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SHIP'S ORDER TELEGRAPH SYSTEM

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2 Sheets-Sheet 1

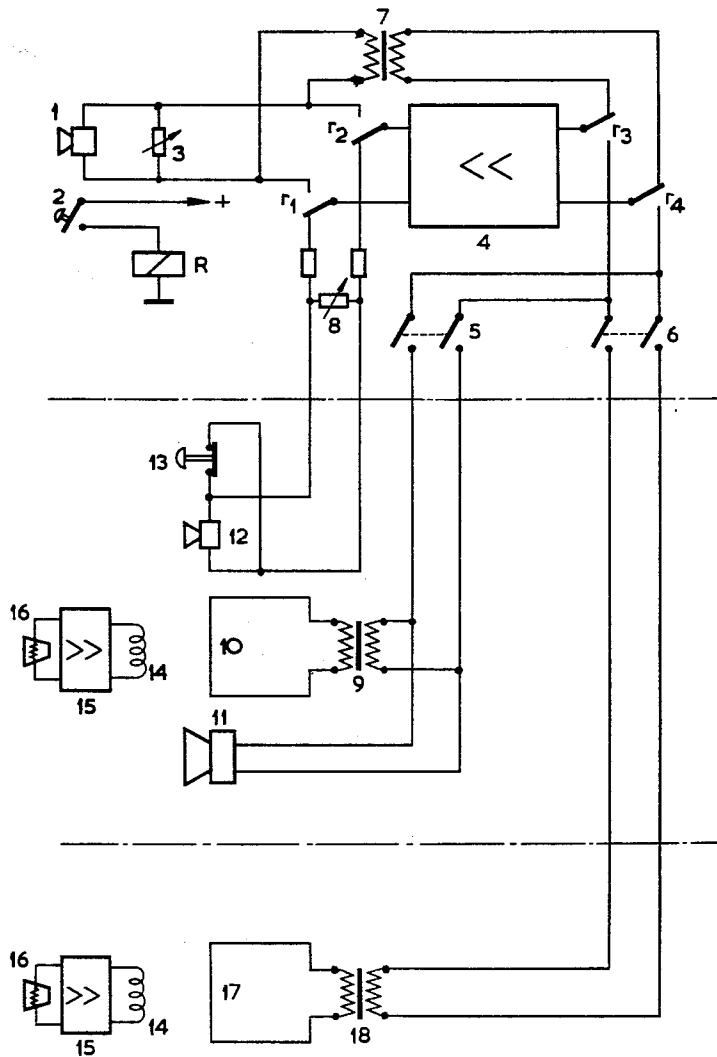


FIG. 1

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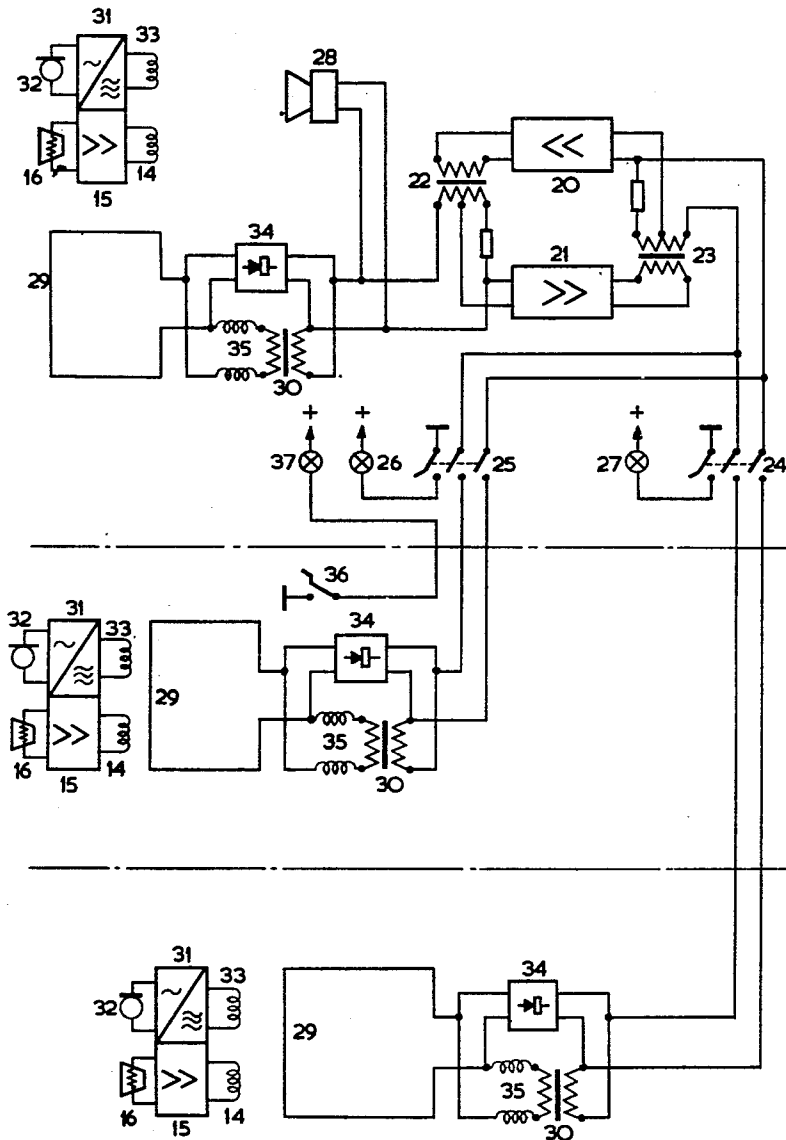


FIG. 2

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SHIP'S ORDER TELEGRAPH SYSTEM

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4 Claims. (Cl. 179—82)

Signalling systems for transmitting orders and, as the case may be, for acknowledging them by replying between the bridge and the engine-room of a ship are known, in which the transmission of orders is restricted to the most important cases of practical operation so that a simple pointer-telegraph can be used. These signalling systems are generally provided with reply-back arrangements by means of which the order given to the engine-room is acknowledged to the bridge.

Since in practical operation such a system is not always sufficient, it has been completed by speech communication arrangements comprising telephone handsets on the bridge and in the engine-room which are interconnected by a suitable speech-cable. It has proved advantageous not to restrict this speech communication between the bridge and the engine-room, but to extend it to other rooms of the ship.

In such signalling systems the loud noise generally prevailing in the engine-room has proved to interfere with speech communication materially. Consequently various methods have been used to ensure sufficient speech communication in spite of the high noise level. The same applies to speech communication between the bridge and, for example, a gun area or the like instead of the engine-room.

The known signalling systems have a further limitation in that the connecting cord between the handset and the speech cable is frequently inconvenient. When engine orders are transmitted to the engine-room, the reception of these orders requires only the observation of the acoustical signal generally coupled therewith and a look at the pointer of the engine telegraph; however, the universally prescribed acknowledgement of this order by replying back compels the receiver of the order to go to the engine telegraph and to operate this correspondingly. Thus, he is kept from his other work during this period of time. If, in addition, a speech connection is to be established between the bridge and the engine room or another room below deck, this means more trouble to the personnel. The same applies to the case where the personnel on the bridge wants to achieve speech communication with the personnel serving a gun.

In the system in accordance with the invention, these disadvantages are avoided in that the rooms concerned are connected to the bridge by speech transmission cables, these rooms being provided, as may be the bridge, with devices connected to these cables, which devices are operative substantially within each separate room only and by means of which the signals can be transmitted wirelessly to receivers which are carried by the personnel in these rooms to whom the signals are directed and which are provided with sound reproducers, for example, headphones, which are screened from ambient noise.

Thus, the bridge can establish a connection with every room connected to the speech cable network in order to transmit orders which are directly understood by the personnel receiving the orders without the latter having to interrupt their work or being impeded therein. If a mutual speech communication is required, that is to say, if for example the orders given must be acknowledged by being repeated, use can be made of microphones, which are fixedly connected to the speech cable and to which the

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person who has received the order goes, if required. If, however, the order must be acknowledged in any case without the person receiving the order being impeded in his work, the reply back may alternatively be given by means of the portable receiver which transmits the reply wirelessly to the speech cable and consequently to the bridge. If required, such wireless communication apparatus may also be used on the bridge.

Preferably the wireless signal transmission is effected by means of apparatus comprising induction loops which are fixed in the rooms and co-operate with receivers similar to the known hearing aids which can be influenced inductively. Such loops and such hearing aids permit of a unilateral speech connection only, however, this can be considered sufficient in many cases.

Preferably the receiving coil of the receiver comprises at least two coil halves arranged at right angles to each other; alternatively the induction loop may comprise two turns arranged at right angles to each other, or a combination of both means may be employed. This ensures a speech connection under all conditions. The person receiving the order is thus enabled to move at will during the transmission of the order without the sound volume being subject to fluctuations.

For the acknowledgement of the order by replying back to the bridge, use may be made of any wireless means, however, preferably use is made of portable miniature transmitters which are provided in the various rooms and the radiated signals of which are received by an induction loop which acts as a receiving aerial and, through a detector, transmits the low frequency signals to the speech cable associated with the room concerned. This ensures a correct separation of the incoming and outgoing traffic since the first is effected through the lines of magnetic force emanating from the induction loop, whereas independently thereof the latter uses electromagnetic waves as information carriers.

In a preferred embodiment of the system in accordance with the invention the miniature transmitter is a battery operated oscillator which works on a comparatively long wave, is modulated by means of a throat microphone and is accommodated in a case similarly to the known hearing aids, the speech coil acting also as a transmitting frame aerial. By the use of very small parts this oscillator can also be designed readily portable; it may, for example, be a small battery-fed double-grid tube. The use of comparatively low high frequencies as carrier waves ensures that the range of the oscillator is substantially restricted to the room concerned of the ship, the operation of the ship's radio communications being interfered with as little as possible.

The headphone and, as the case may be, the microphone, the amplifier and the transmitter are advantageously accommodated in a headress worn by the personnel receiving the orders. This headress may be in a form of the caps used by flying personnel; however, the required parts may be built into any other headress prescribed to the personnel receiving the orders, for example, a steel helmet.

In order that the invention may readily be carried out, two embodiments thereof will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which

FIG. 1 shows the circuit arrangement of a system by which orders can be given from the bridge to the engine room, to a gun area or to both, while a reply back is possible from the engine-room only, and

FIG. 2 is a signalling system enabling speech communication between the bridge and the engine room and between the bridge and a gun area, the engine room being enabled to signal the bridge that it wants to speak to the bridge.

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In a suitable enclosure on the bridge there is accommodated the exchange of the signalling system which occupies little room, and FIG. 1 shows in its upper third part the block schematic diagram of this exchange with the associated communication apparatus. The middle part of FIG. 1 shows the devices accommodated in this embodiment in the engine-room, while the lower part shows the apparatus disposed near the ship's gun.

Use is made of the bridge, both for the transmission of orders and also for the reception of an acknowledgment thereof, of a dynamic loudspeaker 1 which also operates as a dynamic microphone and is provided with a speech button 2 which must be pushed when an order is spoken into the loudspeaker used as the microphone. The loudspeaker-microphone 1 is bridged by a control resistance 3 by means of which its volume can be adjusted once for all.

The exchange substantially comprises an amplifier 4, the input and output of which can be changed over by means of a relay R, which is operated by the speech button 2 and has contacts r_1 , r_2 , r_3 and r_4 . Furthermore provision is made of two switches 5 and 6 by means of which a communication can be established to the required room below deck, and also of a matching transformer 7 and a damping member 8 which will be described more fully hereinafter.

In the engine-room provision is made of an induction loop 10 which can be fed from the output of the amplifier 4 through a matching transformer 9, of a loudspeaker 11 connected in parallel with the loop, and, for replying back to the bridge, of a microphone 12, which is bridged by a speech button 13 which must be depressed whenever the microphone is spoken into. Furthermore there are provided in the engine-room a suitable number of receivers which are worn by the personnel receiving the orders and substantially comprise a receiver coil 14, an amplifier 15 and a headphone 16. For the sake of clarity only one of these receivers is shown in the drawing.

The equipment of the gun area is kept very simple in accordance with the requirements to be satisfied with respect to the transmission of information; here provision is made only of an induction loop 17 which can be fed from the amplifier 4 through a matching transformer and of the required number of portable receivers 14, 15 and 16, which correspond to the receivers in the engine-room.

The contacts of the relay R are shown in their rest position. If an order is to be transmitted, for example, to the gun, the switch 6 in the exchange is closed and the button 2 is pressed. Hence the relay R responds and the contacts r_1 , r_2 , r_3 and r_4 take up their operating positions. Thus the input of the amplifier 4 is connected to the loudspeaker-microphone 1; the order spoken into the latter is raised by the amplifier 4 to a sufficient power level and transmitted, through the contacts r_3 and r_4 and the closed switch 6, to the input of the matching transformer 18. Due to the inductive coupling between the loop 17 and the input coils 14 of all receivers provided in the gun area, the order is transmitted to the headphones 16 and thus to the personnel receiving the order.

When an order is transmitted to the engine room, substantially the same occurs except that in this event the switch 5 must be closed instead of the switch 6, while the order is not only transmitted to the induction loop 10, but also to the loudspeaker 11 which radiates it and makes it perceptible to the personnel having no receivers.

If the order received is to be acknowledged from the engine-room to the bridge, one of the personnel goes to the microphone 12 and talks into it after having pushed down the speech button 13 so that the microphone is no longer short circuited. In the meantime in the exchange or on the bridge the officer who has given the order has released the speech button 2 since he has ceased talking. Consequently the relay R is rendered inoperative and its contacts take up their rest positions. Thus the

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speech recorded by the microphone 12 of the engine-room reaches the amplifier input through the damping member 8, which only serves to adjust the amplifier input amplitude to a suitable value. Through the contacts r_3 and r_4 and the matching transformer 7 the amplified speech signal reaches the apparatus 1 which now acts as a reproducer or loudspeaker so that the officer on the bridge is enabled to hear the reply back.

In this arrangement the gun crew cannot initiate a speech connection to the bridge. However, from the engine-room such a connection can be initiated, since the engine-room microphone is connected, through the amplifier 4, to the microphone loudspeaker 1 by the relay contacts in their rest position. Thus, a speech connection from the engine-room to the bridge can be established simply by pressing the speech button 13.

In the signalling system shown in FIG. 2 for the transmission of orders between bridge, engine-room and gun area the orders can at all times be acknowledged by replying back to the bridge. For this purpose the exchange possesses two amplifiers 20 and 21 which are connected, by means of transformers 22 and 23, to the apparatus of the bridge and the cable leading to the rooms below deck. For making a connection to the engine-room or to the gun area, as required, provision is made similarly to the arrangement shown in FIG. 1 of switches 24 and 25 which in this case are equipped with signal lamps 26 and 27. Furthermore a general loudspeaker 28 is provided on the bridge; it is assumed that in this arrangement portable communication apparatus is used on the bridge also. For this purpose an induction loop 29 with an associated transformer 30 is arranged on the bridge. Similar loops 29 and transformers 30 are provided in the engine-room and at the gun area also.

Similarly to FIG. 1, the portable communication apparatus used comprise a receiving coil 14, an amplifier 15 and a headphone 16. In addition they are combined with a miniature transmitter which comprises an oscillator 31, a throat microphone 32 and a transmitting frame aerial 33.

If an order is to be transmitted, it is spoken into the throat microphone 32 of one of the portable communication apparatus on the bridge. It modulates the oscillator 31 and the modulated high frequency is radiated through the coil 33 and received by the induction loop 29 and reaches a detector 34, since it is prevented from reaching the transformer 30 by high-frequency choke coils 35. Through the transformer 22 the detected low-frequency voltage reaches the input of the amplifier 20, from the output of which it reaches the speech cable through the second transformer 23. If the selector switch 25 is closed, the order signal is supplied to the engine-room, and if the switch 24 is closed, it is supplied to the gun area. Which of these two switches is operative, is indicated by the lighting up of the associated signal lamps 26 or 27. Through the matching transformer, which was already described with reference to FIG. 1 and here is designated 30, and through the blocking chokes 35, which are inoperative for the low frequency, the order signal reaches the induction loop 29 and then, by the route described hereinbefore, the receivers of all the persons for which it is meant.

In order to acknowledge the order, the person concerned only has to reply back, his reply being recorded by the throat microphone 32 and modulating the oscillator 31 by which it is transmitted, by the route described hereinbefore, to the speech cable from which it reaches the input of the amplifier 21 through the transformer 23. From the output of the amplifier 21 it is supplied through the transformer 22 to the loudspeaker. It can also be transmitted inductively, through the transformer 30 and the induction loop 29, to the receiver 14, 15, 16 so as to be heard therewith.

If the engine-room wants to communicate with the bridge, use is made of the button 36 provided in the

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engine-room. When this button is depressed, a call indicating lamp 37 is switched on on the bridge and the information from the engine-room can be received by closing the switch 25.

What is claimed is:

1. A communication system comprising a main station, a sub-station, an audio frequency electrical signal transmission channel interconnecting said main station and said sub-station, means for applying first audio frequency intelligence signals to said transmission channel at said main station, means connected to said transmission channel at said sub-station for producing within said sub-station a magnetic induction field having audio frequency variations as determined by audio frequency signals in said transmission channel, a portable receiver in said sub-station responsive to said induction field for converting said induction field variations into audible signals, a portable wireless transmitter in said sub-station comprising means for emitting a carrier wave and means for modulating said carrier wave with second audio frequency intelligence signals, carrier wave detector means responsive to said wireless transmitter and arranged within said sub-station and connected to said transmission channel, and means connected to said transmission channel at said main station for reproducing said second intelligence signals.

2. A communication system comprising a main station, a sub-station, an audio frequency electrical signal transmission channel interconnecting said main station and said sub-station, means for applying first audio frequency intelligence signals to said transmission channel at said main station, a loop system connected to said transmission channel at said sub-station for producing within said sub-station a magnetic induction field having audio frequency variations as determined by audio frequency signals in said transmission channel, a portable receiver in said sub-station inductively coupled to said loop system for converting said induction field variations into audible signals, a portable wireless transmitter in said sub-station comprising means for emitting a carrier wave and means for modulating said carrier wave with second audio frequency intelligence signals, said wireless transmitter being inductively coupled to said loop system, carrier wave detector means responsive to said wireless transmitter and connected to said loop system, and means connected to said

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transmission channel at said main station for reproducing said second intelligence signals.

3. A communication system comprising a main station, a sub-station, an audio frequency electrical signal transmission channel interconnecting said main station and said sub-station, means for applying first audio frequency intelligence signals to said transmission channel at said main station, amplifier means connected to said transmission channel providing amplified two-way signal transmission through said channel, a loop system comprising a loop member and a matching transformer connected to said transmission channel at said sub-station for producing within said sub-station a magnetic induction field having audio frequency variations as determined by audio frequency signals in said transmission channel, a portable receiver in said substation inductively coupled to said loop member for converting said induction field variations into audible signals, a portable wireless transmitter in said sub-station comprising means for emitting a carrier wave and means for modulating said carrier wave with second audio frequency intelligence signals, said wireless transmitter being inductively coupled to said loop member, carrier wave detector means responsive to said wireless transmitter and having the input thereof connected to said loop member and the output thereof connected to said transmission channel, and means connected to said transmission channel at said main station for reproducing said second intelligence signals.

4. A communication system as claimed in claim 3 wherein said means connected to said transmission channel at said main station for reproducing said second intelligence signals comprises a loop system connected to said transmission channel for producing within said main station a magnetic induction field having audio frequency variations, and a portable receiver in said main station inductively coupled to said loop system for converting said induction field variations into audible signals.

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