B.R. 575(2)H

AUDIO FREQUENCY EQUIPMENT

A.F. 100 SERIES

BROADCAST SYSTEMS

MOUNTING OF RACK UNITS

1953

AMENDMENTS

Amendment No.	A.F.O. "P" No.	Date of insertion in this copy	Initials

Admiralty

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B.R. 575(2)H, *Audio Frequency Equipment—A.F. 100 series, Broadcast Systems, Mounting of Rack Units*, 1953, having been approved by My Lords Commissioners of the Admiralty, is hereby promulgated for information and guidance.

This pamphlet should be inserted in B.R. 575, guard cover for this series.

Attention is directed to the notice printed below.

By Command of Their Lordships,

To Flag Officers and Commanding
Officers of H.M. Ships and
Vessels concerned.

Suggestions for improvement of the text or illustrations which can be incorporated by way of amendment or in any future revision of this book, will be welcomed and will receive careful consideration; they should be forwarded to the Secretary of the Admiralty through the usual channels.

(SO 3084)

CONTENTS

ILLUSTRATIONS

1. The arrangements adopted for the housing of the Rack Units were designed to fulfil the following requirements:—

(*a*) The method to be sufficiently flexible and adaptable to meet the needs of all the varied A.F. 100 systems, with the maximum economy of weight and space.

(*b*) The mountings to afford adequate protection against shock, vibration and accidental damage.

(*c*) To reduce and simplify maintenance work as much as possible.

2. Frameworks are of three sizes, namely:—

One Bay . . .	A.P. 12643
Two Bay . . .	A.P. 12644
Three Bay . . .	A.P. 12645

Each bay can accommodate four rack units of average height.

Bulkhead mountings are of two sizes, namely:—

For one 50 watt amplifier or its equivalent	A.P. 12646
For one 16 watt amplifier . . .	A.P. 32022

DESCRIPTION

One Bay Framework, A.P. 12643 (*Plate* 1)

3. The mounting consists of three principal parts; the outer framework, the rack, and the terminal panel. The main members of the outer framework are channels and angles of mild steel bolted together, with the side panels, top cover and the terminal cover of mild steel sheet.

4. The framework is fixed rigidly to the deck by bolts or studs. Details of fixing dimensions are given in Figure 1. The upper part of the frame is steadied to a bulkhead or other support by two resilient mountings, A.P. W3114.

5. Terminal Panel. At the top of the framework accommodation is provided for a terminal panel consisting of a number (usually 7) of 16-way terminal strips. It is at this terminal panel that the incoming fixed cables are connected to the flexible cables leading to the rack units, and where the interconnection between the rack units and the various associated A.F. 100 systems are made. The fixed cables enter at the back. All wiring connections are accessible at the front. A diagram of terminal connections is fixed to the inner side of the terminal cover plate. The code of letters employed to identify the terminals is given in Appendix 2.

Rack

6. Within the framework and supported by resilient mounts is a rack which carries the units. It consists of mild steel channels and angles welded together. A flexible strip of braided, tinned copper wire with soldered end tags effectively earths the rack to the framework.

7. The resilient mounts or shock absorbers are of moulded rubber, each with a steel boss insert, the two materials being firmly bonded. The boss is drilled and tapped for bolting to the rack, and the rubber mounting flange is secured by four bolts to the framework. The mounts are circular in plan and capable of absorbing shocks in vertical and horizontal directions. Except for the flexible earthing strip they afford complete metallic insulation of the rack from the framework. Each rack is supported by four such mounts, two attached to each of the top and bottom main members. Where necessary, shims in the form of steel washers are employed below the lower mounts for adjustment of distance. Each of the two mounts at the bottom is surmounted by a rubber shroud of circular plan and U-shaped cross section for the prevention of accumulation of foreign matter or moisture in a moulded recess in the mount; the upper mounts, being inverted, need no such protection.

8. The side members of the rack are drilled at standard intervals in order to accommodate rack units of all the usual heights. This arrangement permits any combination of units to be built up in the rack or racks to form a complete equipment. The spacing of the drilling is arranged in units or multiples of $1\frac{3}{4}$ inches. This measurement is the unit of calculation used in assessing possible accommodation in any rack, and the symbol " E " is used to denote it. Thus a single rack provides accommodation for units up to a total of 32 " E ". When the allocation of the rack units has been decided upon, slide brackets and locating pins are fitted.

9. The slide brackets are bolted to the side members of the rack and carry the weight of the unit. Locating pins fitted to the rack engage in holes or slots cut in the edge of the main vertical panel of the units. The pins and holes are sited differently for each unit and so prevent the latter from being replaced in the wrong position in the rack.

10. Situated above each slide bracket is a slide stop. The purpose of this stop is explained in Book (1) A (para. 27) of this series. To insert a rack unit into a rack it must be placed with the ends of its runners resting on the slide brackets and the front then lifted through an angle of about 5 degrees. The stub pins on the runner ends then will clear the slide stops and the unit can be slid home. For removal the lifting action must be repeated.

11. Rack units are secured in position by clamps which are secured and released by the use of a screwdriver. For accurate positioning the clamps have lugs which fit into slots in the edges of the unit main panel The clamps and securing screws are made captive by split pins through the latter

Two Bay Framework. A.P. 12644 (*Plate* 2)

12. Where two racks are required in one compartment to house the rack units of one or more A.F. 100 systems, it is usual for reasons of economy in weight and space,

to use a two bay framework. This arrangement is illustrated in Plate 2, and follows the design of the one bay framework in all respects except that the outer framework has accommodation for two racks and terminal panels. Details of the fixing dimensions are given in Figure 2.

Three Bay Framework. A.P. 12645

13. This arrangement is an extension of the one bay and the two bay framework, for the saving of weight and space where three bay accommodation is needed. The principles of construction and the method of housing the units are the same as in the one bay and two bay frameworks. Details of fixing dimensions are given in Figure 3.

Bulkhead Mounting. A.P. 12646 (*Plate* 3)

14. Where it is desired to house a single rack unit such as the 50 watt amplifier, a bulkhead mounting A.P. 12646 is employed. The mounting consists of an outer framework of mild steel angles and bars, with drip proof top, side and back panels of mild steel sheet.

15. Within the outer framework a sub-frame is mounted on four resilient mounts A.P. W3115, which act as shock absorbers and afford complete metallic insulation of the sub-frame from the outer frame. The resilient mount attachments are at the corners of the base and no support, steadying or otherwise, is provided at the top of the sub-frame. To prevent the overstraining of the resilient mounts under conditions of severe shock two mild steel limit stops are fitted, one at each of the left hand front and the right hand rear mount positions. These stops limit any possible upward movement of the sub-frame. The sub-frame is earth bonded to the outer frame by a braided, flexible, tinned copper wire strip.

16. The sub-frame carries slide brackets, slide stops and securing clamps identical with those of the one bay framework, for the housing and securing of the amplifier or other rack unit. Since the mounting is intended only for units of a standard height (7E) the side members are not drilled except as necessary for the permanent fixing of the items mentioned above.

17. Two sixteen way terminal strips for the connection of the incoming cables to the flexible cables, are situated at the bottom of the mounting behind a terminal cover.

18. Temporary stowage clips are provided on the inner sides of the side panels for the stowage of the socket parts of the connectors when disconnected.

19. For the entry of the incoming cables an aluminium cable gland casting is bolted to a transverse plate at the bottom of the mounting. The casting is drilled with three holes of $\frac{1}{2}$ in., and two holes of $\frac{1}{2}\frac{3}{2}$ in. diameter. Stainless steel gland nuts are fitted; No. 2, A.P. 4951 for the smaller sized holes, and No. 3, A.P. 4954, for the larger. Details of fixing dimensions are given in Figure 4.

Bulkhead Mounting. A.P. 32022

20. This mounting is described in book (2)E of this series, which deals with the amplifiers accommodated by it.

TERMINAL MARKING. DESIGNATION CHANGES

21. In certain early installations some connections on the rack and bulkhead mounting terminal strips are marked JI, JO and JC to denote that they are wired respectively to the "input", "output" and "control" connectors of the rack units. Due to changes in the conventional designations of components these rack unit connectors are shown in the circuit diagrams of this series of books as SKI, SKO and SKC to denote "socket, input", "socket, output" and "socket, control" respectively; the complementary plugs attached to the rack units being denoted by PLI, PLO and PLC. It will therefore be understood that a connection marked JI, JO or JC on a terminal strip is wired to the "input", "output" or "control" connector of the rack unit concerned. For example, the terminal strip connection marked "AP JI 5" will be wired to the connection marked SKI 5 on the alarm panel circuit diagram.

Appendix 1

Weights and dimensions

(a) Frameworks

	ONE BAY A.P.12643	TWO BAY A.P.12644	THREE BAY A.P.12645
Weight (lb.)	200	380	560
Height:—			
In terms of " E "	32	32	32
Ft. and ins.	6′ 2½″	6′ 2½″	6′ 2½″
Depth. Front to back (ins.)	21⅜	21⅜	21⅜
Width overall (ft. and ins.)	2′ 3½″	4′ 3″	6′ 2½″

(b) Bulkhead Mountings

	A.P.12646	A.P.32022
Weight (lb.)	56	21
Height:—		
In terms of " E "	7	—
Inches	18	11¾
Depth. Front to back (ins.)	12	11
Width overall (ft. and ins.)	2′ 0″	1′ 5½″
Front projection of amplifier, etc., beyond mounting (ins.)	5⅝	Nil

Appendix 2

CODE

Terminal Marking for Rack Mountings for A.F. 100 Equipments

TERMINAL LETTER	USED SINGLY INDICATING OPERATION	USED AS SECOND LETTER INDICATING SERVICE
A	Alarm Control	Armament
B	Buzzer	Box (Control)
C	Common	Ship's company
D	—	Day Cabin
E	Earth	Entertainment
F	Fault	Flight Deck
G	General (Master)	Armament (Aft)
H	High Tension	Hangar
I	Input	—
J		
K	Buzzer call	—
L	Lamp Control	Lower Hangar
M	Microphone	Machinery
N	Indicator	Action Information Officers
O	—	
P	Press to Speak	—
Q	Note (alarm or warning)	—
R	Return (supply)	Ready Room
S	Loudspeakers	Main Broadcast
T	Transfer control	Reply Outstation
U	Muting (S.R.E.)	Upper Deck
V	Volume	—
W	Warning Control	—
X	Loudspeaker Group Control	—
Y	Remote Control	—
Z	Priority Switch	—
+	+ ve D.C. Supply	—
−	− ve D.C. Supply	—
~	A.C. Supply	—

N.B. Control Boxes are numbered from 1 upwards for each system.

FIG. 1

ONE BAY FRAMEWORK A.P.12643

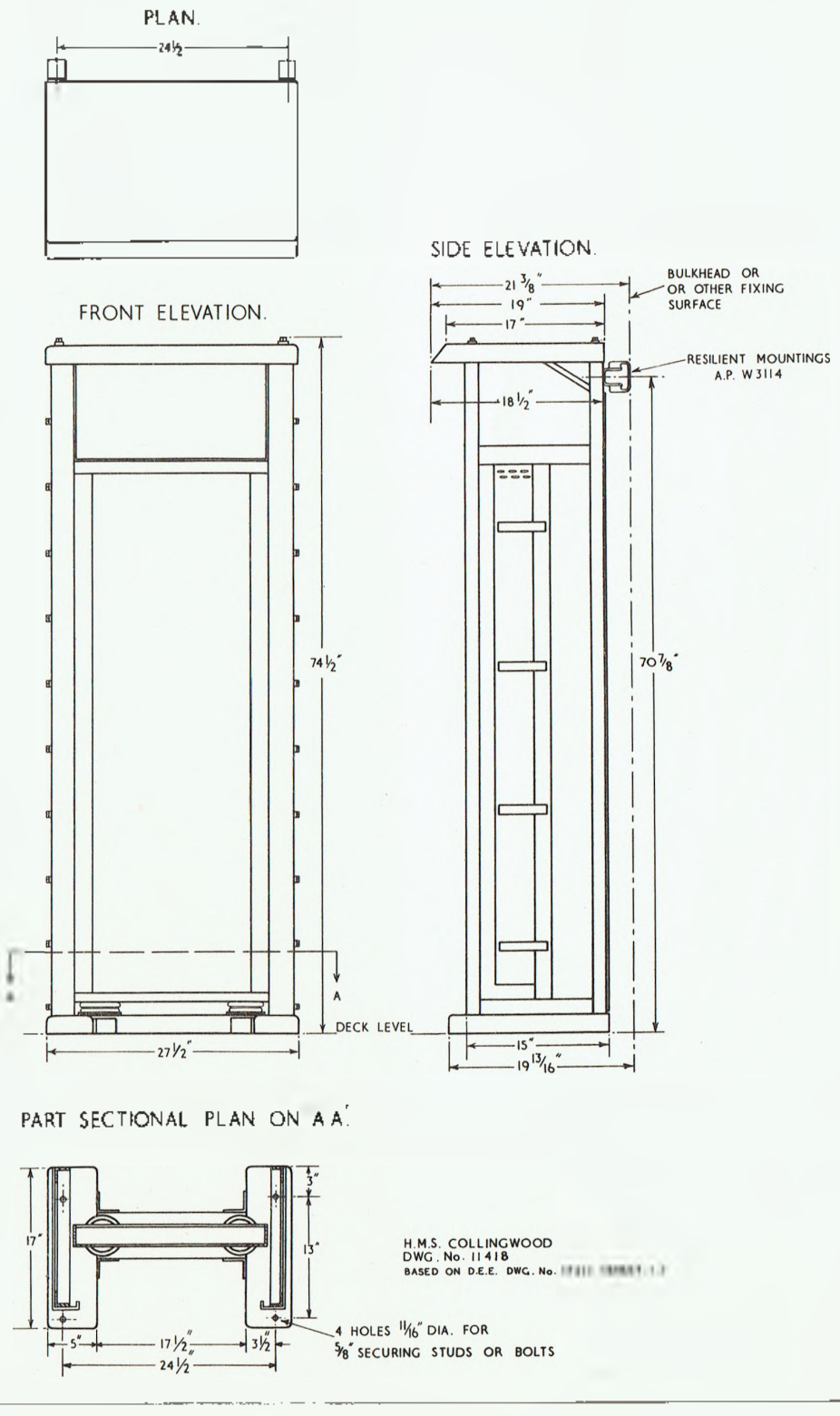


FIG. 2

TWO BAY FRAMEWORK A.P.12644

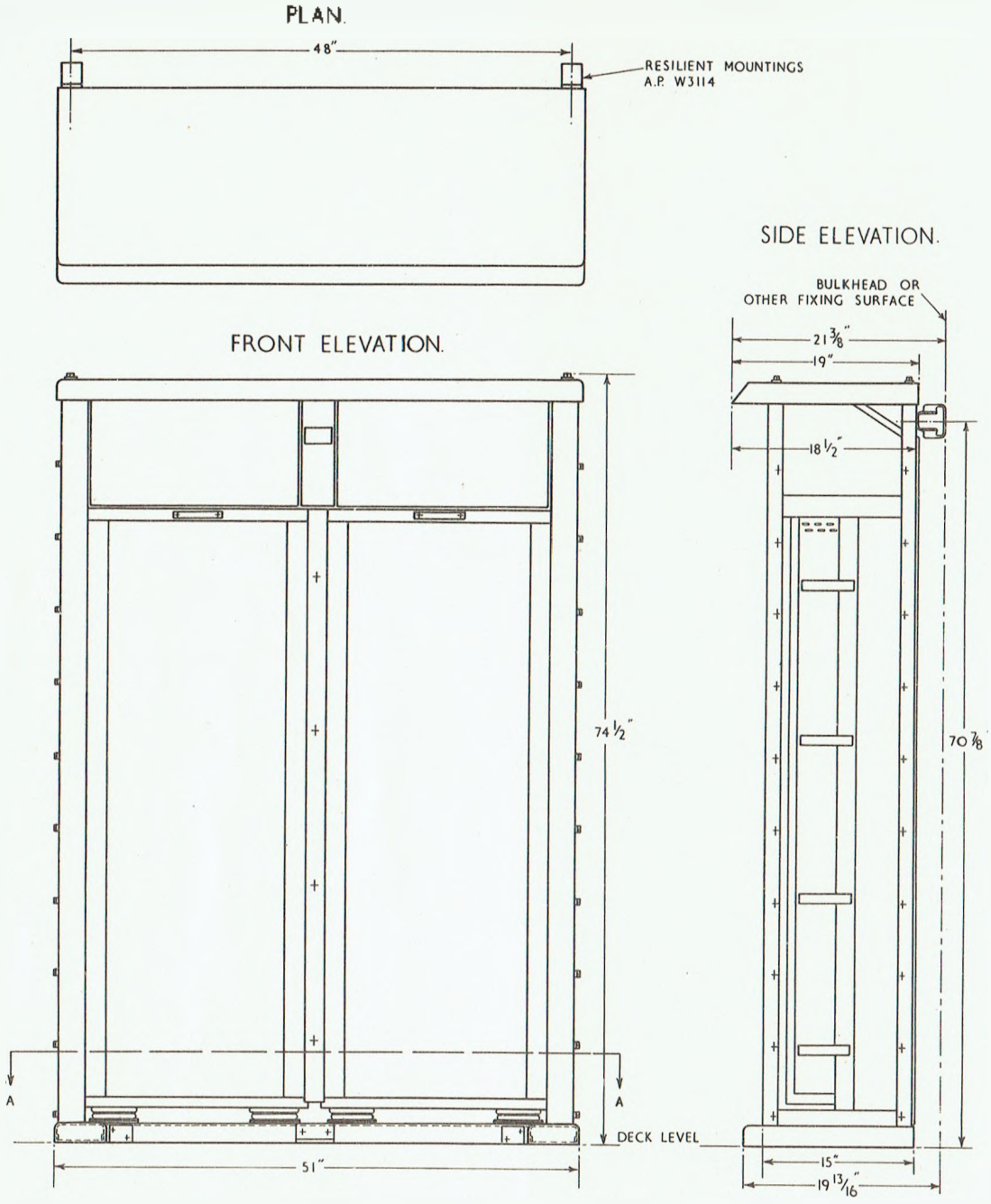
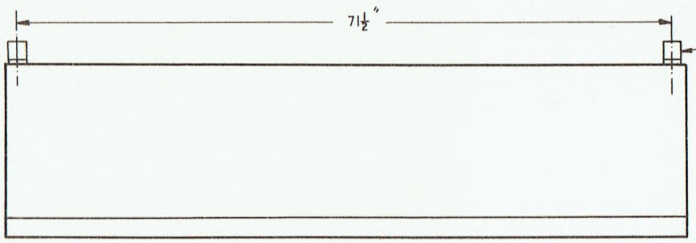


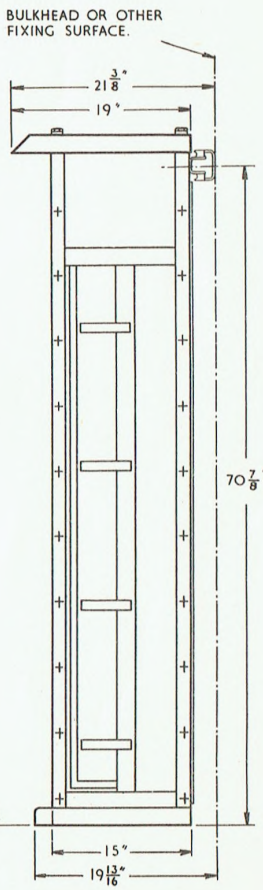
FIG. 3

THREE BAY FRAMEWORK A.P.12645

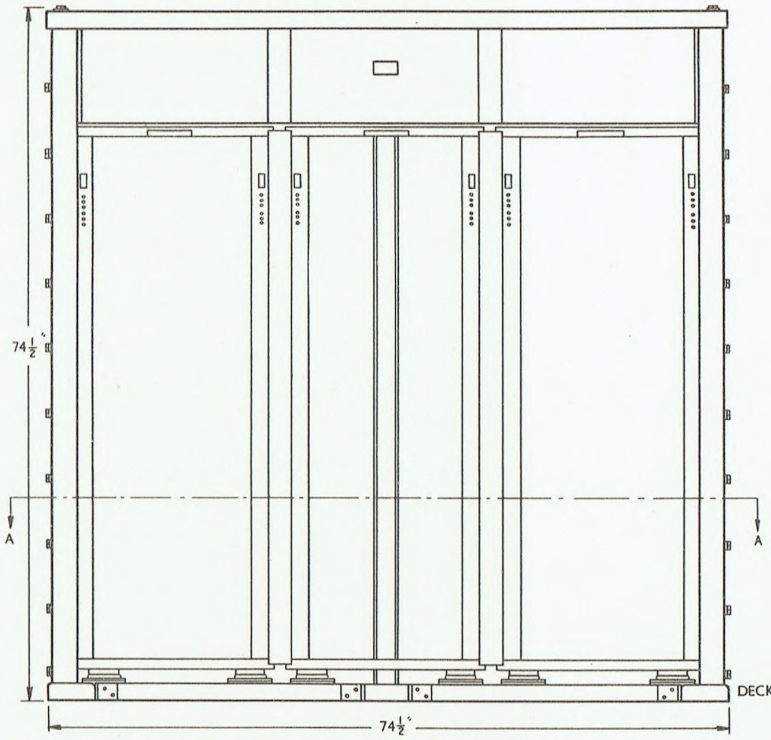
PLAN



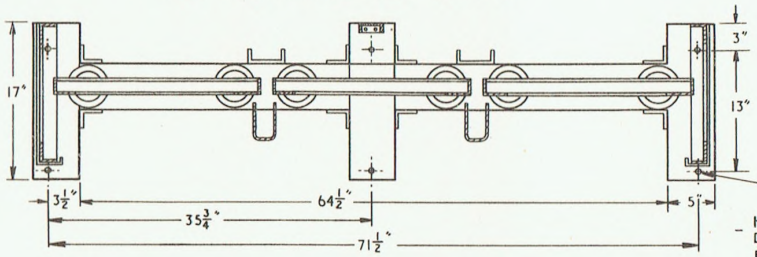
SIDE ELEVATION



FRONT ELEVATION



PART SECTIONAL PLAN ON 'AA'

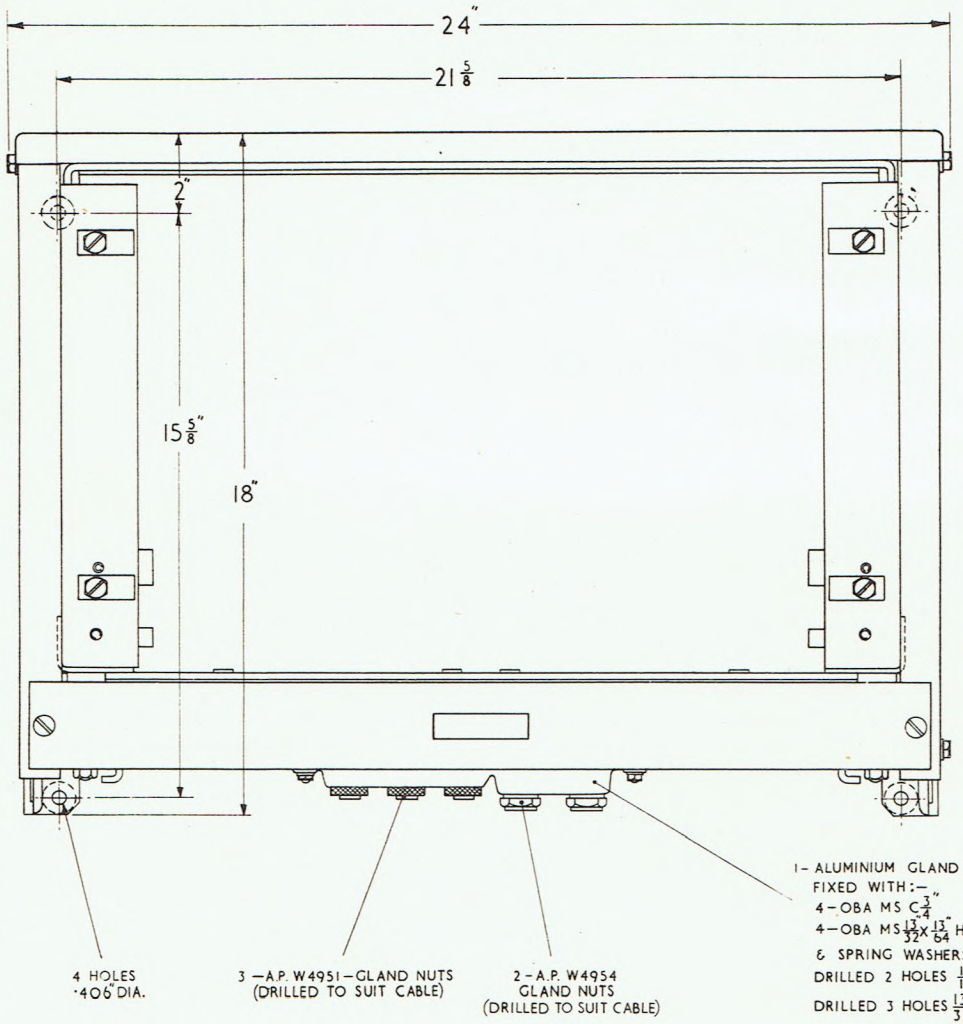


H.M.S. COLLINGWOOD
DWG. No. 11420
BASED ON D.E.E. DWG. No 17311 (SHEET 2)

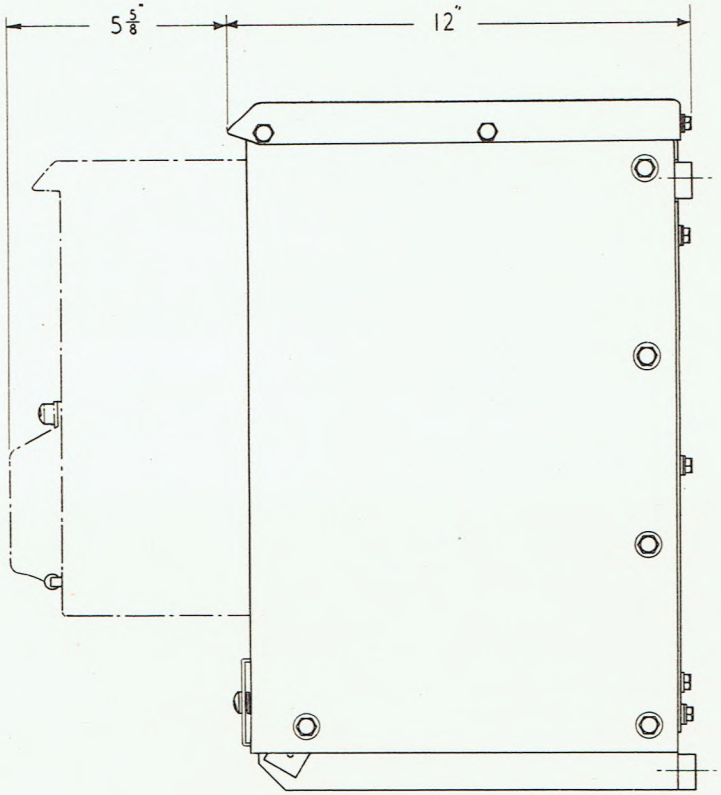
BULKHEAD MOUNTING A.P. 12646
FIXING PARTICULARS AND CABLE ENTRY DETAILS

FIG 4

FRONT ELEVATION



SIDE ELEVATION



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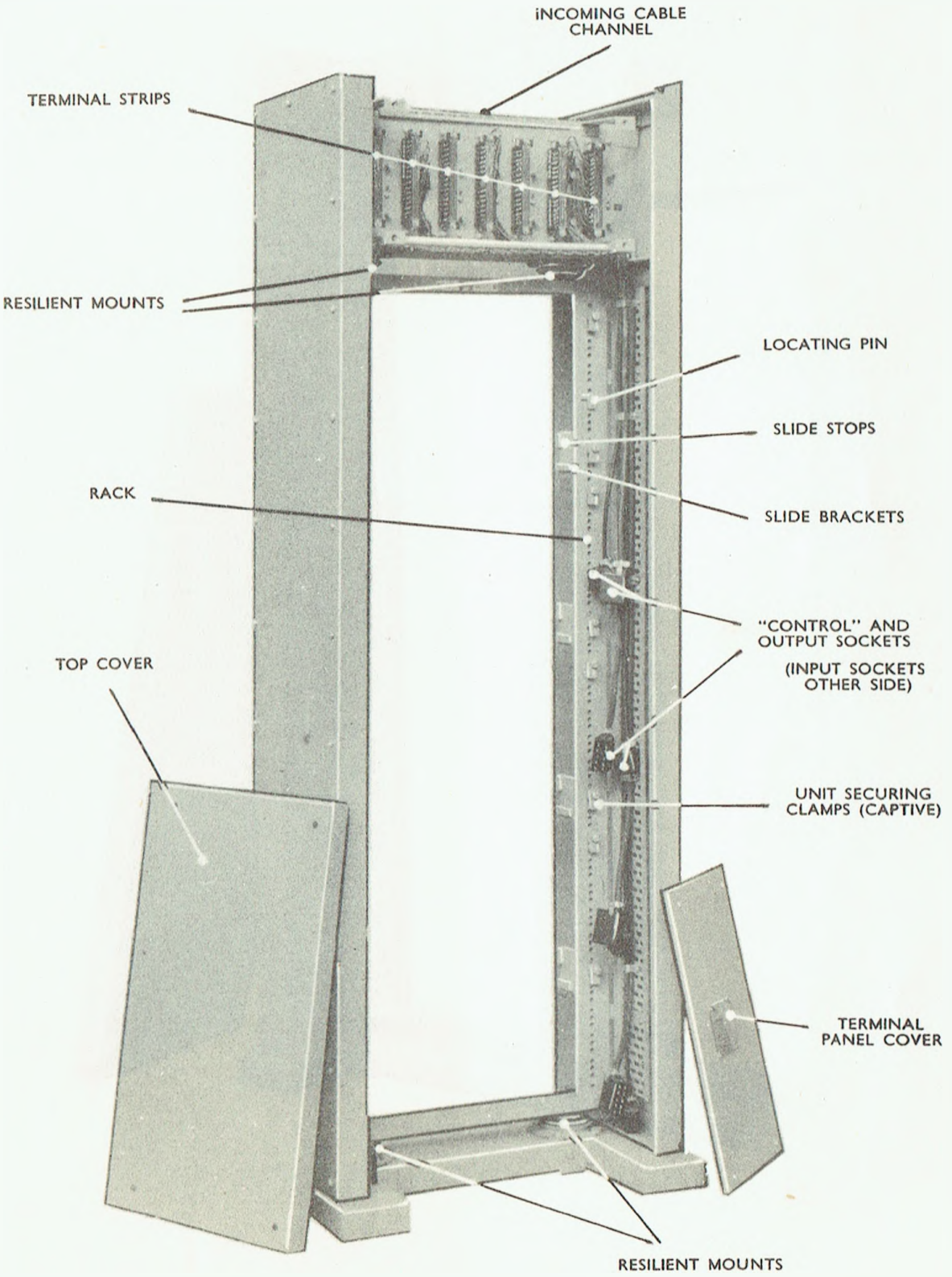


PLATE I. FRAMEWORK, ONE BAY. A.P.12643

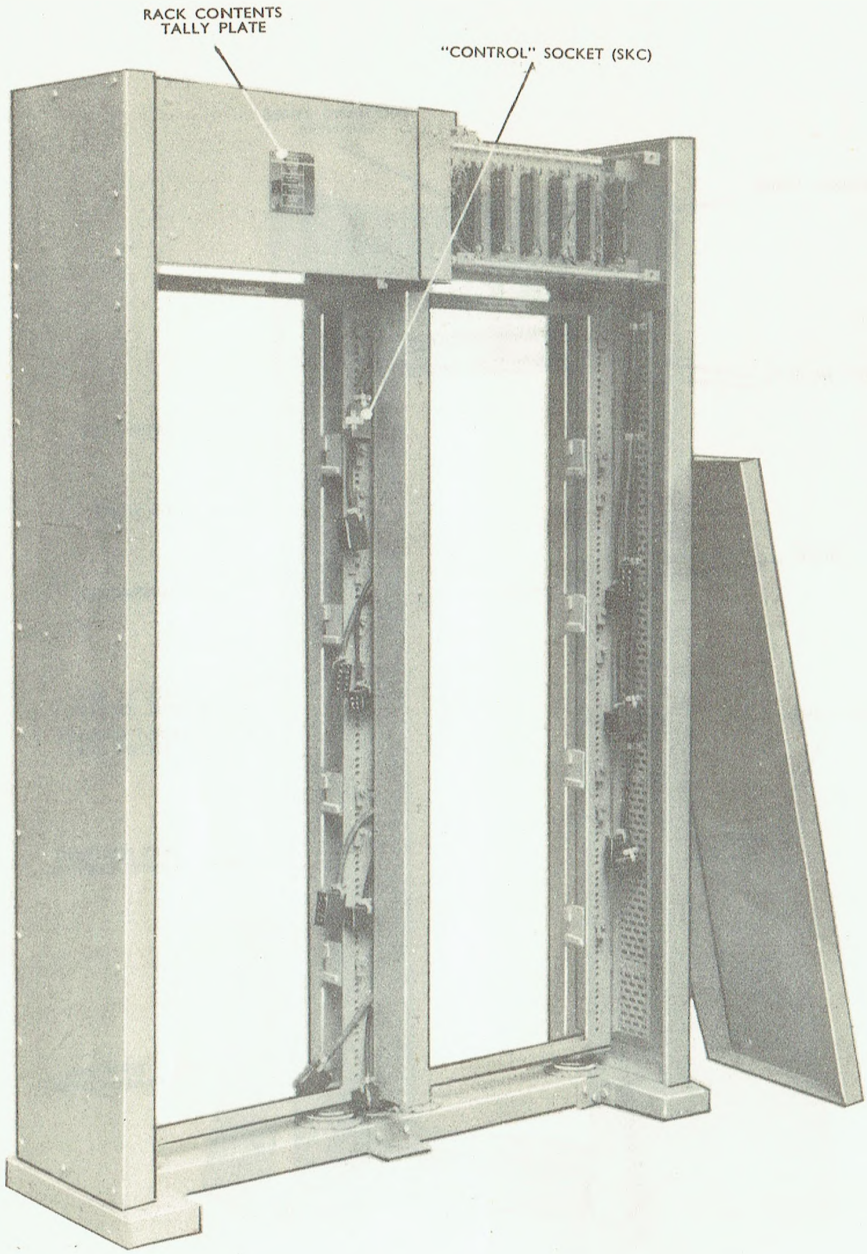
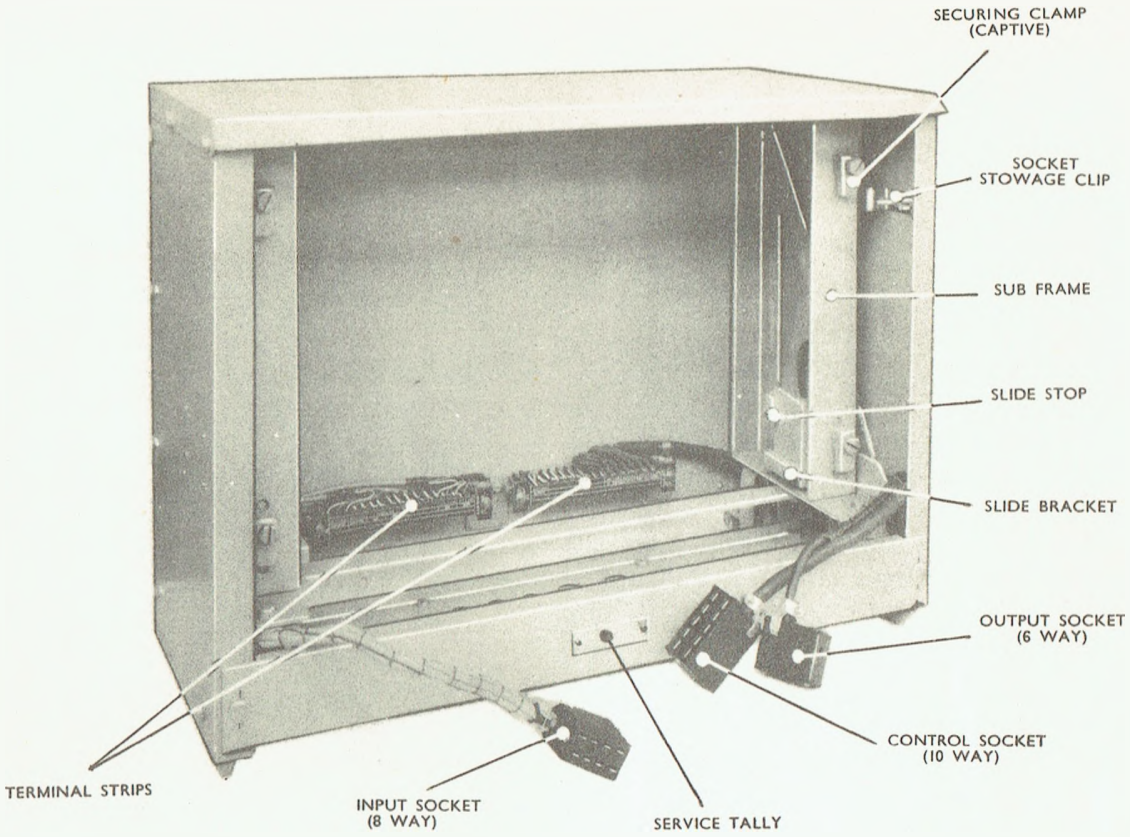
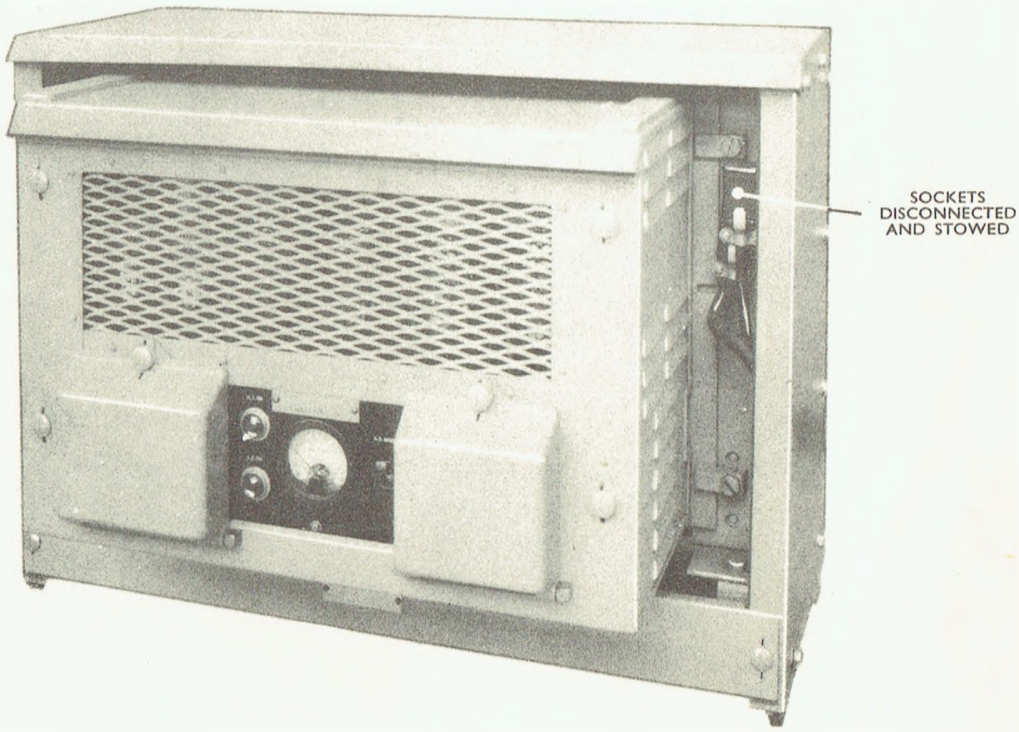


PLATE 2. FRAMEWORK. TWO BAY. A.P.12644



(a). BULKHEAD MOUNTING. A.P.12646



(b) BULKHEAD MOUNTING A.P.12646
WITH
AMPLIFIER 50 WATT. A.P.12647

PLATE 3.