Feb. 23, 1932. W. MENTOR 1,846,687

CONTROLLING MEANS FOR ELECTRIC DEVICES

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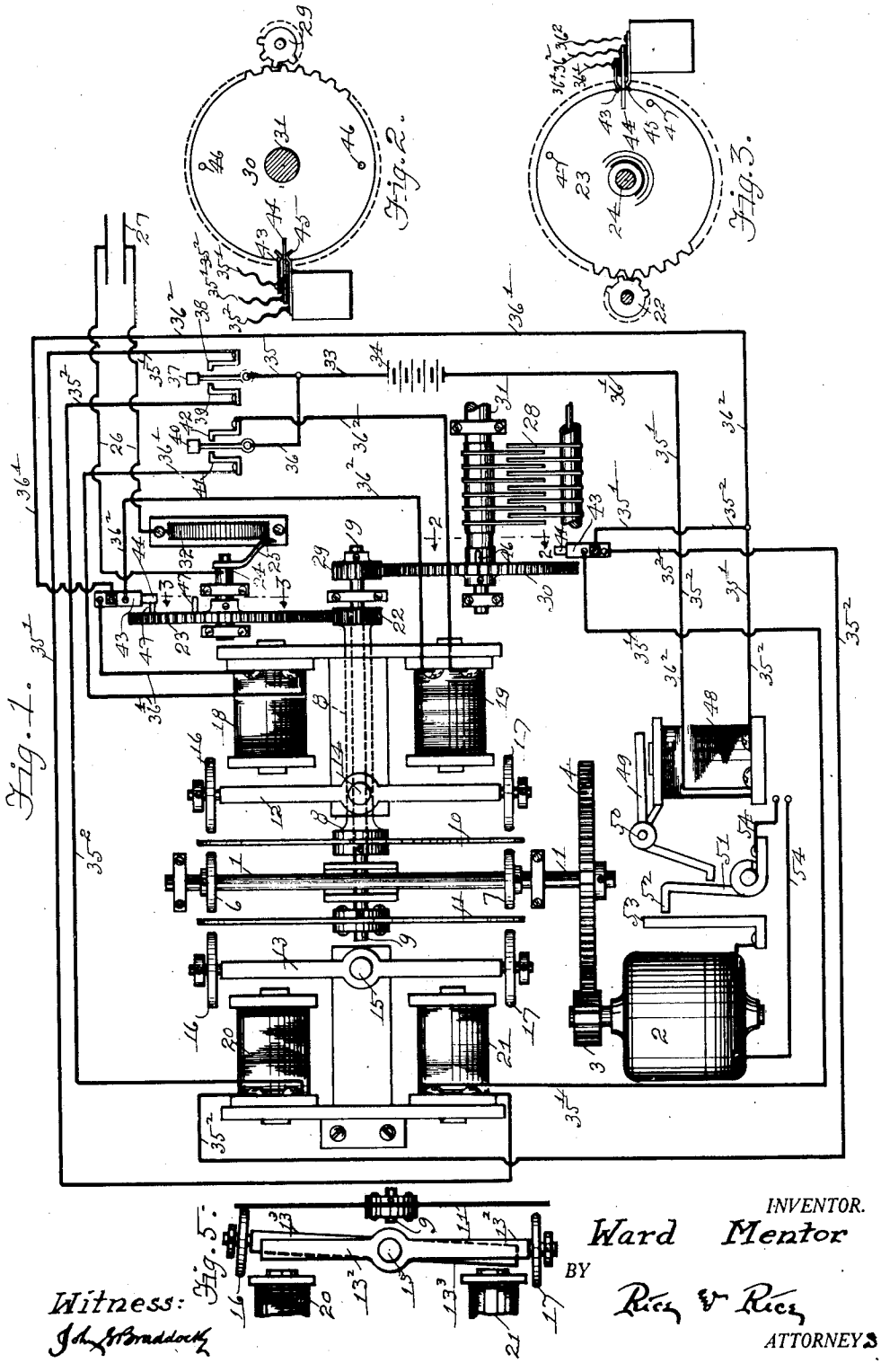


Fig. 1.

Fig. 2.

Fig. 3.

Fig. 5.

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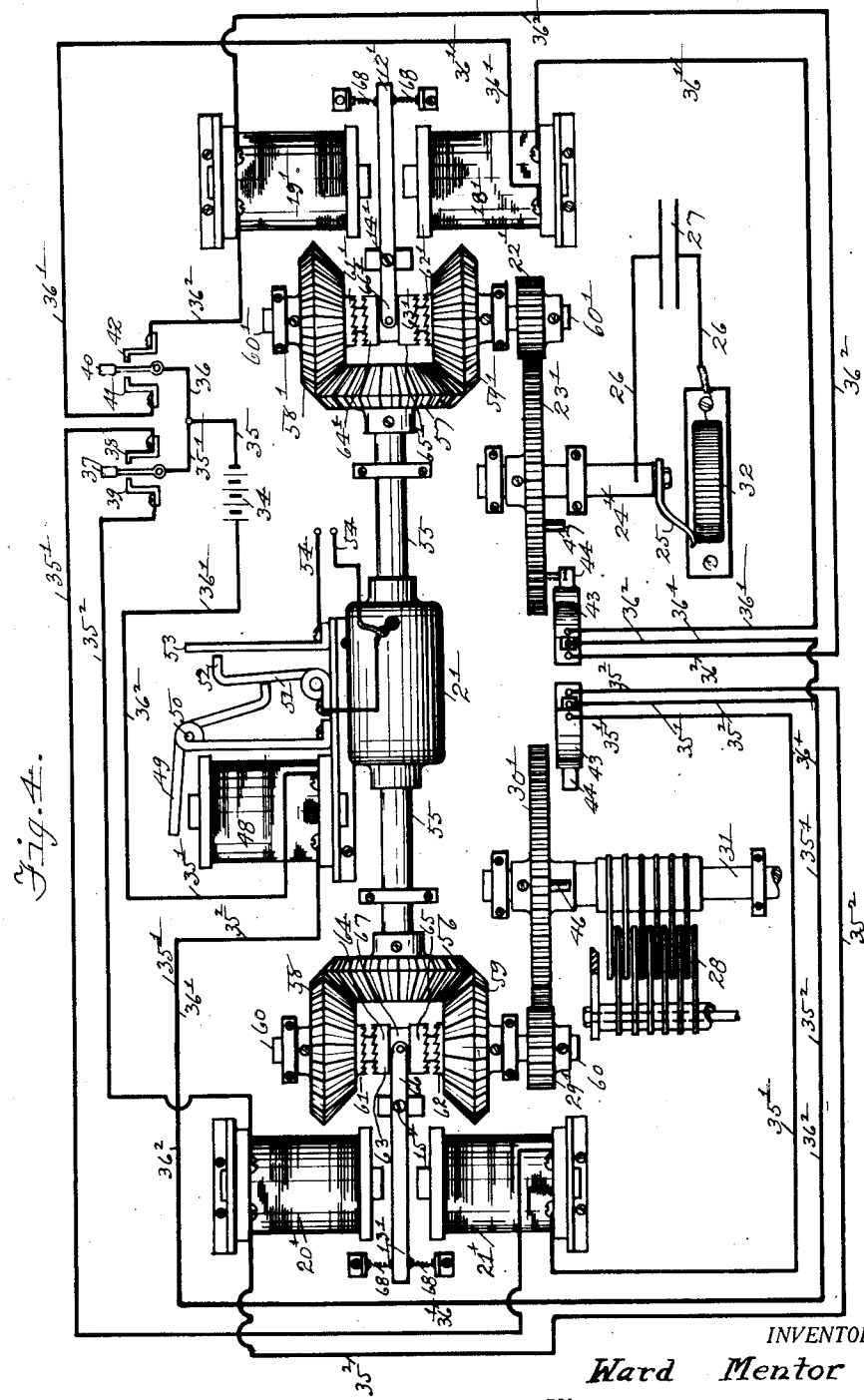


Fig. 4.

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UNITED STATES PATENT OFFICE

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CONTROLLING MEANS FOR ELECTRIC DEVICES

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The present invention relates to controlling means for electric devices, and more particularly to means whereby radio receiving sets may be remotely controlled.

An object of the invention is, generally, to provide such controlling means improved in various respects hereinafter appearing; and more particularly to provide such means which shall be very compact, and simple and shall comprise few parts although having a wide range of action, and which may be easily and efficiently operated.

These and any other and more specific objects hereinafter appearing are attained by, and the invention finds preferable embodiment in, the mechanical and electrical organizations hereinafter particularly described in the body of this specification and illustrated by the accompanying drawings forming a part hereof, in which:

Figure 1 is a plan view, partially diagrammatic in character, of an electrical and mechanical organization and controlling means therefor;

Figure 2 is a transaxial sectional view of certain parts thereof taken on line 2—2 of Figure 1;

Figure 3 is a transaxial sectional view of other parts of the same taken on line 3—3 of Figure 1;

Figure 4 is a plan view, partially diagrammatic in character, of a modified construction of the electrical and mechanical organization and controlling means therefor; and

Figure 5 is a plan view of a slightly modified construction.

In these drawings is illustrated combined mechanical and electrical means particularly adapted for controlling from a distance the operation of a radio receiving set, said means operating to vary the volume of the set and also to select broadcasting stations. These controlling means include a driving element rotated in one direction and a driven element rotated thereby in either of opposite directions as governed by electrically controlled and operated parts.

In the form of the invention illustrated in Figure 1 such a driving element—the shaft 1—is continuously rotated by the electric motor 2 whose shaft's gear 3 meshes with the gear 4 on said shaft 1, which carries adjacent its opposite ends the frictionally-driving wheels 6, 7. A hollow shaft 8 in axially transverse relation with shaft 1 contains a shaft 9, these shafts 8 and 9 carrying rotatably driven elements—the disks 10, 11—on the opposite sides of shaft 1. These disks are movable toward and into driven contact with either wheel 6 or 7 (being in the shown construction flexible to that end) and are thus flexed and held in driven frictional contact with either the wheel 6 or 7 on the driving shaft 1 to rotate the shafts 8 or 9 by the following means: On the opposite sides of shaft 1 are the double-arm armature bars 12, 13 each of which is swingably mounted at 14 or 15 in its middle, and has at its opposite ends the idler rolls 16, 17. A pair of electromagnets are arranged to swing each of these armature bars in opposite directions, the magnets 18, 19 operating to thus swing armature bar 12 and magnets 20, 21 to swing armature bar 13. When magnet 18 is energized the arm of bar 12 carrying roll 16 is attracted thereby causing the roll 17 on the opposite arm to contact and flex the disk 10 into frictional driven contact with wheel 7 on shaft 1, so that its rotation rotates this disk and hollow shaft 8 in one direction; but if magnet 19 be energized roll 16 contacts and flexes this disk into driven contact with the other wheel 6 on shaft 1 whereby said shaft 8 is rotated in the opposite direction.

The other pair of electromagnets 20, 21 act upon the arms of armature bar 13 in a similar manner to flex the other disk 11 into driven contact with either wheel 6 or 7 of shaft 1 and thus rotate the shaft 9 in one direction or the other. The rotation of these driven shafts 8, 9 operates to govern different electrical devices respectively. Thus the rotation of hollow shaft 8 governs the tone volume of the radio receiving set, its gear 22 meshing with the toothed segment or gear 23 on the shaft 24 carrying the arm 25 of a rheostat indicated at 32 in an electric circuit 26 containing the amplifier indicated at 27 of the set's reproducer; and the rotation of shaft 9 governs the set's broadcasting-selecting de-

vice indicated generally at 28, this shaft's gear 29 meshing with the toothed sector or gear 30 on the shaft 31 of said device.

Electrical means for energizing said magnets and operating said electrical devices and mechanical parts are shown in Figure 1 somewhat diagrammatically.

An electric circuit 33 containing a source of electric energy indicated at 34 comprises main branches 35, 36. Branch 35 comprises secondary branches 35^1 and 32^2. Branch 35^1 is closed by turning the switch 37 into contact with the contact 38 to energize magnet 21 in said branch. When this switch 37 is turned into contact with contact 39, the branch 35^2 is closed containing magnet 20. Thus the broadcasting-station device 28 of the receiving set is controlled, by the switch 37 turned to energize either magnet 20 or 21 thereby turning shaft 31 of said device one way or the other.

The other main branch circuit 36 comprises secondary branches 36^1 and 36^2. Branch 36^1 is closed by turning the switch 40 into contact with the contact 41 to energize magnet 18 in said branch. When this switch is turned into contact with contact 42 the branch 36^2 is closed containing magnet 19.

Thus the volume of the radio receiving set is controlled by the switch 40 turned to energize either magnet 18 or 19 thereby turning the rheostat arm 25 one way or the other. A switch for opening and closing branch 35^1 and 35^2 is shown in Figure 2, and a like switch for opening and closing branches 36^1, 36^2 is shown in Figure 3. Each of these switches comprises three parallelly disposed leaf spring conductors 43, 44, 45 insulated at their fixed ends. the middle leaf 44 being connected with both branches and each of the other leaves being connected with only one of said branches, leaf 43 in Figure 2 being connected with branch 35^1 and leaf 45 with branch 35^2, and leaf 43 in Figure 3 being connected with branch 36^1 and leaf 45 with branch 36^2.

These switches are operated by one or the other projecting pin 46 in Figure 2, or 47 in Figure 3 striking in the rotation of the toothed sectors on which they are mounted, one side or the other of the middle leaf 44 and springing it away from one of the other leaves and into close contact with the other, thus opening the branch circuit containing the one branch circuit and securely closing that containing the other; depending on which way the toothed sector is turned.

Each of these branch circuits 35^1, 35^2, 36^1, 36^2 contains an electromagnet 48 whose bell crank armature 49 pivotally mounted at 50 strikes a pivotally mounted switch 51 and closes the contacts 52, 53 in an electric circuit 54 containing the motor 2.

In the modified form of the embodiment of the invention illustrated in Figure 4 the action is similar to that of the form illustrated in the other views.

In this Figure 4, the shaft 55 of the motor 2^1 extends from both ends of the motor, one end of the shaft carrying the driving bevel gear 56 (through which the broadcasting-station selecting device 28 of the radio receiving set is controlled) and the other end of the shaft carrying the driving bevel gear 57 (through which the volume of the set is controlled).

The driving gear 56 meshes at its opposite sides with the driven gears 58, 59 freely rotatable on the shaft 60 and having on their inner sides oppositely acting clutch members 61, 62 respectively. A sleeve 63 splined on shaft 60 has at its opposite ends the clutch members 64, 65 cooperating with the driven gears' clutch members 61, 62 respectively.

An armature bar 13^1 pivotally mounted at 15^1 has the fork 66 embracing the sleeve 63 and engaging in its groove 67 to operate said clutches. A pair of electromagnets 20^1, 21^1 on the opposite sides of the armature bar 13^1, when severally energized, swing this bar to cause the clutch members 62, 65, or the clutch members 61, 64 to engage and thus rotate the shaft 60 in one direction or the other, its gear 29^1 meshing with the gear or toothed segment 30^1 on the shaft 31 of the station-selecting device 28 of the set. The other driving gear 57 meshes with the gears 58^1 59^1 having the oppositely acting clutch members 61^1, 62^1 respectively.

A sleeve 63^1 splined on shaft 60^1 has at its oposite ends the clutch members 64^1, 65^1 cooperating with the driven gears' clutch members 61^1, 62^1 respectively. An armature bar 12^1 pivotally mounted at 14^1 has a fork 66^1 embracing the sleeve 63^1 and engaging in its groove to operate said clutches. A pair of electromagnets 18^1, 19^1 on the opposite sides of the armature bar 12^1, when severally energized, swing this bar to cause the clutch members 61^1, 64^1 or the clutch members 62^1, 65^1 to engage and thus rotate the shaft 60^1 in one direction or the other, this shaft's gear 22^1 meshing with gear 23^1 on shaft 24^1 which carries the arm 25 of the rheostat 32.

The electrical connections for energizing the magnets 20^1, 21^1, 18^1, 19^1 and operating the parts in this form illustrated in Figure 4 are the same as those shown in the other views for operating correspondingly numbered parts and devices.

The armature bars in Figure 4 are yieldingly held in neutral position by springs 68.

In Figure 5 is illustrated a slightly modified construction of certain parts illustrated in Figure 1. In this modification the armature bar 12 or 13 is shown as a pair of separate bars or members; one of them (13^2) carrying only one of the wheels (17) and the other (13^3) carrying the other wheel (16).

In this modification however both magnets 20, 21 might be simultaneously energized causing a contrary effect on the driven element's rotation. It is evident that the operative connection or contact of the circular portions 6, 7 of the driving element with the driven elements 10, 11 may be positively geared as well as merely frictional.

The invention being intended to be pointed out in the claims, is not to be limited to or by details of construction and arrangement of any embodiment thereof illustrated by the drawings and hereinbefore described.

I claim:

1. Electric controlling means of the character specified comprising an electric motor, a pair of opposed electromagnets, each in an independent circuit, an electrically operated switch for the motor circuit closable with each of the electromagnet circuits, a driving member connected with the motor to be actuated thereby, reversely driven elements, and a reversing clutch mechanism operable by the said electromagnets to throw one or the other of the driven elements into engagement with the said driving member.

2. Electric controlling means of the character specified comprising an electric motor, pairs of electromagnets, the several electromagnets being included in independent circuits, an electrically operated switch for the motor circuit closable with each of the electromagnet circuits, a driving member connected with the motor, reversely driven elements for each pair of electromagnets, and a reversing member for each pair of electromagnets to be actuated thereby for throwing one or the other of the driven elements into operative engagement with the driving element to reverse the direction of rotation.

3. Electric controlling means of the character specified comprising an electric motor, a pair of opposed electromagnets, each in an independent circuit, an electrically operated switch for the motor circuit closable with each of the electromagnet circuits, a drive member connected with the motor to be actuated thereby, reversely driven elements, and a pivoted member associated with the reversely driven elements and the electromagnets to be actuated by the latter to throw one or the other of the driven elements into engagement with the driving element to reverse the direction of rotation.

4. Electric controlling means of the character specified comprising an electric motor, a plurality of pairs of electromagnets, each magnet being in an independent circuit, an electrically operated switch in each of the electromagnet circuits for closing the motor circuit when a selected electromagnet circuit is closed, a driving member connected with the motor to be actuated thereby, reversely driven elements, and a reversing clutch mechanism operable by the said electromagnets to throw one or the other of the driven elements into engagement with the said driving member.

5. A remote radio control comprising an electric motor, a pair of electromagnets, each electromagnet being in an independent circuit containing a switch, an electrically operated switch for the motor circuit closable with each of the electromagnet circuits, a driving member connected with the motor, reversely driven elements connected with the radio control, and a reversing mechanism operable by the electromagnets for reversing the radio control.

6. A remote radio control comprising an electric motor, a pair of electromagnets, each electromagnet being in an independent circuit containing a switch, an electrically operated switch for the motor circuit closable with each of the electromagnet circuits, a driving member connected with the motor, reversely driven elements connected with the radio control, and means movable with the radio control for automatically operating the switch to break the operating circuit.

7. Electric controlling means of the character specified comprising an electric motor, a flexible disk adapted to be driven by the motor, a pivoted member provided with a rotatable element, and an electromagnet for actuating the pivoted member to bring the rotatable element thereof into contact with the said flexible disk.

8. Electric controlling means of the character specified comprising an electric motor, a flexible disk adapted to be driven by the motor, opposed rotatable elements at one side of the disk, opposed rotatable elements at the opposite side of the disk, electromagnets for actuating one set of rotatable elements to flex the disk and bring it into contact with one or the other of the opposite set of rotatable elements to reverse rotation of the parts.

9. Electric controlling means of the character specified comprising an electric motor, a flexible disk, a shaft connected with the motor and disposed at one side of the disk, rotatable elements fast to opposite ends of the shaft, other rotatable elements at the opposite side of the disk, and electromagnets for actuating the last mentioned rotatable elements to flex the disk and bring it into contact with one or the other of the rotatable elements mounted upon the said shaft.

10. Electric controlling means of the character specified comprising an electric motor, a shaft connected with the motor and provided at its ends with rotatable elements, flexible disks at opposite sides of the shaft, concentric shafts connected with the disks, pivoted members associated with the flexible disks and provided with rotatable elements, a pair of electromagnets for the pivoted members, an electrically operated switch for the motor circuit, and a switch for each electro-

magnet circuit to energize a selected electromagnet whereby to flex a disk and reverse its rotation.

In testimony whereof I have hereunto set my hand at Grand Rapids, Michigan, this 3rd day of June, 1930.

WARD MENTOR.