Marine Communal Aerials

Ship's Distribution Systems Providing Interference-free Reception with Private Receivers

Communal aerial amplifier for the Redifon distribution system which is capable of feeding 300 private receivers from a single ship's aerial.

THE indiscriminate erection of aerials on board a ship by passengers and crew so that they can use their own wireless receivers at sea is frowned upon by the ship's officers, as, apart from being very unsightly, a host of small aerials can prove a serious source of error in the ship's direction-finding equipment.

A communal aerial is the only satisfactory alternative, but to be really efficient the system must be properly engineered. If an attempt is made to use a large number of receivers on a single aerial without certain precautions being taken many peculiar effects may be encountered. These can take the form of varying signal strength as receivers elsewhere are tuned over the broadcast bands; heterodyne whistles due to leakage of local oscillators into the distribution system; cross modulation; and, in the case of a ship, complete wipe out of all signals whenever the ship's transmitters come into operation. Some, if not all, of these troubles can also be experienced when separate aerials are used.

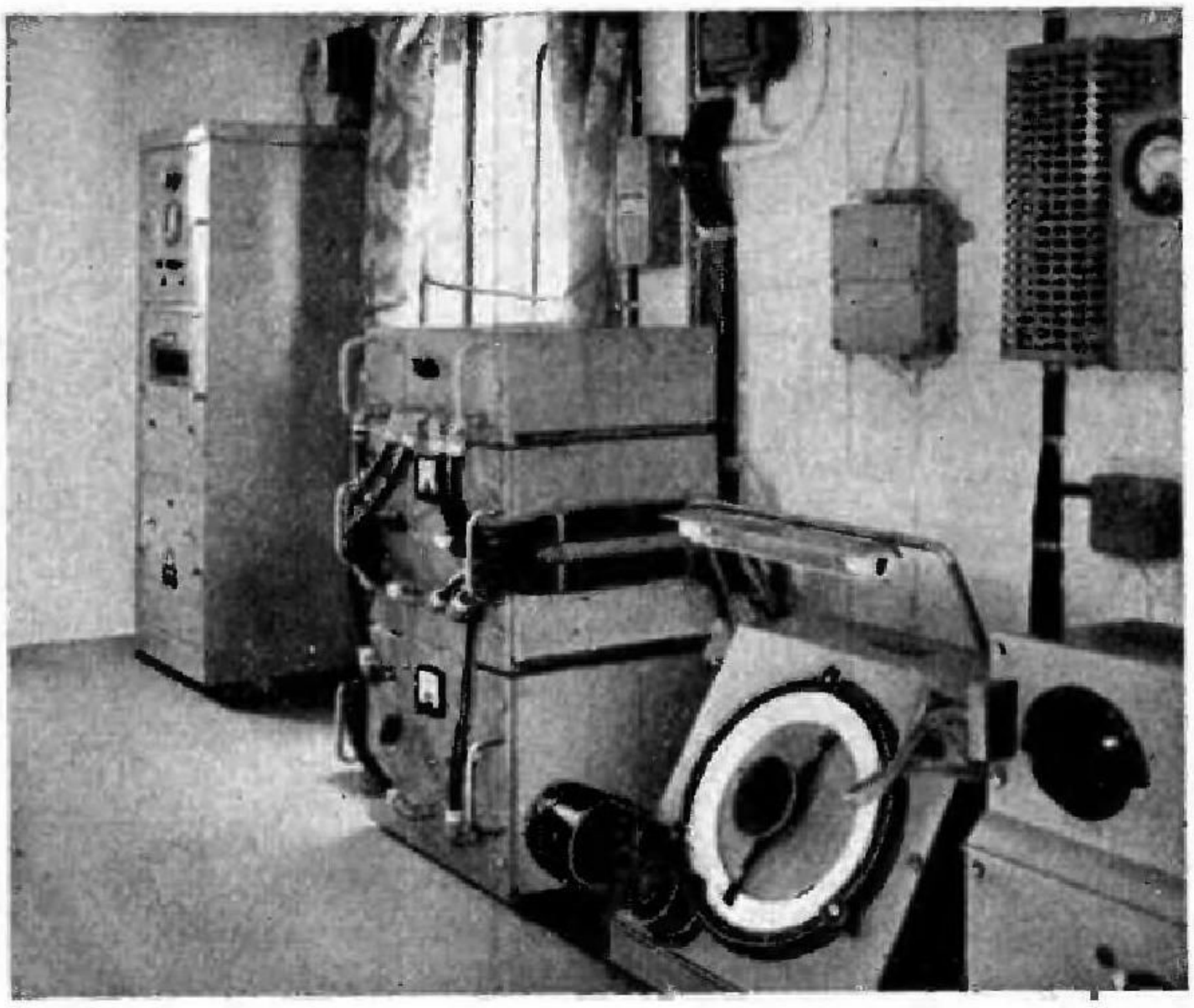
Several of the principal firms in the United Kingdom engaged in installing radio in ships have given this matter their attention and at least two communal aerial systems, which allow trouble-free reception with private sets, have been installed in some of the larger vessels launched recently.

The system evolved by the Marconi International Marine Communication Co. consists of a main unit having three basic output circuits and this is augmented by supplementary units throughout the ship, which vary in number according to the size of the installation.

As it is possible to operate up to three receivers from each of the basic output circuits the main unit alone would serve a total of nine receivers. When more are needed, supplementary units are brought into use and, as each of these has six output circuits each capable of operating up to three receivers, a supplementary unit will cater for eighteen sets. As the supplementary units provide amplification as well as circuit isolation there is no limit to the number of such units that can be employed.

The main unit, to which the aerial is connected, contains the necessary filter and rejector circuits to rid the broadcast signals of interference from the ship's transmitters. After these come a channel splitting stage then a three-channel amplifier. Each channel has a voltage amplifying stage and an output stage and is completely isolated from other channels.

A stage of amplification is used in the supplementary units and this feeds six separate output valves giving an adequate signal in all receivers over the 180- to 550-metre and 12- to 67-metre bands with small gaps as required to prevent interference from the ship's transmitters. There are no



The Marconi communal aerial unit installed between the direction finder and the auto-alarm in the wireless cabin of the cable ship *Edward Wilshaw*.

filters in the supplementary units and all the rejection is effected in the main unit.

All units have self-contained power supplies and are available for either 110V or 220V d.c., or 230V a.c. The power consumption of each unit is between 60W and 110W according to the nature of the supply.

The system designed by Redifon provides optimum working conditions for about 300 receivers in the ship. Incoming signals from the aerial are fed *via* a cathode follower to two wideband amplifiers, one covering the medium- and long-wave bands, and the other the short-wave broadcast bands. The output from each chain is fed to a mixing circuit and thence to three power stages each connected as cathode followers and feeding into separate output lines of from 70 to 150 ohms impedance. The receiving bands provided are 200 to 2,000 metres and 13 to 60 metres, with small gaps where necessary to reject frequency bands required for the ship's transmitters. This equipment is known as the Type A133.

At appropriate points in the system special junction boxes are fitted and in each cabin, or receiving point, is an outlet unit—for matching the receiver input circuit to the line—and the aerial and earth sockets. Isolating capacitors are included in these units so that under no conditions can mains voltages get into the distribution system.

In the Redifon system all amplifiers, filters and rejectors are contained in a single unit which gives about 25 times overall amplification from the aerial to each of the output sockets. An a.c. power pack is also incorporated in the unit and the only external equipment needed, apart from the line apparatus, is a rotary converter to provide the necessary power when an a.c. supply is not available. The whole is housed in a sturdy metal case, measuring approximately 2ft 1½in x 1ft 3in x 1ft 9in, and weighing 115 lb, and fitted with shock-absorbing bushes for bulkhead or desk mounting.