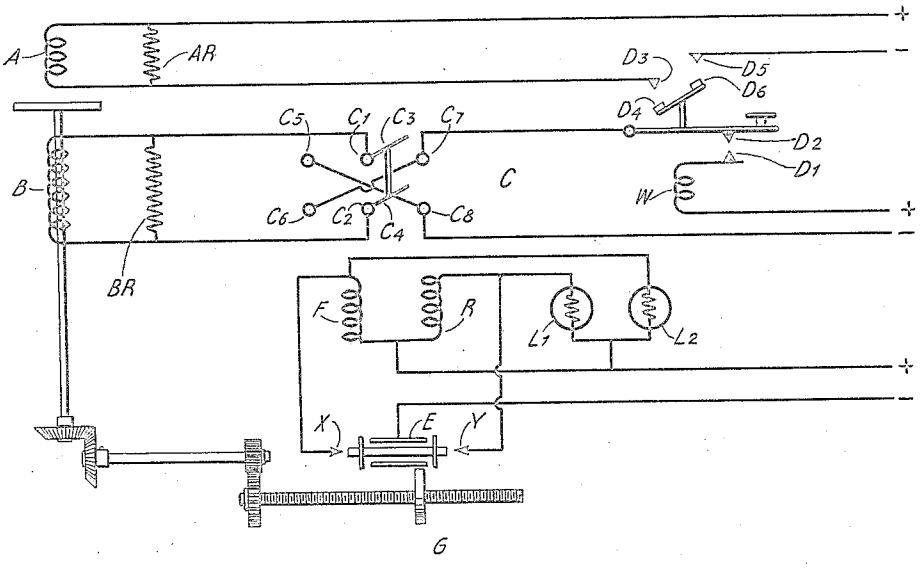
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ELECTRICAL REMOTE CONTROL SYSTEM

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ELECTRICAL REMOTE CONTROL SYSTEM

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This invention relates to electrical remote control systems and has for its object to provide a remote control system suitable for the control of an electric motor or other driving member which is required to be moved between limits of movement in either of two directions.

Although not limited to its application thereto the present invention is especially suitable for use for the remote control of electric motors operating collapsible aerial structures suitable for use on submarines. Such aerial structures may be operated either manually or by means of electric motors and the present invention provides a convenient control system for the control of such electric motors in the latter case.

According to this invention an electrical remote control system comprises a reversing switch device controlling the member to be controlled, means for operating said reversing switch device to change it over from one position into another and back again, switch contacts adapted to be actuated by the member to be controlled and connected in association with the means for actuating the reversing switch device, said switch contacts being so arranged that one is closed and the other opened when the member to be controlled reaches one extreme of travel and vice versa when the said member reaches the other extreme, manually operable contacts in series with the reversing switch contacts and with the member to be controlled and a hold-on winding in series with the said manually operable contacts for holding said contacts closed (once they are closed manually) until the circuit of said hold-on winding is broken elsewhere.

Preferably an electromagnetic brake is provided for arresting the movement of the member to be controlled and means interlocked with the manually operable contacts are provided for energizing said brake when said contacts are open.

The invention will now be described with reference to the accompanying diagrammatic drawing as applied to the control of an electric motor for hoisting and lowering an aerial structure.

Referring to the drawing the reversible motor for hoisting and lowering the aerial structure has its armature which is represented by the winding B connected across the middle pair of contacts of a reversing switch device generally designated C which contacts C1, C2, are permanently connected to the two arms C3, C4 of the switch, the remaining pairs of contacts C5, C6, C7, C8 being cross connected as in the usual way. A circuit extends from one terminal, say, the positive terminal of a source of supply, through a hold-on winding W through the normally open contacts D1, D2 of a manually operable switch D to contact C7, while contact C8 is connected to the negative terminal of supply. The reversing switch device which may in practice take any of a variety of different forms, e. g. it may be constituted by a pair of electromagnetic switches, is electromagnetically actuated by means of a pair of coils F and R whereby the switch device may be moved into its "forward" or "reverse" position according as to which coil is energized. A circuit extends from the positive terminal of the source of supply to the junction point of the two operating coils F R for the reversing switch device, the other end of the coil F being connected to a fixed contact X and the other end of the coil R being connected to another fixed contact Y. A slidable contact member E is movably mounted between the two fixed contacts X Y so that when said contact member is in one position it completes a circuit through one of the reversing switch coils while when it is in the other it completes a circuit through the other, said circuits being both completed through the slidable contact member E to the negative terminal of the source of supply. The slidable contact member is adapted to be moved back and forth by means of an abutment member G suitably mechanically geared or otherwise driven with the aerial structure or the motor driving the same so that when said aerial is moved into one extreme position the contact member E is moved into a position at which it completes a circuit for one actuating coil of the reversing switch device while when the aerial structure is moved into its other position, the contact member completes the circuit for the other reversing switch device coil. An electromagnetic brake A associated with the driving motor or with some other part of the driving structure is also provided, and this brake is adapted to be energized from the source of supply through pairs of contacts D3, D4, D5, D6 which are closed when the manually operable contacts D1, D2 are open and opened when said manually operable contacts are closed. The hold-on winding W is arranged when energized to attract an armature so as to maintain the manually operable contacts closed when once they have been closed. If desired a main or master switch (not shown) may be provided in series in the main lines of supply and resistances AR BR may be shunted across the electromagnetic brake winding and the motor armature.

The operation of the whole device is as follows:—

Suppose the reversing switch device is in such

a position that when the manually operable contacts D1, D2 be closed the driving motor will be driven in a direction to hoist the aerial, the slidable contact member E being, of course, in such a position as to complete the circuit of the appropriate reversing switch coil for holding the reversing switch device in the appropriate position for this direction of movement to be obtained. If now the manually operable contacts D1, D2 be closed by hand the driving motor will start to move in the stated direction, the manually operable contacts being held closed by the hold-on winding W. When the aerial has been hoisted the slidable contact member E will be moved to open circuit that reversing switch coil which has been energized during the movement last described, and will close the circuit for the other reversing switch coil, the reversing switch device being in consequence thrown over into its other position. The reversing switch device is so arranged that there is a short interval of time between the opening of the motor circuit for driving in one direction and the closing of the motor circuit for driving in the other, and in consequence, during this short interval of time, the circuit for the hold-on winding W is broken and the manually operable contacts D1, D2, permitted to open. Simultaneously with the opening of the manually operable contacts the contacts D3, D4, D5, D6, in series with the brake winding A are closed and the aerial is accordingly stopped, the motor circuit being held open at the manually operable contacts D1, D2, and the reversing switch being held in that position proper for driving the motor to lower the aerial. If now the manually operable contacts be again closed by hand, the motor will be energized to lower the aerial structure to be moved from whatever position it happens to be to the opposite position, the motor continuing to run until the said opposite position has been reached.

Preferably appropriately coloured indicating lamps L1, L2, e. g., a red lamp and a green lamp, are associated with the reversing switch coils, the two lamps being connected together on one side, the other terminal of one lamp being connected to the end of one coil, and the remaining terminal of the other lamp to the end of the other coil, the common terminal of the lamps (like the common terminal of the coils) being connected to the positive terminal of the supply.

Although the invention has been described with reference to the control of the hoisting and lowering mechanism of a submarine aerial structure, it is, of course, not limited to this application. Another application is to the remote re-tuning of a short wave aerial, which may be required to be re-tuned, for example owing to alteration of its impedance due to ice formation thereon. It is, of course, necessary that in a short wave beam or similar aerial system that the impedance of the aerial should match that of the feeder associated therewith and a relatively high degree of accuracy of matching is required if alteration in the load on the transmitter valves of a transmitter associated with such a short wave aerial is to be avoided. The present invention provides a convenient means for providing such remotely controlled re-tuning.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. An electrical remote control system comprising a device to be controlled, a reversing switch for controlling the device to be controlled, means for operating said reversing switch from one position to another and back again, a plurality of fixed contacts adapted to be actuated by the device to be controlled, said fixed contacts being connected and arranged with said operating means so that one contact is closed when the other contact is open after said device to be controlled reaches a predetermined extreme position of travel, and vice versa when said device reaches an oppositely disposed position, a pair of manually operated contacts connected in series with said reversing switch and the device to be controlled, an electromagnetic brake for arresting the movement of said device to be controlled and interlocking means connected with said manually operable contacts for energizing said brake when said manually operable contacts are open.

2. An electrical remote control system comprising a device to be controlled, a reversing switch for controlling the device to be controlled, means for operating said reversing switch from one position to another and back again, a plurality of fixed contacts adapted to be actuated by the device to be controlled, said fixed contacts being connected and arranged with said operating means so that one contact is closed when the other contact is open after said device to be controlled reaches a predetermined extreme position of travel, manually operable contacts connected in series with said reversing switch and the device to be controlled, an electromagnetic brake for arresting the movement of said device to be controlled and interlocking means connected with said manually operable contacts for energizing said brake when said manually operable contacts are open.

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