

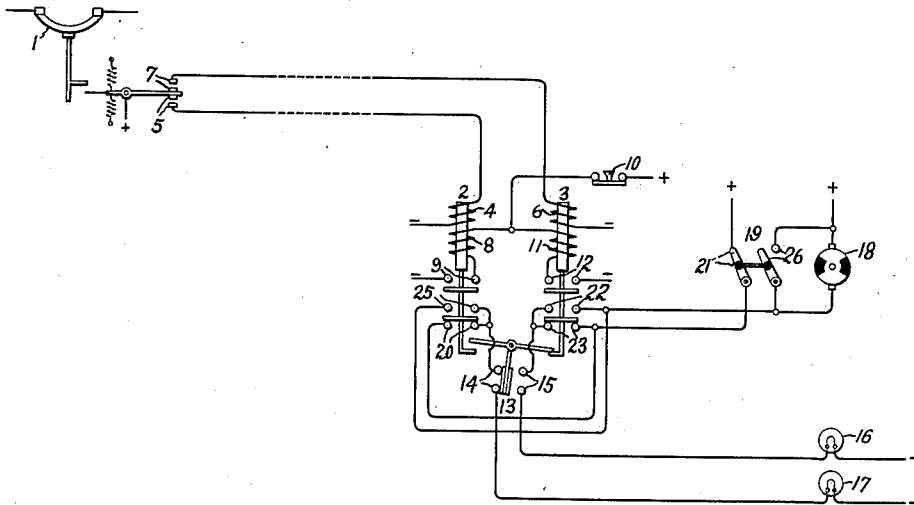
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G. MEINERS

1,979,114

REMOTE INDICATING SYSTEM

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UNITED STATES PATENT OFFICE

1,979,114

REMOTE INDICATING SYSTEM

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1 Claim. (Cl. 177—311)

My invention relates to remote indicating systems and particularly to systems for remotely indicating the position and the change in the position of a movable device, such as a circuit breaker, a switch, a regulator, etc.

It has been common practice in remote indicating systems to indicate at a remote station changes which occur in the position of a two-position device by means of a lamp which is lighted when the device is in one position and is not lighted when the device is in its other position. Such an arrangement has the disadvantage that in large stations where there are many devices having positions to be indicated, it requires a relatively large amount of current simultaneously to light all of the lamps. Such an arrangement also has the disadvantage that there is no way of telling whether an unlighted lamp is due to the corresponding device being in a certain position or whether it is due to the burning out of the lamp.

One object of my invention is to provide a simple and reliable arrangement in which these disadvantages are removed. In accordance with my invention, I provide an arrangement whereby by means of a reversing switch either of two indicating systems may be employed to indicate the position of a control device. When the reversing switch is in one of its positions, the existing position of a control device is indicated by a lamp which corresponds to that position and which is lighted continuously and a change from that position is indicated by another lamp which corresponds to the new position of the device and which is intermittently lighted. When the reversing switch is in its other position, the existing position of the device is indicated by the lamp corresponding to that position not being lighted and a change from that position is indicated by the lamp corresponding to the new position being lighted continuously.

My invention will be better understood from the following description when taken in connection with the accompanying drawing which diagrammatically illustrates a circuit breaker indicating system embodying my invention and its scope will be pointed out in the appended claims.

Referring to the accompanying drawing, 1 represents a circuit breaker, the position of which it is desired to indicate at a remote point. At the remote point, there are provided two relays 2 and 3 which are respectively energized in accordance with the position of the circuit breaker 1. As shown, the relay 2 is provided with an operating winding 4, the circuit of which is arranged to

be completed momentarily by auxiliary contacts 5 associated with the circuit breaker 1 when the circuit breaker moves from its open position to its closed position. The relay 3 is provided with a similar operating winding 6 the circuit of which is arranged to be completed momentarily by auxiliary contacts 7 associated with the circuit breaker 1 when it moves to its open position. The relay 2 is also provided with a holding winding 8, the circuit of which is completed through contacts 9 of the relay 2 when its operating winding 4 is energized. The circuit of the winding 8 also includes the contacts of a manually controlled switch 10 which is normally closed. The relay 3 is similarly provided with a holding winding 11 the circuit of which is completed through the contacts of the switch 10 and the contacts 12 of the relay 3 when the operating winding 6 is energized. The two relays 2 and 3 are arranged in any suitable manner, examples of which are well known in the art so that they control a reversing switch 13 in such a manner that the energization of either of these relays causes the switch 13 to be moved to a corresponding position in which position the switch 13 remains until the other relay is energized. As shown in the drawing, the energization of the relay 2 causes the reversing switch 13 to close its contacts 14 and the energization of the relay 3 causes the reversing switch 13 to close its contacts 15.

The position of the switch 1 is indicated at the remote point by the indicating electric lamps 16 and 17, the circuits of which are selectively controlled by the relays 2 and 3 and the reversing switch 13 in accordance with the position of the circuit breaker 1 and any change in the position thereof. 18 represents any suitable interrupter, examples of which are well known in the art, for intermittently interrupting an electric circuit and 19 represents a manually controlled reversing switch which determines by its position the particular manner in which the lamps 16 and 17 are selectively controlled by the relays 2 and 3 and the reversing switch 13. The lamps 16 and 17 are usually colored differently, one usually being green and the other red, corresponding to the open and closed position of the circuit breaker.

With the circuit breaker 1 closed, the switch 19 in the position shown, both of the holding windings 8 and 11 deenergized and the reversing switch 13 in the position shown, the lamp 17 is lighted by means of a circuit which includes the contacts 14 of the reversing switch 13, contacts 20 of the deenergized relay 2 and the closed

contacts 21 of the reversing switch 19. The lighted lamp 17 indicates that the switch 1 is in its closed position.

It will now be assumed that the circuit breaker 1 is opened in any suitable manner, examples of which are well known in the art. In moving towards its open position, the circuit breaker momentarily closes its auxiliary contacts 7 and thereby completes an energizing circuit for the operating winding 6 of the relay 3. The relay 3, by closing its contacts 12, completes through the contacts of the switch 10 an energizing circuit for the holding winding 11 so that the relay 3 remains in its energized position after the circuit of the operating winding 6 is interrupted at the auxiliary contacts 7 of the circuit breaker 1. The relay 3 also closes its contacts 22 and operates the reversing switch 13 so that it opens its contacts 14 and closes its contacts 15. The above traced circuit for the lamp 17 is, therefore, opened and a circuit is intermittently completed for the lamp 16 to indicate that the circuit breaker 1 has moved from its closed position to its open position. This circuit for the lamp 16 includes the contacts 15 of the reversing switch 13, the contacts 22 of the energized relay 3 and the interrupter 18. This circuit of the lamp 16 continues to be completed intermittently by the interrupter 18 until the operator acknowledges the indication by operating the switch 10 to open the circuit of the holding winding 11 of the relay 3. When the switch 10 is opened, the relay 3 opens its contacts 22 and closes its contacts 23, thereby completing through the contacts 15 of the reversing switch 13 and the switch 21 of the reversing switch 19 a circuit for the lamp 16 so that the lamp remains continuously lighted.

It will now be assumed that the circuit breaker 1 is reclosed in any suitable manner. In moving to its closed position, the circuit breaker 1 momentarily closes its auxiliary contacts 5 so that the operating winding 4 of the relay 2 is energized. The relay 2 by closing its contacts 9 completes through the contacts of the switch 10 an energizing circuit for the holding winding 8 of the relay 2 so that the relay remains in its energized position after the auxiliary contacts 5 of the circuit breaker 1 are opened. The relay 2 also closes its contacts 25 and operates the reversing switch 13 so that it opens its contacts 15 and closes its contacts 14. A circuit is then intermittently completed for the lamp 17 to indicate that the circuit breaker 1 has moved from its open position to its closed position. This circuit for the lamp 17 includes the contacts 14 of the reversing switch 13, the contacts 25 of the relay 2 and the interrupter 18. The lamp 17 continues to be lighted intermittently until the operator acknowledges the indication by opening the switch 10 to effect the deenergization of the holding winding 8 of the relay 2. A circuit is then completed for the lamp 17 through the contacts 14 of the reversing switch 13, contacts 20 of the relay 2 and the contacts 21 of the reversing switch 19 so that the lamp 17 now remains continuously lighted.

With the reversing switch 19 in the position shown in the drawing, it will be seen that when either the lamp 16 or 17 is continuously lighted, it indicates that the circuit breaker 1 is in the corresponding position and when either of these lamps is intermittently lighted it indicates that the circuit breaker has changed its position and

is in the position corresponding to the lamp which is being intermittently lighted.

It will now be assumed that while the circuit breaker 1 is closed, the reversing switch 19 is moved to its other position, in which position the contacts 21 are opened and the contacts 26 complete a short-circuit around the interrupter 18. The opening of the contacts 21, when the switch 19 is moved to its right-hand position, interrupts the above traced circuit for the lamp 17. Therefore, with the switch 19 in its right-hand position, the existing position of the circuit breaker 1 is indicated by both of the lamps 16 and 17 not being lighted.

Let it be assumed that while the switch 19 is in its right-hand position, the circuit breaker 1 opens so that it effects the energization of the relay 3 and the operation of the reversing switch 13 in the manner above described. A circuit is then completed for the lamp 16 so that the lamp is lighted continuously to indicate that the circuit breaker 1 has moved from its closed position to its open position. This circuit of the lamp 16 includes the contacts 15 of the reversing switch 13, the contacts 22 of the energized relay 3 and the contacts 26 of the reversing switch 19. The lamp 16 remains lighted until the switch 10 is opened. The circuit of the lamp 16 is then opened by the relay 3 opening its contacts 22.

When the circuit breaker 1 is reclosed while the reversing switch 19 is in its right-hand position, the circuit breaker effects the energization of the relay 2 and the operation of the reversing switch 13 in the manner above described. A circuit is then completed for the lamp 17 so that it is lighted continuously to indicate that the circuit breaker 1 has moved from its open position to its closed position. This circuit of the lamp 17 includes the contacts 14 of the reversing switch 13, contacts 25 of the energized relay 2 and the contacts 26 of the reversing switch 19. The lamp 17 remains lighted until the switch 10 is opened to interrupt the circuit of the relay 2. The relay 2, by opening its contacts 25, opens the circuit of the lamp 17.

From the above description, it will be seen that when the reversing switch 19 is in its right-hand position, the lamps 16 and 17 are lighted only when a change in the position of the circuit breaker 1 occurs. The lamp 17 is lighted when the switch 1 moves from its open position to its closed position and the lamp 16 is lighted when the switch moves from its closed position to its open position.

When the reversing switch 19 is in its right-hand position and the lamps are not lighted, the arrangement normally indicates that the circuit breaker 1 has not changed its position since the last indication was noted by the operator opening the switch 10. There is a possibility, however, that, due to the burning out of a lamp, the circuit breaker 1 may have changed its position without effecting the lighting of one of the lamps. The operator may readily determine whether the lamp corresponding to the position occupied by the circuit breaker has burned out by moving the reversing switch 19 to its left-hand position. If a lamp is continuously lighted in response to the movement of the switch 19 to its left-hand position, the lighted lamp indicates the position of the circuit breaker, that the circuit breaker has not changed its position since the last indication was noted by the operation of the switch 10 and that the lamp has not burned out. If, however, the movement of the switch 19 to its

left-hand position results in no light being light-
ed, the operator is then informed that at least one
of the lamps has burned out. By replacing the
lamps with new ones, he can then determine
5 which one has burned out.

While I have, in accordance with the patent
statutes, shown and described my invention as
applied to a particular system and as embodying
various devices diagrammatically indicated,
10 changes and modifications will be obvious to
those skilled in the art and I, therefore, aim in
the appended claim to cover all such changes
and modifications as fall within the true spirit
and scope of my invention.

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

In a remote indicating system, a movable de-
vice having two positions, two signals correspond-
ing respectively to different positions of said mov-
able device, a two position control switch, means
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operative when said switch is in one of its posi-
tions for effecting the continuous operation of the
corresponding signal in response to the move-
ment of said device to either of its positions,
means for discontinuing the operation of a sig- 80
nal while said device remains in the position cor-
responding thereto and said switch is in said one
of its positions, means operative when said switch
is in the other of its positions for effecting an 85
intermittent operation of the corresponding sig-
nal in response to the movement of said device
to either of its positions, and means responsive
to the operation of said discontinuing means
while said switch is in said other of its positions
and the signal corresponding to the position oc- 90
cupied by said device is being intermittently op-
erated for effecting the continuous operation of
the signal corresponding to the position occupied
by said device.

GUSTAV MEINERS. 95

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