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CONTROL SYSTEM FOR TRANSMITTERS

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1 Claim. (Cl. 307—115)

The present invention relates to the electrical signalling art and more specifically pertains to a switching system for shifting control of electrical operating units such as transmitters to any one or more remote control stations.

In communication centers such as those for emergency purposes it is the practice to provide a plurality of transmitters which are supplied from separate electrical sources having different voltages and the phase relationship of the energy sources are often displaced with respect to each other. Transmitter installations of such a character have been used on board ships and particularly naval vessels. It is desirable in operating such communication equipment to control any one of the transmitters of the group or all from any one of a number of remotely located control stations and the apparatus should be such as to make it possible to shift operation and the control of any one of the transmitters to any one control station so as to energize the transmitter, control the operation thereof and to terminate energization of the transmitter.

The equipment available in the past for such purposes includes switches having swingable contact blades which are so connected to the respective transmitters that twelve switches having twelve circuit making contacts have been necessary for shifting the control of six transmitters to two remote control stations. The prior equipment for shifting the control of transmitters to control stations has included mechanical interlocking means which has made the apparatus bulky and awkward so as to occupy an excessive amount of space particularly when used on board a ship. In operation of the prior equipment it has been possible to parallel the control circuits of the transmitters even though the switching equipment has been provided with mechanical interlocking means. When the control circuits of the transmitters are connected in parallel circuit relationship the transmitter equipment as well as to the switching elements have been damaged. In the past it has often been necessary to replace elements of the system and the time consuming delays occasioned by such repairs are undesirable particularly during emergencies.

An object of the present invention is to provide a system including switches so constructed and connected in circuit arrangements as to entirely eliminate the possibility of interconnection of the control circuits of the transmitters to thereby eliminate damage which has occurred in the past to the switch units and the transmitter control units as a result of parallel connections of the control circuits and the energizing supply sources.

Another object of the invention is to provide a transmitter control switching system which includes switches of such structure and circuits thereto which make it impossible to connect the transmitters control circuits in parallel and which permits any one of the transmitters to be connected so as to be operated by any one or all of the remote control stations.

A still further object of the invention is to provide a switching system for transferring the control of a trans-

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mitter of a group to any one of a plurality of remote control stations and to eliminate a large number of switches required for a control system of the same scope in the past.

5 Other objects and features of the invention will become apparent to those skilled in the art to which the present invention pertains and upon consideration of the following detailed description and the accompanying drawing wherein an exemplary embodiment of the invention is disclosed.

10 The drawing is a circuit diagram of some of the elementary controls for a representative group of transmitter control units in association with two representative remote control stations.

15 The present invention is directed to the switches and the circuits therefor making up a system for transferring the control of electrical equipment and particularly the control of transmitters. Selected portions of control elements and circuits for two transmitters are shown at 20 10 and 11 in the drawing. These are representative for illustrating an embodiment of the invention and the switches and the circuits shown is capable of transferring the control of six transmitters. The transmitter control elements making up the unit 10 is adapted to be 25 supplied from an electrical source 12 at a one voltage such as two hundred and forty volts. Another portion of the transmitter control unit 10 may be supplied with energy from a source 14 having a voltage of one hundred and ten. The transmitter control elements making 30 up the unit 11 may be supplied with electrical energy from a source 16 having a voltage of one hundred twenty volts and another portion of this transmitter control unit is supplied from a source 17 having voltage at two hundred and twenty volts. The phase relationship of 35 each of these electrical sources may be displaced from each other. It is therefore essential to avoid the paralleling of the transmitter control unit 10 with the transmitter control unit 11 and in cases where there are additional transmitter units supplied with even different volt- 40 ages it is important to avoid the circuit connections which would provide for the control of any one transmitter being in parallel circuit relationship with the control of another.

A plurality of control stations are provided located 45 remotely of the transmitters and their control units. When the system is on board a ship the remote control stations are usually located in different positions on the vessel. Any number of remote control stations are provided and in some cases there are more remote stations 50 than there are transmitters. Two of such stations located in areas removed from the control units for the transmitters are shown at 18 and 19.

There is shown at 21 a switch assembly providing a part of means for transferring the control of any transmitter unit of the group to the remote control station 18. 55 This switch assembly includes a plurality of blades or wiper arms 22 which are mechanically coupled so as to rotate in unison by mechanical means diagrammatically represented at 23. Each swingable blade 22 is arranged 60 to engage fixed contacts 24 arranged in a circular outline and circumferentially spaced from each other. An "off" position may be provided for each blade 22. The fixed contacts 24 are so spaced that the wiper arms 22 disengage one contact of each arcuate group before the blade engages the next adjacent contact. Thus the remote control station 18 is disconnected from one transmitter or operating unit before the wiper arms may make circuit establishing engagement with other contacts 24 con- 65 nected to another transmitter unit. In the drawing some of the control elements for a transmitter are shown in association with each remote control station 18 and 19 and some elements of each transmitter or operating unit 70

are illustrated. In the embodiment disclosed each remote control station has six terminals but additional terminals and conductors leading therefrom may be employed.

The transmitter control unit 10 may be energized and controlled from the remote control station 18 when the wiper blades 22 of the switch assembly 21 are in the position shown in the drawing and in engagement with the "number ten" contacts 24. When the switch assembly 21 is in this position the transmitter is energized by actuation of the push button 27 to close its contacts. A circuit is then established from one side of the source 12 through a conductor 28, one blade 22 of switch assembly 21 to the conductor 29, the closed contacts of the push button 27, the conductor 31, another blade of switch assembly 21, the conductor 32, a relay coil 33, the conductor 34, a resistor 26 to the other side of the supply source 12. The relay coil 33 is energized and the contacts 37 are closed to provide a holding circuit for maintaining energization of the relay coil 33 when the push button 27 returns to an open position. The contacts 39 are closed when the relay coil 33 is energized to complete a circuit energizing the signal lamp 41. This circuit includes a conductor 42, a lead 43, another blade 22 of switch assembly 21, the wire 44, and the closed contacts 39. A circuit is also established from the supply source 14 through a keying relay coil 46, the conductor 47, another blade 22 of switch assembly 21, lead 48, closed contacts of the jack plug 49, the conductor 51, another blade 22 of switch assembly 21 whereby operation of the transmitter may be carried on from the remote control station 18. When it is desired to interrupt energization of the transmitter or operating unit 10, the push button 53 is actuated to its closed contacts. A circuit is then established through the lead 32, another blade 22 of switch assembly 21, conductor 31, the closed contacts of the push button 53, a conductor 56, another blade 22 of switch assembly 21, a lead 57 to short circuit the terminals of the relay coil 33 through the resistance 26. The relay 33 then moves to its open position and the transmitter or operating unit 10 is deenergized.

While there are but six terminals 60 shown in association with the remote control station 18 all necessary elements may be embodied in the remote control stations and as many conductors as are necessary may extend therefrom to provide for full operation of the transmitter or other electrical apparatus. It will be observed that each conductor from the remote control station 18 is connected to a wiper arm 22 of the switch assembly 21. The arrangement shown in the drawing is illustrative of apparatus exhibiting the invention and additional control features have been avoided in order that the invention may be more readily appreciated and understood. Each of the six terminals 60 of the remote control station 18 is connected to a terminal 25 which is in turn connected to a wiper arm 22 of the switch assembly 21. When more leads are employed extending from the remote control station 18 additional wiper arms 22 and associated circumferentially spaced contacts 24 will be provided with the blades 22 mechanically coupled to the others. The elements making up the unit 10 represent a portion of the equipment required for initiating operation of and controlling a transmitter. The leads from the operating unit 10 extend to terminals 65. Each terminal 65 is connected to the "number ten" of the groups of contacts 24. When additional leads extend from the unit 10 such conductors would be connected to additional terminals 65 with conductors leading therefrom to the "number ten" contact of additional circumferentially spaced groups of contacts 24. The operating unit 10 is provided with terminals 55 for detachable connection of the conductors.

The system includes a switch assembly 61 similar to the switch organization 21. This switch assembly 61 includes a plurality of blades 62 which are similar in construction to the wiper arms 22 and all of the blades 62

are mechanically coupled so as to swing in unison by mechanical means diagrammatically represented at 63. The contacts 64 of the switch assembly 61 are similar to those shown at 24 and described in connection with the switch assembly 21.

The remote control station 19 is provided with terminals 70 which are connected to the switch blades 62 of the switch assembly 61. The terminals 75 of the switch assembly 61 are connected to the "number eleven" contacts of the arcuately arranged groups of contacts 62 of the switch assembly 61. The terminals 73 of the unit 11 are connected to the terminals 75 of the switch assembly 61 and accordingly are connected to the "number eleven" contact in each group of contacts in this switch assembly. The control elements of the unit 11 are similar to those described in connection with the control unit 10 and the elements of the remote control station 19 are like those described in connection with the remote control station 19.

The remote control station 18 previously described as being connected to the unit 10 so as to control operation of this unit may be disconnected and rendered inoperative by turning the knob or the like to swing the blades 22 to an "off" position. The remote control station 18 may be retained operative with the switch blades 22 in engagement with the "number ten" contacts 24. With the switch assembly 21 in this position the remote control station 19 may be also utilized to control the unit 10. The switch blades 62 are then turned counterclockwise from the position shown so that all of these blades engage the "number ten" contacts of the switch assembly 61. Such disposition of the switch blades 62 disconnects the remote control station 19 from the transmitter or operating unit 11 and actuation of the push button 67 so as to close its contacts will provide for energization of the relay coil 33 of the operating unit 10. The closure of the contacts 37 of the relay 33 of the unit 10 will provide a circuit maintaining energization of this coil when the push button 67 is released. The closure of the contacts 39 of the relay 33 will provide for energization of the signal lamp 81. When the jack contacts 89 are included in the circuit they will serve to influence the keying relay coil 46 of the unit 10. Energization of the transmitter controlled by the unit 10 may be interrupted by pressing the push button 83 which short circuits the relay coil 33 through the resistor 26 and the relay is deenergized so that the signal lamp 81 is no longer ignited.

The remote control station 18 may be employed for controlling operation of the unit 11 by actuating the mechanical means 23 to turn the switch blades 22 of the switch assembly 21 to engage their "number eleven" of the contacts 24 which are connected by conductors 91 to the "number eleven" contacts 64 of the switch assembly 61. During such operation of the switch assembly 21 the circuits extending from the control station 18 to the unit 10 are broken before the switch blades 22 engage the "number eleven" of the contacts 24 and it is accordingly impossible to have the unit 10 in parallel circuit relationship with the unit 11.

The conductors connecting a contact of each group of contacts 24 with a related contact in each group 64 may be extended to accommodate any number of transmitter control or operating units. One switch assembly such as shown at 21 or 61 is provided for each remote control station. One contact of each group of spaced contacts 24 of the switch assembly 21 and one contact of each group of spaced contact 64 of the switch assembly 62 is used for each transmitter unit to be controlled. The switch assembly 21 and the switch assembly 61 each include six contacts in each group of fixed spaced contacts 24 or 64. Thus these switch assemblies provide equipment for handling six transmitter control or operating units such as shown at 10 or 11. The system thus provides for the transfer of control for six transmitters by two remote control stations and requires but two switch

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assemblies each having thirty-six contacts. The arcuate groups of contacts may be arranged in superimposed relationship in a stacked wafer type switch assembly with the wiper arms actuated by a shaft keyed thereto in a known and conventional manner. The switching equipment accordingly requires very little space in relation to prior arrangements for similar purposes.

While the invention has been described as pertaining to the signalling art and with regard to the control and the shifting of the control of transmitters it will be understood that the invention is useful in connection with the shifting control of the other electrical equipment. In addition changes and modifications may be made in the control elements and in the switching units without departing from the spirit and scope of the invention as set forth in the appended claim.

What I claim and desire to secure by Letters Patent is:

An electrical distribution system for shifting operation of control units for transmitters comprising, a plurality of transmitter control units each having a plurality of conductors extending therefrom, a plurality of control stations located remotely of said units, a switch assembly for each control station, each switch assembly having a

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plurality of groups of fixed contacts with the number of groups of contacts equalling the number of said conductors, a switch blade for each group of contacts adapted to be moved into engagement with any one contact of the group, mechanical means for moving all of the switch blades of one switch assembly in unison, the conductors extending from each transmitter control unit being connected to one contact of each group of contacts of each switch assembly, a plurality of conductors extending from one control station each connected to one of the switch blades of one switch assembly, and a plurality of conductors extending from another control station each connected to one of the switch blades of another switch assembly.

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