation of said wheel.

2. In a count control switch comprising a stationary axial conductor shaft having a longitudinal electrical insulation section therein, an indicator wheel rotatably carried on said shaft, means for progressively rotating said wheel on the shaft, and a contactor on said wheel, said contactor having wiping engagement with said shaft upon rotation of said wheel.

3. In a count control switch comprising a stationary axial conductor shaft having a longitudinal electrical insulation section therein, an indicator wheel rotatably carried on said shaft, means for progressively rotating said wheel on the shaft, and a contactor on said wheel, said contactor having wiping engagement with said shaft upon rotation of said wheel, and indicia on said wheel arranged so that upon rotation of the wheel to a predetermined zero position said contactor is in engagement only with the insulated portion of the shaft.

4. A count control switch including a stationary conductor axial shaft, a counting wheel rotatable on said shaft, means for rotating said wheel, and a contactor carried by said wheel and adapted to have sliding engagement with said shaft, said shaft having a segment formed of insulating material.

5. A count control switch including a stationary conductor axial shaft, a counting wheel rotatable on said shaft, means for rotating said wheel, and a contactor carried by said wheel and adapted to have sliding engagement with said shaft, said shaft having a segment formed of insulating material, said contactor being positioned on said wheel to come to rest on said insulating segment and to thereby open an electric circuit in which said switch may be connected, when said wheel is rotated to indicate a zero position.

6. A count control switch including a station-

ary axial shaft of electrical conducting material, a plurality of indicating wheels rotatable on said shaft, means for driving one of said wheels, transfer means to actuate successively said other wheels upon each complete revolution of said one wheel, and electrical contactors on said wheels having sliding engagement with said shaft, said shaft having a longitudinal portion of its peripheral surface formed of insulating material, whereby when the relative positions of said contactors is such that said wheels indicate a zero position, an electric circuit through said switch will have been broken.

7. A count control switch including a stationary axial shaft of electrical conducting material, a plurality of indicating wheels rotatable on said shaft, means for driving one of said wheels, transfer means to actuate successively said other wheels upon each complete revolution of said one wheel, and electrical contactors on said wheels having sliding engagement with said shaft, said shaft having a longitudinal portion of its peripheral surface formed of insulating material, whereby when the relative positions of said contactors is such that said wheels indicate a zero position an electric circuit through said switch will have been broken, said shaft being further characterized by having a plurality of longitudinally extending flutes corresponding in number to the number of indicia on one of said wheels.

8. In a count control switch, a fixed conductor shaft, an indicator wheel rotatable on said shaft and insulated therefrom, means for rotating said wheel, and a contactor on said wheel and engageable with the outer surface of the shaft as the wheel is rotated, said conductor shaft outer surface including a longitudinally extending portion of electrical insulating material.

9. A count control switch including a stationary axial shaft of electrical conducting material, a plurality of indicating wheels rotatable on said shaft, means for driving one of said wheels, transfer means to actuate successively said other wheels upon each complete revolution of said one wheel, and electrical contactors on said wheels having sliding engagement with said shaft, said shaft having a longitudinal portion of its peripheral surface formed of insulating material, whereby when the relative positions of said contactors is such that said wheels indicate a zero position an electric circuit through said switch will have been broken, said shaft being further characterized by having a plurality of longitudinally extending flutes corresponding in number to the number of indicia on one of said wheels, each of said wheels having a hub portion in sealing abutment with the hub portion of an adjacent wheel.

10. A count control switch including a stationary conductor axial shaft, a counting wheel rotatable on said shaft, means for rotating said wheel, and a contactor carried by said wheel and adapted to have sliding engagement with said shaft, said shaft having a polygonal cross section and comprising a number of sides equivalent to the number of indicia on the counting wheel, one of said sides being formed of insulating material, said wheel having a hub portion extending outwardly thereof along the shaft and a member in abutting relation with the hub portion to seal the space between the polygonal shaft and the inner wall of the wheel encircling the shaft.

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