Feb. 6, 1934. F. P. BERCOT 1,945,511

REMOTE CONTROL APPARATUS

Filed May 22, 1931 2 Sheets-Sheet 1

Fig. 1.

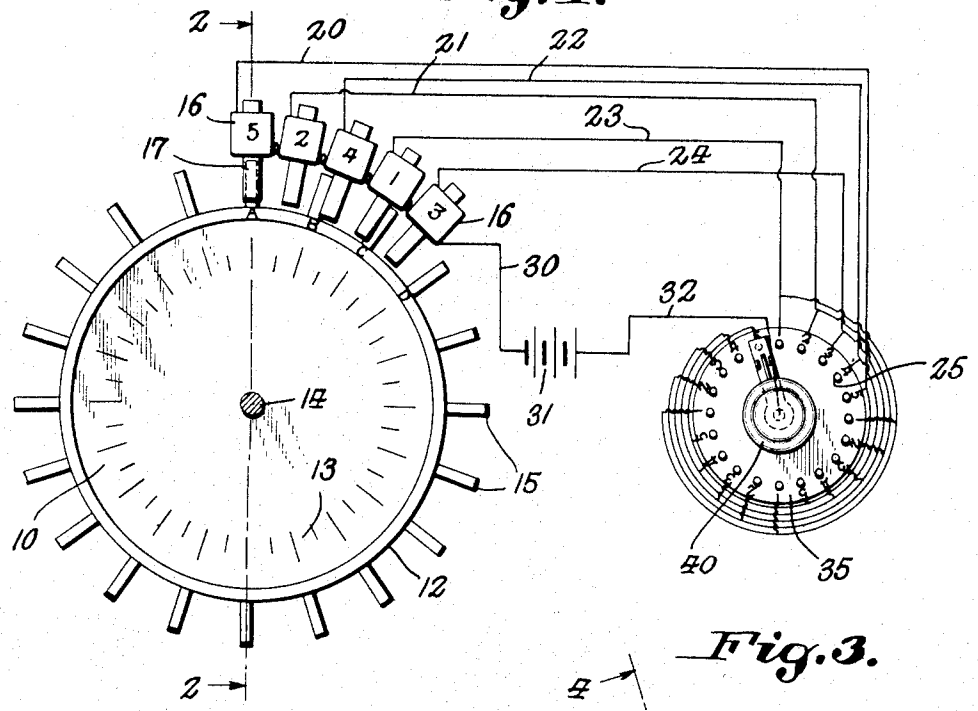


Fig. 3.

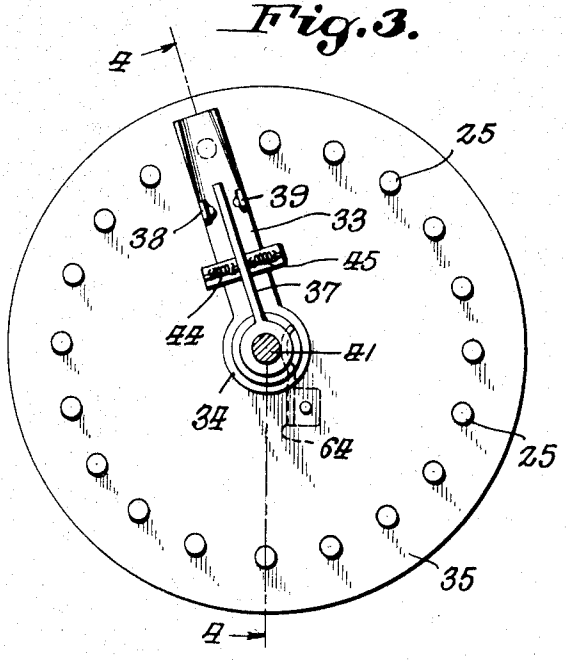
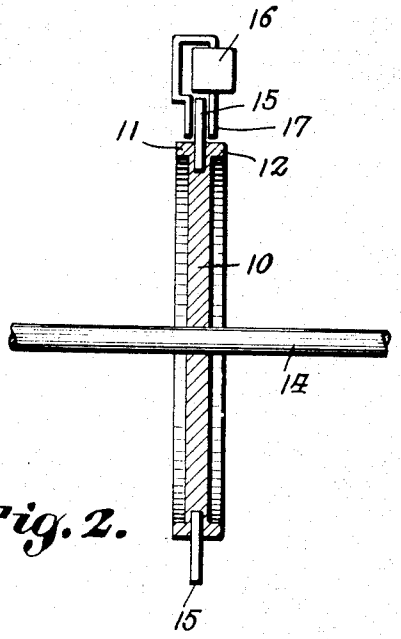


Fig. 2.



Franklin P. Bercot,

INVENTOR

A. L. Evans

ATTORNEY

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Filed May 22, 1931 2 Sheets-Sheet 2

Fig. 4.

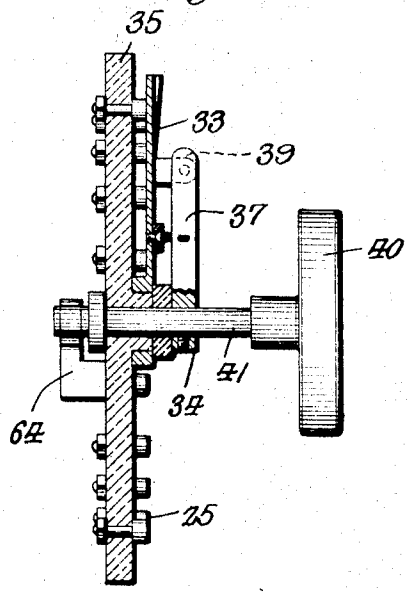
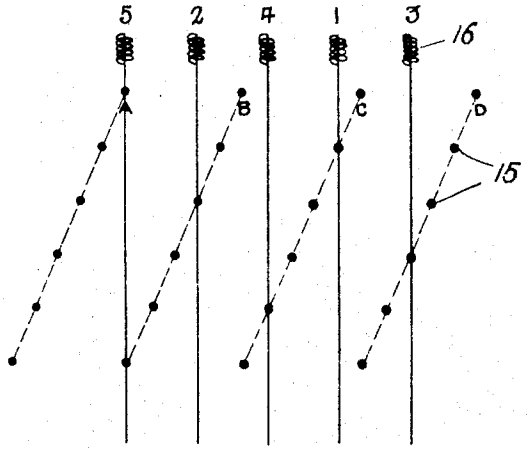


Fig. 5.



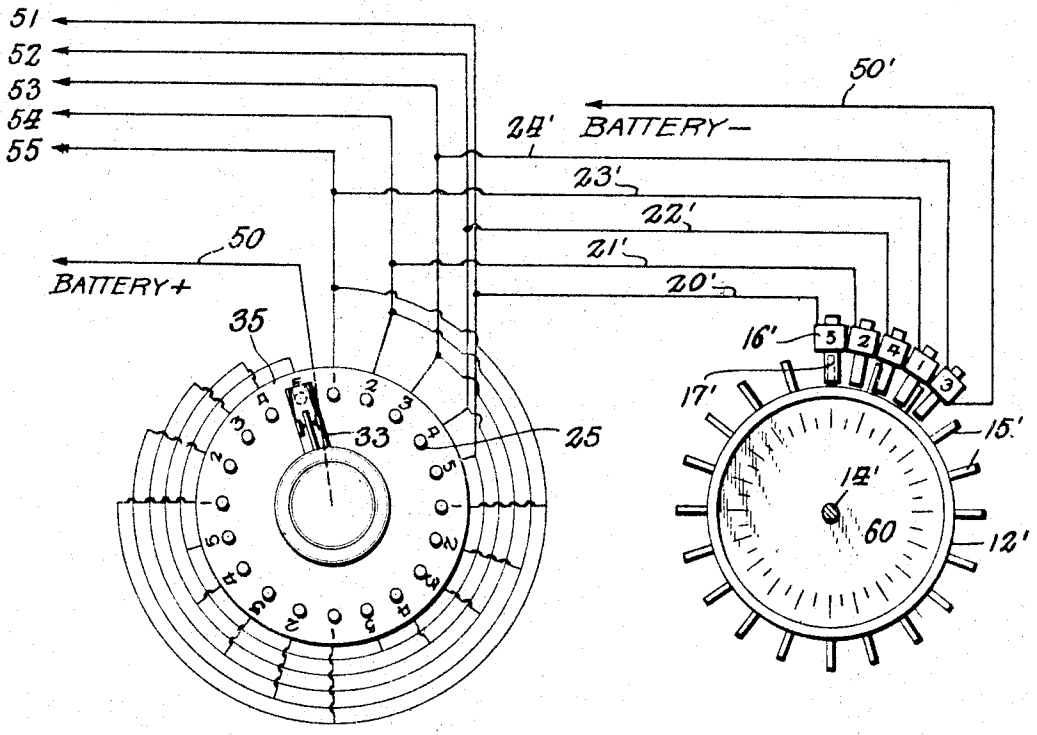


Fig. 6.

Franklin P. Bercot,

INVENTOR

BY A. L. Evans

ATTORNEY

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UNITED STATES PATENT OFFICE

1,945,511

REMOTE CONTROL APPARATUS

Franklin P. Bercot, Fort Wayne, Ind.

Application May 22, 1931. Serial No. 539,400

2 Claims. (Cl. 172—239)

The object of this invention is to provide means for controlling radio dials and other similar apparatus from nearby or remote points, and especially to provide elements which will operate synchronously and which may be employed under various conditions instead of synchronous motors, adapted for simultaneously placing in corresponding positions those elements of a plurality of pieces of apparatus which must be so controlled.

With the foregoing and other objects in view, the invention consists in the novel features of construction and in the novel arrangement of the elements herein disclosed, it being understood that modifications, alterations or changes may be made within the scope of the claims without departing from the spirit of the invention.

In the drawings forming part of this application:—

Figure 1 is a diagrammatic view showing at the left a power wheel or controlled element, and showing at the right of the view a commutator-like device by means of which control is effected from a distant point or from any point where control is desired.

Figure 2 is a section on line 2—2 of Figure 1, and through that portion of the apparatus by means of which the radio dial is rotated.

Figure 3 is an elevation and shows the principal element at the right of Figure 1, the wiring being omitted,—this structure being employed for effecting the control under consideration.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a graphical representation of the spacing of the electromagnets appearing at the top of this view, with reference to the pins A, B, C, D, these pins being shown in the five different positions assumed by the rotatable element at the left of Figure 1, incident to each complete stage of its operation.

Figure 6 is a further diagrammatic view showing the two principal pieces of apparatus which may be employed at the point from which control is effected; the necessary structure for mechanical connection with the radio dial being mounted on the radio receiving apparatus, and not appearing in this view.

In carrying out the invention, the power wheel, so called, may be connected with the radio dial, or other element to be controlled, by mechanical means applied directly,—or may be connected by means of gearing, link mechanism, or the like. In the operation of the device, and for the energization of the magnets, either direct current or alternating current may be employed.

An annular element or wheel, of the type shown n Figures 1 and 2, includes a web portion 10 and a circumferential portion providing flanges 11 and 12; this structure is to be applied to the dial 13, by suitable means, or merely by frictional engagement with the flanges just referred to. The shaft or stem is designated 14.

A plurality of radially extending pins 15, angular in cross section, are applied to the outer portion of the wheel above referred to, and these pins 15 are equally spaced, and in Figure 1 a series of four pins is illustrated as being designated A, B, C, D. For cooperation with these pins, broadly designated by reference number 15 and designated in series as indicated,—I provide a plurality of electromagnets, each including a coil 16 and a core 17, and the proportions are such that the pins and cores will have substantially the relation indicated in Figures 1 and 6. The pins are of soft steel, permalloy, or steel of high permeability is suitable. The magnets are in groups of five and in any multiple thereof.

The electromagnets are connected by means of wires, such as those shown at 20, 21, 22, 23, 24, with contact points of the device at the right of Figure 1, by means of which the radio dial 13 at the left is to be controlled. Assuming that there are several groups of five contact devices designated in general by the reference number 25, all contact devices indicated by the numeral 3 for instance, are connected with a single wire, such as wire 24, and this wire runs to the magnet appearing at the right in the group previously referred to in Figure 1. The circuit for this magnet just mentioned is therefore through wire 24 and the magnets indicated, thence through wire 30, battery 31 and wire 32, to brush 33 which is adapted to contact with the elements 25, as will readily be understood from an examination of Figures 3 and 4.

Brush 33 is rotatable with the hub portion 34 of the disk 35 mounting pins 25, but this rotation is effected indirectly, an arm 37 being positioned between devices 38 and 39 carried by brush 33 and spaced as shown, so that upon manual rotation by means of knob 40 and shaft or stem 41, contact is first produced mechanically at 37 and 38, or 37 and 39, as the case may be, and immediately thereafter, rotation of the brush by means of the knob takes place. This construction is provided in order that there may be an open circuit under normal conditions, in view of the fact that arm 37 is held by springs 44, 45 in a neutral position, as indicated in Figure 3. It will be recalled that wire 32 from battery 31 runs to the brush, and the

circuit is completed thence through the individual pins 25 and the coils 16 of the series of five magnets (or any multiple thereof) appearing at the left of Figure 1.

Figure 5 is a graphical representation of the spacing of the electromagnets 16 with reference to the steel pins 15, the horizontal rows of points representing the pins in the five different positions of the remote control device.

In connection with the operation of the device, reference being had especially to Figures 1 and 5,—

As the brush 33 is rotated at the point of remote control, coil 1 of the series 16 is energized and point C, being the nearest, is brought to position 1 indicated at the upper portion of Figure 5. As the brush continues to move, coil 2 is energized and point B is brought to the position designated 2 at the upper portion of Figure 5. Coil 3 is next energized and point D is brought to the position 3 in Figure 5. Thereafter coil 4 is energized and point C is brought to position 4, Figure 5. Finally coil 5 is energized and point B is brought to the position 5, Figure 5.

Thus far, the power wheel applied to the radio dial or the like has rotated a distance equal to the space between two consecutive pins, and the pins are in the same relative position with reference to the magnets as when the operation was started. Repetition of the foregoing operation follows as the brush is rotated, and each time the brush passes 5 contact points, the rotatable device advances a distance equal to the distance between two consecutive pins 15.

When the apparatus is used for the remote control of a radio dial, and if desirable under any similar condition, a small power wheel such as that shown in Figure 2 is employed at the point from which control is effected. This drives a wave length index dial, and the two wheels controlled are in parallel because of the connections illustrated in Figure 6, and synchronous movement between the control devices at the point from which control is effected, and at the point where the control is employed for turning an apparatus to be governed, is produced.

In Figure 6, the brush 33 is in electrical connection through wire 50 with the positive terminal of a source of current, or is presumed to be thus connected, and wires 51, 52, 53, 54, 55 are to be connected in the same manner as wires 20 to 24 in Figure 1, with a power wheel so called at the point where the control of a radio apparatus is produced. These wires 51 to 55 are also in electrical connection through wires 20', 21', 22', 23', 24' with the coils of the magnets in the series designated generally by reference character 16' in Figure 6. Wire 50' leads toward the negative terminal of the source of current to be employed. An index dial 60 is thus controlled by means of the magnets of series 16', the pins 15' and the rotatable structure including the flange 12' of a rotatable device corresponding with member 10 of Figure 2.

As the pieces of apparatus assumed to be employed in Figure 6, and including dial 60 and a dial such as dial 13 in Figure 1, are movable simultaneously and synchronously, it is obvious that a control of rotatable elements is effected, such as that produced in a corresponding control of synchronous motors.

Spring 64 of Figure 3 supplies current to arm 37.

What is claimed is:—

1. In a device of the class described, an element to be applied to a radio dial or the like, rotatable therewith, and including radial members subject to magnetic control, a plurality of stationary electro-magnets including coils, mounted in a segmental series in a predetermined relation with reference to the radial members, the magnets exceeding the radial members in number in an approximately five to four ratio in an arc of less than ninety degrees defined by the movement of said element rotatable with the dial, and said radial members each being advanced by the magnets a distance sufficient to bring another of said members in relation to a cooperating magnet at a point of maximum efficiency, for every electrical impulse, a plurality of contact members arranged in an arc-like series, successive contact members being connected in non-progressive relationship with the coils of the magnets, individually, the sequence of the contact members being 1, 2, 3, 4, 5, and the sequence of the coils being 5, 2, 4, 1, 3, with energization of the coils in the order in which the contacts occur, a brush assembly movable over the contact members, a source of current, and means connecting said brush assembly with the source of current.

2. In a device of the class described, a disk member for application to a radio dial, said disk including oppositely located peripheral flanges either one serving to engage an edge of the dial, and radial members mounted in the edge of the disk and between the flanges, and means positioned to attract individual radial members, for moving the dial angularly.

FRANKLIN P. BERCOT.