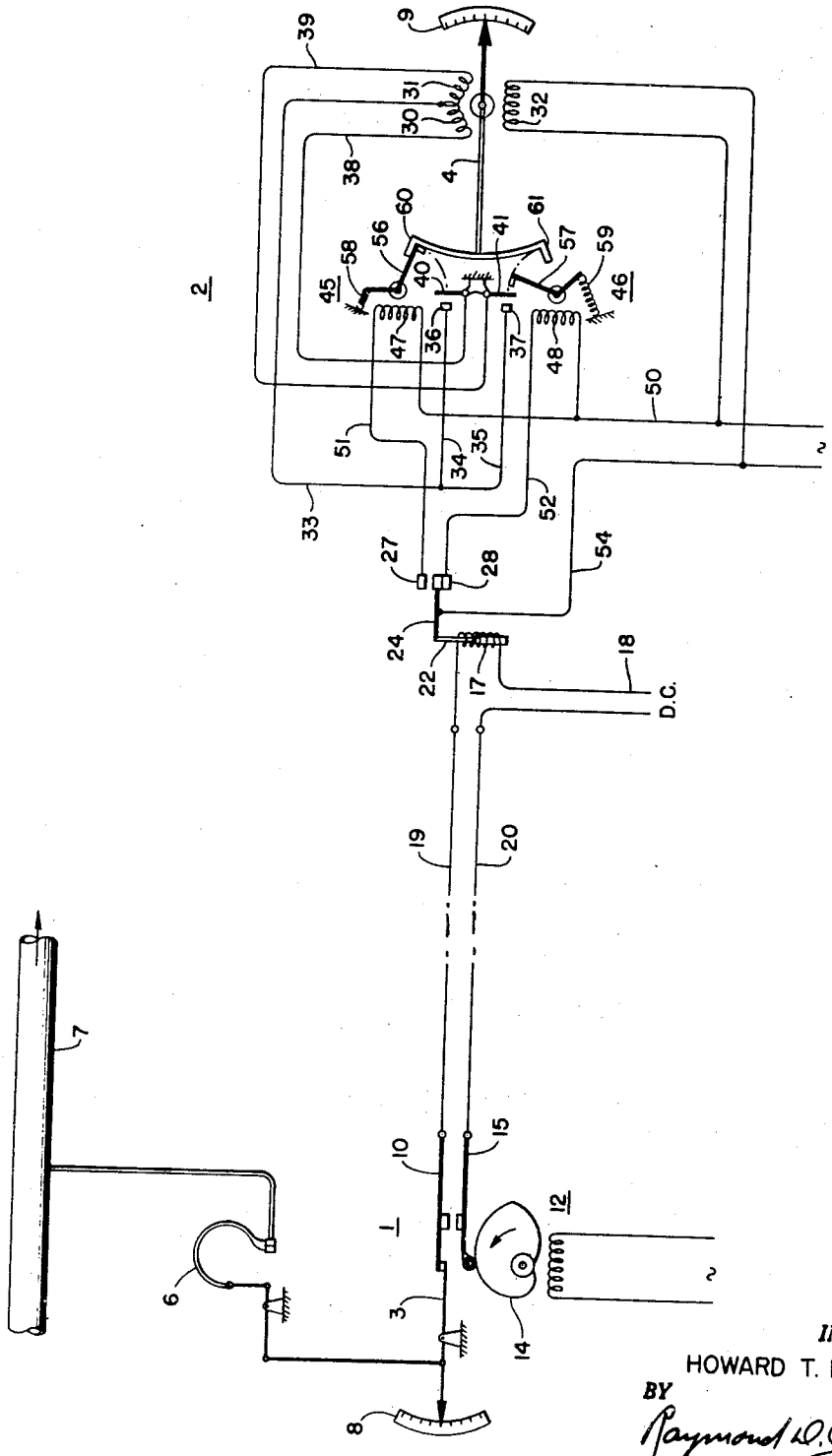
Nov. 9, 1948. H. T. HOFFMAN 2,453,686

TELEMETRIC SYSTEM

Filed Oct. 25, 1947



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Patented Nov. 9, 1948

2,453,686

UNITED STATES PATENT OFFICE

2,453,686

TELEMETRIC SYSTEM

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Application October 25, 1947, Serial No. 782,113

12 Claims. (Cl. 318—18)

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This invention relates to telemetric systems, and more particularly to telemetric systems in which a receiver is adapted to operate periodically in response to signals from a transmitter and adjust a receiving or indicating member until it is in correspondence with a transmitting member.

A preferred embodiment of my invention may include motors operating in response to transmitted signals and controlling circuits of another motor which positions a receiving or indicating member. Changes in position of the receiving member regulates the control effected by the first motors in such a manner that operations of the motor positioning the receiving member is reduced as it is brought into correspondence with the transmitting member. When the two members are in exact correspondence, the control is so regulated that no operation of the indicator motor is obtained.

An object of my invention is to provide an improved telemetric system. Another object is to provide a telemetric system having a receiver adapted for operation in response to signals transmitted at a low voltage by a transmitter. Still another object is to provide in an improved telemetric system a receiver having means operating in response to transmitted signals and under the control of a receiving member for regulating the position of the latter. Other objects will appear in the course of the following description.

In the accompanying drawing there is shown for purposes of illustration a schematic diagram of my improved telemetric system.

Referring to the drawing it will be noted that there is shown a transmitter 1 and a receiver 2, the transmitter having a pivoted transmitting member 3 which is positioned in response to changes in some variable condition, and the receiver having a receiving or indicating member 4 adapted to be moved to positions corresponding with those of the transmitting member. A suitable device 6, such as a Bourdon tube, is operatively connected to the transmitting member for positioning the latter in response to changes in some variable condition, such as pressure or temperature in a conduit 7. Scales 8 and 9 are shown cooperating with the transmitting and receiving members respectively to provide a reading of the changes in the condition. A pivoted contactor 10 is operatively engaged by the transmitting member so as to be positioned by the latter. The transmitter is also provided with a constant speed motor 12 driving a substantially uniform rise cam 14 in the direction of the arrow. A pivoted contactor 15 engages the periphery of the cam

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14 and is periodically reciprocated by the latter to engage the contactor 10 during time intervals varying with the positions of the contactor 10 determined by the member 3.

At the receiver is a relay having a winding 17 connected at one end by a conductor 18 to one side of a D. C. source, and connectable at its other end through a conductor 19, the contactors 10, 15, and a conductor 20 to the other side of the D. C. source. A relay armature 22 carries a contact arm 24 engageable with one or the other of a pair of contacts 27, 28 for controlling circuits shortly to be described.

The receiving member 4 is shown diagrammatically arranged to be positioned by a reversible motor having shading poles 30, 31, and a field winding 32 continuously energized from a source of alternating current. Rotation of the motor in one direction is effected by short circuiting the pole winding 30, while rotation in the opposite direction is effected by short circuiting the winding 31. If the pole windings are both open circuited or both short circuited, the motor remains stationary and is not urged to rotation in either direction. The adjacent ends of the pole windings are connected by a common conductor 33 and branch conductors 34, 35 to stationary contacts 36 and 37, and the other ends of the pole windings 30, 31 are connected respectively by conductors 38, 39 to contactors 40, 41 engageable with the contacts 36 and 37, respectively, and normally assuming positions out of engagement with such contacts.

When the contactor 40 is forced into engagement with contact 36, a circuit is completed short circuiting the pole winding 30 so as to effect an operation of the motor to swing the receiver member 4 in a clockwise direction. An engagement between the contactor 41 and the contact 37 results in a short circuiting of the pole winding 31 and an operation of the motor to swing the receiving member in a counterclockwise direction. Movement of the contactors 40, 41 into engagement with the contacts 36, 37 is accomplished by constant speed motors 45, 46 having windings 47, 48 connected at one end to a conductor 50 leading to a source of alternating current, and connected at their other ends to conductors 51, 52 leading to the contacts 27, 28. The contact arm 24 is connected by a conductor 54 to the source of alternating current and operates on engagement with contact 27 or 28 to complete a circuit for energizing the winding 47 or the winding 48. Operatively connected to the motors 45, 46 are members 56, 57 normally held by springs

58, 59 in engagement with abutment portions 60, 61 carried by the receiving member 4, and the members 56, 57 are adapted to be moved by the motors into engagement with the contactors 40, 41 for forcing the latter against the contacts 36, 37. The abutment portions 60, 61 are so spaced that the time required by the motor 45 to move the member 56 from the abutment 60 to a point where it forces the contactor 40 into engagement with the contact 36 plus the time required by the motor 46 to move the member 57 from the abutment 61 to a point where it forces the contactor 41 into engagement with the contact 37 equals the time required for the cam 14 to make one complete revolution. The cam 14 is of such shape that the time intervals during which the contactors 10 and 15 are engaged and disengaged when the transmitting member 3 is in the position shown, are equal.

The operation of the mechanism described is as follows:

The cam 14 is shown moving the contactor 15 towards the contactor 10 with only a short distance remaining to travel before engagement between the contactors is completed. With the contactors disengaged, the relay winding 17 is deenergized and the armature 22 is in such a position that its contact arm 24 engages the contact 28 and completes the circuit through the motor winding 48, causing the motor 46 to operate and swing the member 57 towards the contactor 41. With the receiving member 4 in correspondence with the transmitting member as shown, the member 57 will reach a point to close contactor 41 with contact 37 just as the cam 14 moves the contactor 15 into engagement with the contactor 10. Closing of contactors 10 and 15 energizes the relay winding 17 to move the armature 22 to such a position that the contact arm 24 engages the contact 27. A circuit is then completed from the source of alternating current through the conductor 54, the contact arm 24, the contact 27, conductor 51, motor winding 47 and conductor 50 to effect operation of the motor 45 in a direction to move the member 56 towards the contactor 40. Movement of the contact arm 24 away from the contact 28 results in a deenergizing of the motor winding 48 and a repositioning of the member 57 against the abutment portion 61 by the spring 59. By the time that the motor 45 moves the member 56 to a position to connect the contactor 40 with the contact 36, the cam 14 will be in a position to permit contactor 15 to move away from contactor 10 and deenergize the relay winding 17. This results in a deenergization of the motor winding 47 so that the member 56 is returned to the abutment portion 60 by the spring 58, and an energizing of the motor winding 48 to move the member 57 towards the contactor 41.

If the condition changes so that the transmitting member 3 is actuated to move the contactor 10 to a position spaced further from contactor 15, it will be seen that the time periods during which the contactors 10 and 15 are disengaged and engaged will be correspondingly increased and decreased, respectively. The increased period of disengagement between these contactors will result in a holding of contact arm 24 in engagement with contact 28 for a time after the member 57 has been moved from the abutment portion 61 in the position shown, to a point where it holds the contactor 41 in engagement with the contact 37. This completes a circuit from the contact 37 through the conductors 35, 33, the pole winding 31, and the conductor 39 to the contactor 41, thereby short circuiting the pole winding 31 and effecting operation of the motor to move the receiving member 4 in a counterclockwise direction. The abutment portions 60 and 61 are moved with the receiving member to decrease and increase, respectively, the distances of travel required by the members 56 and 57 to engage the contactors 40 and 41. When the contactor 15 is finally moved into engagement with the contactor 10, the member 56 will be moved by the motor 45 from its position nearer to contactor 40, towards the latter. If the time required to move the member 56 to a position engaging contactor 40 with contact 36 is less than the time period during which contactors 10 and 15 are held closed, then a circuit will be completed from the contact 36 through the conductors 34, 33, pole winding 30, and the conductor 38 to the contactor 40, thereby short circuiting the winding 30 and effecting operation of the motor to position the receiving member 4 in a clockwise direction. As soon as the member 4 reaches a position in correspondence with the new position of the transmitting member 3, the travel distances for the members 56 and 57 will be adjusted so that they reach points to actuate the contactors 40 and 41 just as the contactors 10 and 15 are being opened and closed. A change in the position of the transmitting member 3 to position the contactor 10 nearer to the contactor 15 results in an operation of the motor to position the receiving member 4 in a clockwise direction from the position shown, thereby increasing and decreasing the travel required by the members 56 and 57, respectively.

While there is described in this application one form which my invention may assume in practice, it will be understood that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent is:

1. A telemetric system comprising, in combination, a transmitter operating to transmit a signal during portions of fixed time periods, said portions varying directly with changes in a variable, a receiver including a movable receiving member, a reversible motor for positioning said receiving member, circuits operable selectively for energizing said motor to effect its operation in one direction or the other, control members movable towards and away from positions for closing said circuits, abutments movable with said receiving member and engageable by said control members for limiting movement of the latter away from their circuit closing positions, means for yieldingly holding said control members in engagement with said abutments, motors for moving said control members from said abutments toward their circuit closing positions, means operating in response to said transmitted signal for energizing one of said motors, and means operating on the termination of said signal for energizing the other of said motors.

2. The system of claim 1 in which a closing of either one of said circuits effects operation of said reversible motor in a direction to position said abutments so as to increase the travel distance required by the one of said members operating to close the circuit.

3. A telemetric system comprising, in combination, a transmitter operating to transmit a signal during portions of fixed time periods, said portions varying directly with changes in a variable condition, a receiver including a movable re-

ceiving member, a reversible motor having opposed shading poles and operable to position said receiving member, circuits operable selectively for short circuiting one or the other of said shading poles to effect operation of said motor in one direction or the other, control members movable towards and away from positions for closing said circuits, abutments movable with said receiving member and engageable by said control members for limiting movement of the latter away from their circuit closing positions, means for yieldingly holding said control members in engagement with said abutments, means operating in response to said transmitted signals for moving one of said control members at a constant speed toward its circuit closing position, and means operating on termination of said signal for moving the other of said members at a constant speed toward its circuit closing position.

4. A telemetric system comprising, in combination, a transmitter operating to transmit a signal during portions of fixed time periods, said portions varying directly with changes in a variable, a receiver including a movable receiving member, a reversible motor for positioning said receiving member, circuits operable selectively for energizing said motor to effect its operation in one direction or the other, means operating during the transmission of said signal for completing one of said circuits, means operating during the absence of said signal for completing the other of said circuits, and means adjustable by said receiving member for regulating the time periods of operation required by each of said last two mentioned means to complete said circuits.

5. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits operable selectively for energizing said motor to effect its operation in one direction or the other, means operating during time periods proportional to transmitted signals for completing said circuits, and means adjustable by said receiving member for regulating the time periods of operation required by said means to complete said circuits.

6. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor having opposed shading poles and operable to position said receiving member, means including contactors normally held in open positions and operable to short circuit said shading poles, members for actuating said contactors, abutments carried by said receiving member and engageable by said members for limiting movement of the latter away from said contactors, yielding means for holding said members normally in engagement with said abutments, motors for moving said members at constant speed towards said contactors, and means including a relay operating in response to transmitted signals for controlling the energizing of said motors moving said members.

7. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits operable selectively for energizing said motor to effect its operation in one direction or the other, a contactor included in each of said circuits and normally held in an open position, members for moving said contactors toward their closed positions, abutments movable with said receiving member and engageable by said members for limiting movement of the latter away from said contactors, means for yieldingly holding

said members in engagement with said abutments, motors for moving said members from said abutments toward said contactors, and means operating in response to transmitted signals for controlling the energizing of said motors moving said members.

8. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits for energizing said motor to effect its operation in one direction or the other, said circuits including contactors normally held in open positions, means including constant speed motors for closing said contactors, means responsive to transmitted signals for effecting consecutive energization of said constant speed motors, and means adjustable with said receiving member for varying the operation required by said constant speed motors to effect a closing of said contactors.

9. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits for energizing said motor to effect its operation in one direction or the other, said circuits including contactors normally held in open positions, means including constant speed motors for closing said contactors, means operating in response to transmitted signals for effecting consecutive energization of said constant speed motors, and means adjustable with said receiving member for increasing the operation required by one of said constant speed motors and decreasing the operation required by the other of said constant speed motors, to effect a closing of said contactors.

10. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits for energizing said motor to effect its operation in one direction or the other, said circuits including contactors normally held in open positions, means including constant speed motors for closing said contactors, means including a relay normally held in a position to energize one of said constant speed motors and operating in response to transmitted signals for energizing the other of said constant speed motors, and means adjustable with said receiving member for varying the operation required by said constant speed motors to effect a closing of said contactors.

11. A telemetric receiver comprising, in combination, a movable receiving member, a reversible motor for positioning said receiving member, circuits for energizing said motor to effect its operation in one direction or the other, said circuits including contactors normally held in open positions, means including constant speed motors for moving said contactors toward circuit closing positions, means normally energizing one of said constant speed motors and operating in response to transmitted signals for energizing the other of said constant speed motors, and means movable with said receiving member for varying inversely the travel required by said contactors to reach circuit closing positions.

12. The receiver of claim 11 in which said last mentioned means moves so as to increase the travel distance required by the contactor then closing a circuit for energizing said reversible motor and to decrease the travel distance required by the other of said contactors.

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No references cited.