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H. E. WAGNER

2,586,750

MULTIPLE CIRCUIT CONTROL SWITCH

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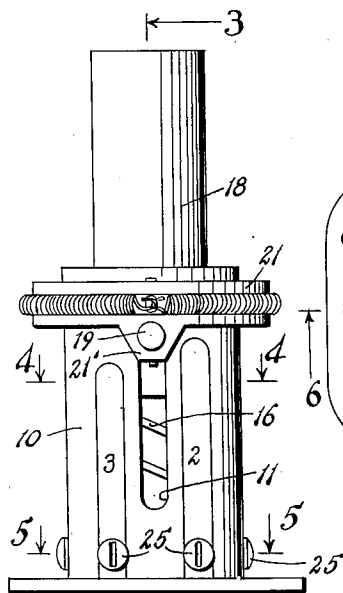


Fig. 1

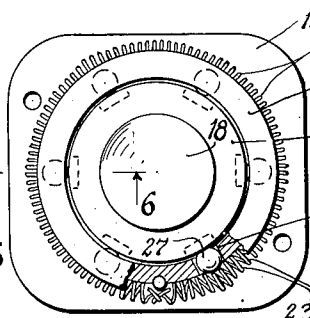


Fig. 2

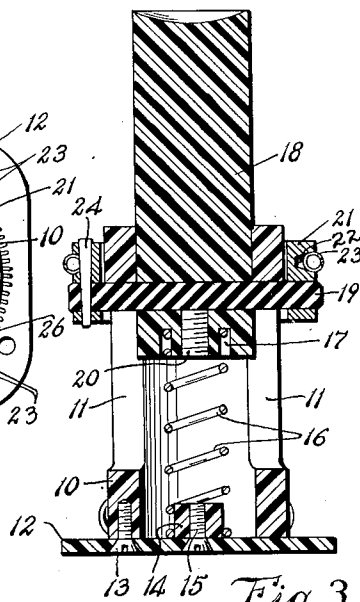


Fig. 3

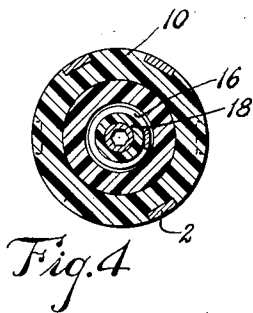


Fig. 4

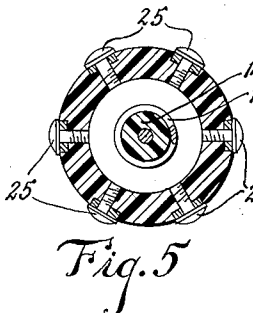


Fig. 5

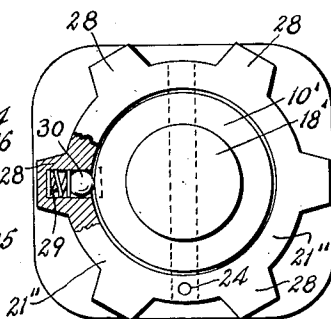


Fig. 6

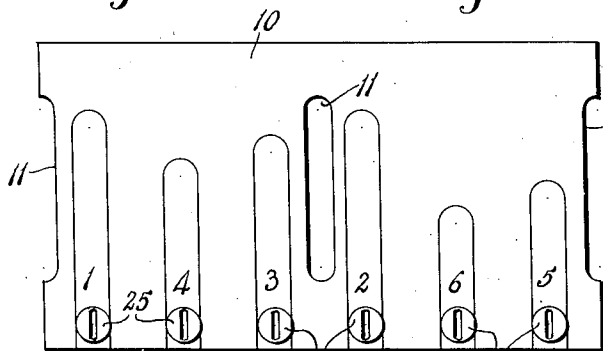


Fig. 7

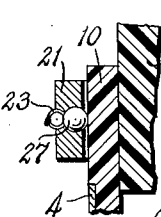


Fig. 8

INVENTOR,
Herbert E. Wagner

BY *H. E. Wagner*
ATTORNEY.

UNITED STATES PATENT OFFICE

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MULTIPLE CIRCUIT CONTROL SWITCH

Herbert E. Wagner, Los Angeles, Calif.

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5 Claims. (Cl. 200—16)

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This invention relates to multiple circuit control switch, and more particularly to a circuit closing push button by means of which a plurality of circuits can be successively closed for the purpose of controlling the operation of electrically operated machinery, and particularly for the control of electrically operated hoists.

Among the salient objects of the invention are:

To provide a five step push button for a variable speed control, for example, of a traveling crane, with two buttons for the hoist motor having five steps up and five steps down; and two buttons for the trolley motor having five speeds right and five speeds left; and two buttons for the bridge motor, with five speeds forward and five speeds reverse; to provide such a multiple circuit control which is practically indestructible and which is simple, practical and which has a long, trouble-free life.

In order to further explain the invention, I have shown one practical embodiment thereof on the accompanying sheet of drawings in which:

Figure 1 is a side elevation of a push button unit embodying my invention;

Figure 2 is a plan view thereof, with a part in section;

Figure 3 is a longitudinal sectional view thereof, taken on line 3—3 of Fig. 1;

Figure 4 is a cross sectional view taken on the line 4—4 of Fig. 1;

Figure 5 is a cross sectional view taken on the line 5—5 of Fig. 1;

Figure 6 is a fragmentary sectional view taken on line 6—6, Fig. 2;

Figure 7 is a flat or spread-out view of the body of the invention to show the conductor strips in face view and in their relationship to each other; and

Figure 8 is a plan view, with a part in section, of a modified form of the invention.

Referring in detail to the drawings, my invention as here shown for explanatory purposes, includes a cylindrical body 10, made of a very tough and durable fiber, with longitudinal slots 11, 11 through said body, opposite each other, said body having a base plate 12, also of fiber, secured thereto by means of screws, as 13, and seen in Fig. 3.

On said base plate 12, within said body 10, is a fiber lug 14, held in place by means of a screw 15, as shown. A coiled spring 16 has its lower end around said lug 14 and its upper end seated in an annular channel or groove 17 formed in the lower end of a push button or plunger 18, 55

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as clearly shown in Fig. 3. A through pin 19 of fiber material extends through the lower end of said push button 18 and has its opposite ends extended through the opposite slots 11, 11, in said body 10, said through pin being secured in place by means of a set screw 20, in the lower end of said push button, whereby to move up and down in said slots 11, 11 as said push button is pressed down against the tension of a coiled spring 16.

Movably mounted around the body 10 is a bronze collector ring 21, having a groove or channel 22 in its outer surface to receive a small coiled spring 23, sometimes referred to as a garter spring, and clearly seen in Figs. 1 and 3. The opposite ends of said spring 23 are attached to a taper pin 24, through the collector ring 21 and through the end of the fiber pin 19, as shown in Fig. 3.

Said bronze collector ring, at its opposite under sides, is provided with two extension lugs, as 21', to receive the opposite ends of the fiber pin 19. Thus said collector ring 21, by reason of the fiber pin 19, is moved downwardly with the push button 18 whenever it is pressed downwardly against the tension of the spring 16, said pin 19 moving in the opposite slots 11, 11 in the body 10, as shown.

On the outer surface of said body 10, spaced around said body, are shown six brass conductor strips, designated 1, 4, 3, 2, 6 and 5, as seen in the flat view in Fig. 7. Said conductor strips are set in milled grooves formed in the outer surface of said fiber body 10, and in the present showing are secured in place therein by means of a moisture proof cement, thus making a very smooth outer surface on said body 10, for the movement up and down of the collector ring 21.

The lower ends of said conductor strips are provided with connecting screws, as 25, to which the circuit wires (not shown) are connected. The bronze collector ring 21 is provided around its body, under the garter spring 23, with a plurality of holes or openings 26, opening inwardly, in which are placed contact balls 27 to bear upon said collector strips successively as the bronze collector ring is moved downwardly by means of the push button or plunger 18, as before described.

In Fig. 8, I have shown a slightly modified form of the invention. Instead of the button, here designated 18', being provided with the annular groove around its outer face to receive the garter spring 23, said bronze conductor ring, here designated 21'', is provided with a plurality of separate

hollow lug portions, as 28, 28, opening inwardly, and each having therein a coiled spring 29 and a contact ball 30, as shown in the sectioned portion of Fig. 8. Otherwise, said push button mechanism is the same in form and operation as that shown in Fig. 1. Said contact balls 27, or 30, as the case may be, are moved with the bronze collector ring 21, or 21'', and come into yielding engagement with the conductor strips on the outer surface of the unit body 10, successively as said collector ring is moved downwardly by means of said push button 18, whereby to successively complete the various circuits as required in the operation of the different machines, or of the hoists controlled thereby.

The operation of the mechanism will be clear from the showing thereof, in connection with the foregoing detailed description of the embodiment of the invention shown for such purpose, but I do not limit the invention to the details of construction and arrangement shown for explanatory purposes, except as I may be limited by the hereto appended claims.

I claim:

1. In a multiple circuit control unit; a tubular body of insulating material, a plurality of conductor strips of different lengths mounted in spaced relationship around the outer surface of said body, with means for connecting circuit wires therewith, a collector ring movable on said body, said collector ring having a plurality of contact balls yieldingly held therein to move therewith, and movable inwardly to contact said conductor strips on the outside of said body, as said ring is moved thereon, a push button movable in said body and operatively connected with said collector ring for moving it on said body to put said balls in contact with said conductor strips, and spring means in said body for returning said push button after it has been moved in one direction.

2. In a multiple circuit control unit: a tubular body of insulating material, a plurality of conductor strips of different lengths mounted in spaced parallel relationship around the outer surface of said body, with means for connecting a circuit wire to each strip, a collector ring movably mounted on said body, and movable in a path parallel with said conductor strips, said collector ring having a plurality of contact balls seated in its inner side to be moved into engagement with said conductor strips, with spring means yieldingly pressing said contact balls inwardly on said body, said balls being positioned in alinement with said conductor strips on the outer side of said body, a push button in said body, a through pin through said push button and through said collector ring, whereby the movement of said push button moves said collector ring and its contact balls, said body having opposite slots in which said through pin moves, a spring in said body under said push button for returning it when it has been moved in one direction, and means for holding said spring in operative position with the inner end of said push button.

3. In a multiple circuit control unit, a tubular body of insulating material, a plurality of conductor strips of different lengths on the outer surface thereof, lengthwise thereof, and each having means for connecting a circuit wire therewith, a collector ring around said body and movable thereon, said collector ring having a plurality of contact elements in its inner side to be moved into contact with said strips, spring means yieldingly moving each element inwardly, a push button in said body and having its inner end connected through said body with said collector ring, for moving said ring and said contact elements along and in engagement with said conductor strips, and spring means in said body operating on said push button for returning it to its neutral position after it has been moved in an operation.

4. In a multiple circuit control unit, a tubular body, a series of contact and conductor strips of metal imbedded in the outer surface of said body and flush with the outer surface thereof, with means for connecting circuit wires to said conductor strips, a push button of plunger form in said body, a spring operable on said push button to return it to its normal position when released, a collector ring on said body, connections between said push button and said collector ring for moving them together along said body, spring loaded contact elements in the inner face of said collector ring and positioned to engage said conductor strips as said collector ring is moved up and down on said body by said push button, said conductor strips being of different lengths, and spaced around said body in parallel relationship with each other, said contact elements between the collector ring and said conductor strips completing circuits therebetween.

5. In a multiple circuit control unit of the character referred to which includes a hollow body of tubular form with longitudinal slots in its opposite sides, a collector ring on said body to be moved thereon lengthwise thereof, a plunger in said body having its inner end connected through said opposite slots with said collector ring for moving it, a series of conductor strips around the outer surface of said body, within said collector ring, spring loaded contact elements carried in the inner face of said collector ring and positioned to engage said conductor strips as said collector ring is moved thereon, means for connecting circuit wires to said conductor strips, said body, plunger, and the connection between the end of said plunger and said collector ring being of insulating material.

HERBERT E. WAGNER.

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

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