

Chapter 1

BATTERY CHARGING REQUIREMENTS

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Introduction

1. Rooms used for the charging of lead-acid or alkaline batteries should be specially equipped as described in the following paragraphs. Such rooms should be well lit, cool, have ample ventilation, and, if possible, a fan or some other satisfactory means of exhausting the gases given off by the batteries whilst on charge. As these gases are extremely inflammable, no naked lights are permitted in charging rooms, and should not be used to examine a battery at any time. This cannot be too strongly emphasized where blackout conditions sometimes render ventilation inadequate and almost entirely dependent on the use of air circulating fans. The floor, with suitable drains, may be of concrete, bitumastic compound or tiled, with wooden

duckboards which have been waxed, oiled or treated with anti-sulphuric paint.

2. Whenever possible, batteries in electrically-operated vehicles, such as starter trolleys and fork-lift trucks, should be charged in situ, by plugging in to the charging socket provided. Charging is normally carried out external to the working building; when facilities are not available within a reasonable distance, nearer charging points should be provided, preferably on an external wall with a lean-to roof for protection. Charging within the working building may be permitted, provided an adequate area around the charging point is kept clear of combustible material and material likely to be contaminated by fumes.

RESTRICTED

3. Charging may be unsupervised provided that vehicles on charge are inspected by a competent tradesman before being left overnight, or unattended by a prolonged period; charging timers are fitted on some vehicles to disconnect the power after a suitable charging period. Attention should be paid to the serviceability of all associated electrical equipment; adequate fire precautions must be taken at all charging points.

DESCRIPTION

Equipment

4. Adequate sink space and draining boards for washing out and draining of batteries should be provided in charging rooms, together with a liberal supply of running water. When solid wooden or concrete benches are used, i.e., not the slatted type described in para. 10 and 11, batteries must not be allowed to stand directly on the benches, but should rest on grids of oiled or waxed wood, or on dry wood planks well rubbed with protective PX-7, or treated with anti-sulphuric paint.

5. A copy of Poster 20 and/or 21 should be prominently displayed, and the appropriate records kept in accordance with current authorized procedure.

6. It must be stressed that on no account must acid-contaminated equipment be used in connection with alkaline batteries or vice versa, or the batteries will be seriously damaged. For this reason it is preferable to have separate charging rooms for lead-acid and alkaline batteries, but where of necessity only one charging room is available, the two types of batteries must be separated by at least 3 feet, and the servicing equipment and vents separated in the same way.

7. For the sake of uniformity, and to avoid confusion when more than one person is engaged in charging operations, batteries should be segregated as follows:—

Receipts. (1) For initial charge, (2) For re-charge.

Issues. (1) Serviceable (aircraft), (2) Serviceable (ground).

Unserviceable batteries should be drained, dried and removed from the charging room.

8. Fig. 1, 2 and 3 are typical wiring diagrams for battery charging rooms. Referring

to fig. 1 and 2 it will be seen that the boards may be fed from alternative rectifiers, double-pole, double-throw switches being used to select the rectifier. The centre terminals of these switches should be given a feeder number and the charging boards should also be numbered. Five-way terminal blocks mounted directly below the charging board are recommended for battery trolley connections. A typical charging room hangar annexe installation with provision for an extra rectifier and boards is shown in fig. 3.

9. The leads are cleated to wooden battens fixed at a convenient height, the pilot lamp being mounted not less than 8 feet from the ground. The terminal block, cables and plugs should be connected to provide facilities for in situ charging. The positive and negative terminals on two (or more if necessary) circuits on the board should be connected in parallel with removable links, so that the correct charging current can be obtained.

Charging benches

10. A new design of charging bench is being introduced as an alternative to the conventional solid wooden or concrete bench. As illustrated in fig. 4, it consists of a number of mild steel roller slats, covered in $\frac{3}{4}$ in. bore P.V.C. water hose, resting in circular grooves in wooden or concrete partitions. The optimum bench height has been found to be 1 ft. 8 in., which reduces lifting strain on the operator when placing batteries on charge, and enables visual inspection to be made effectively.

11. This design of bench obviates corrosion and consequent deterioration of the structure since any spilt electrolyte falls to the floor where it can be wiped up without batteries on charge being disturbed, and individual slats can be removed and wiped clean. In tropical climates, the slatted bench promotes maximum air circulation and cooling; the bench area is readily adjustable by removal of unwanted slats, and by this means, the charging boards are more easily accessible for adjustment. ►

Charging boards

12. The charging boards should be mounted above the benches in a convenient position, avoiding as far as possible the necessity for long charging leads. The leads must be of

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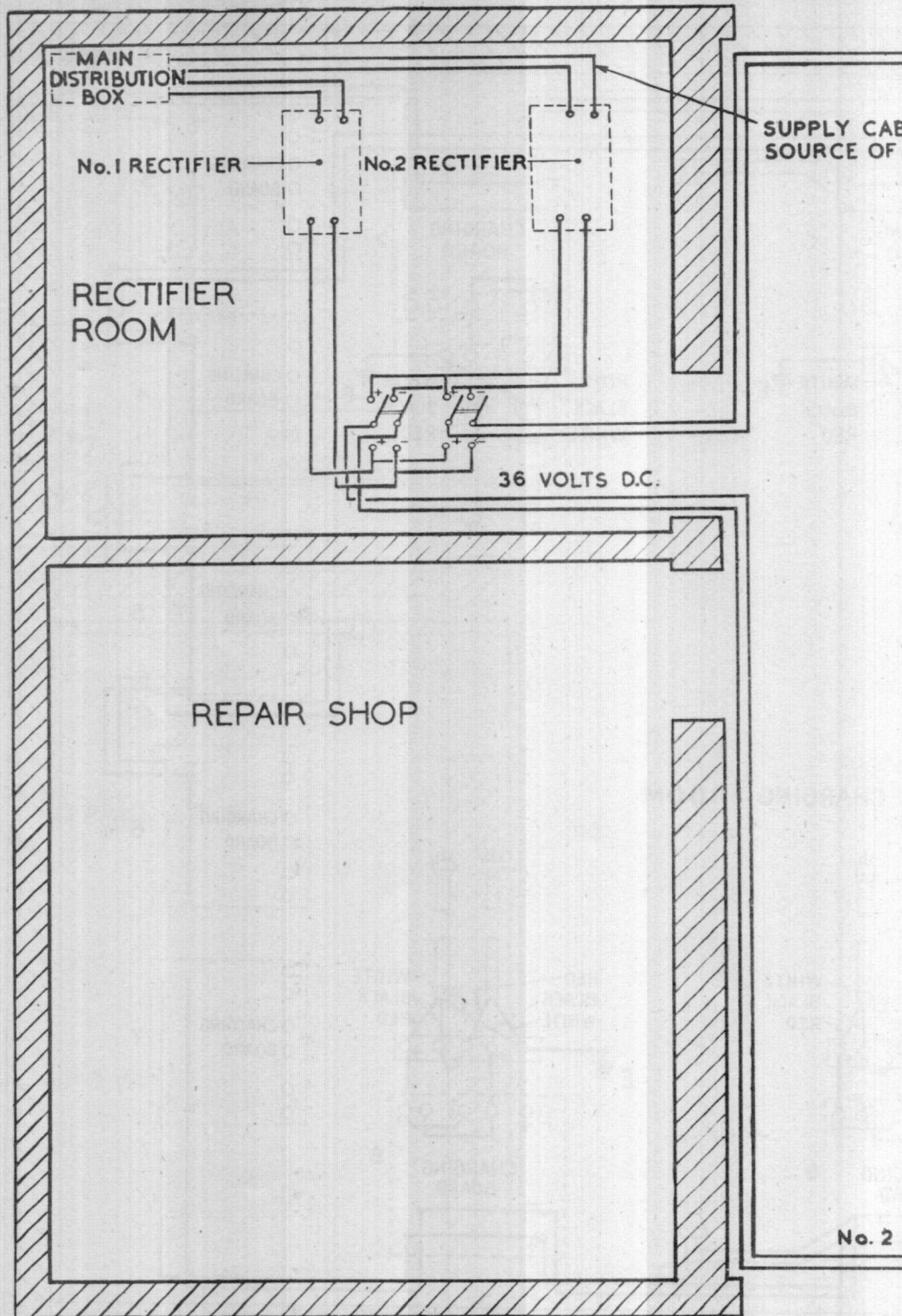


Fig.1. A

BATTERY CHARGING ROOM

3-CORE
FLEXIBLE CABLES (CORES
TO BE TAPED UP WHERE
EXPOSED)

PILOT LAMP

NOTE :-BOARDS (4) & (5)
EACH ARRANGED TO
CHARGE 2 12-VOLT TROLLEY
BATTERIES IN SERIES
AT 18-AMPERE RATE

board charging installation

STRICTED

(A.L. 62, Aug. 1954)

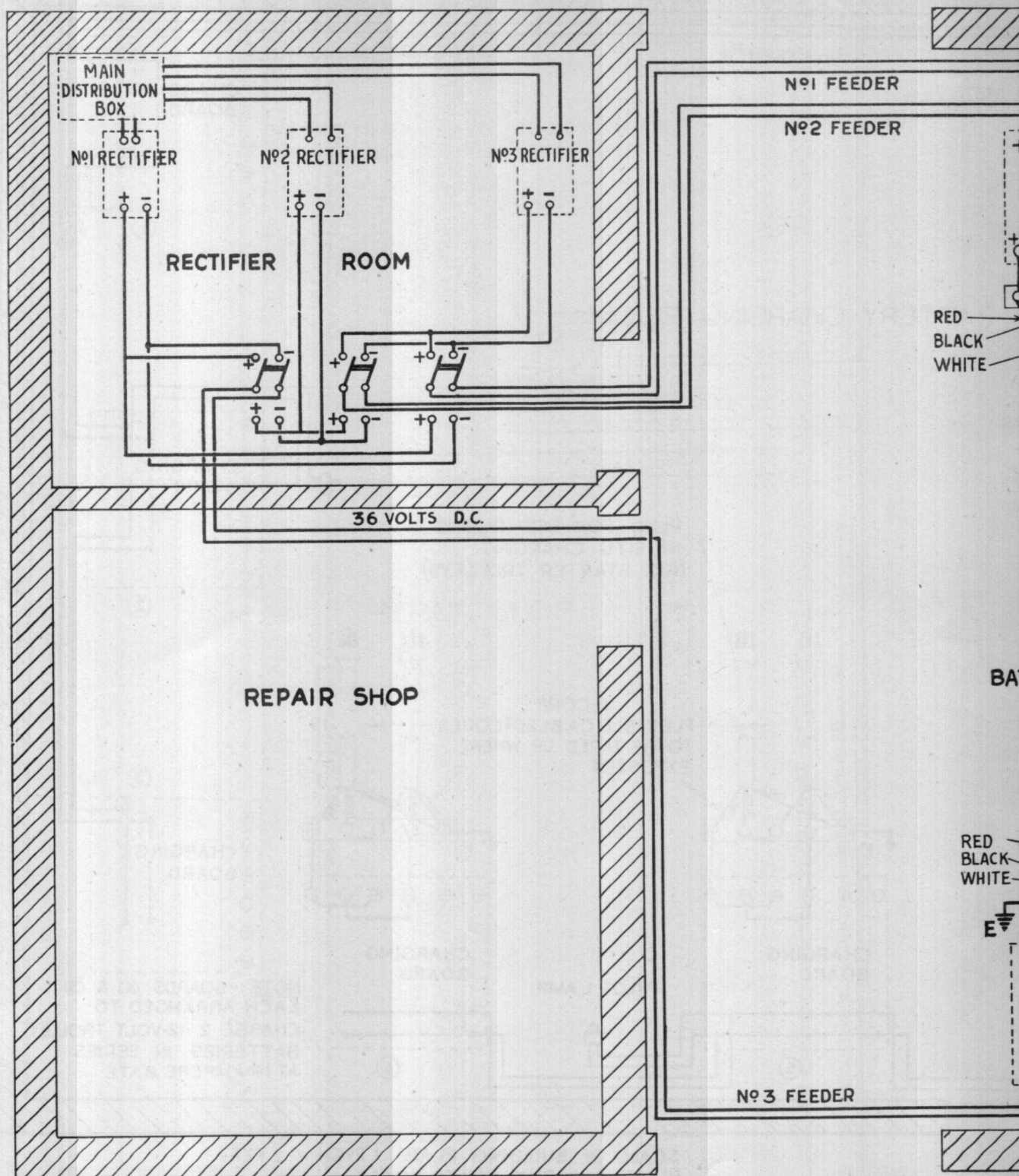


Fig. 2. A nine-board charging system with restricted access.

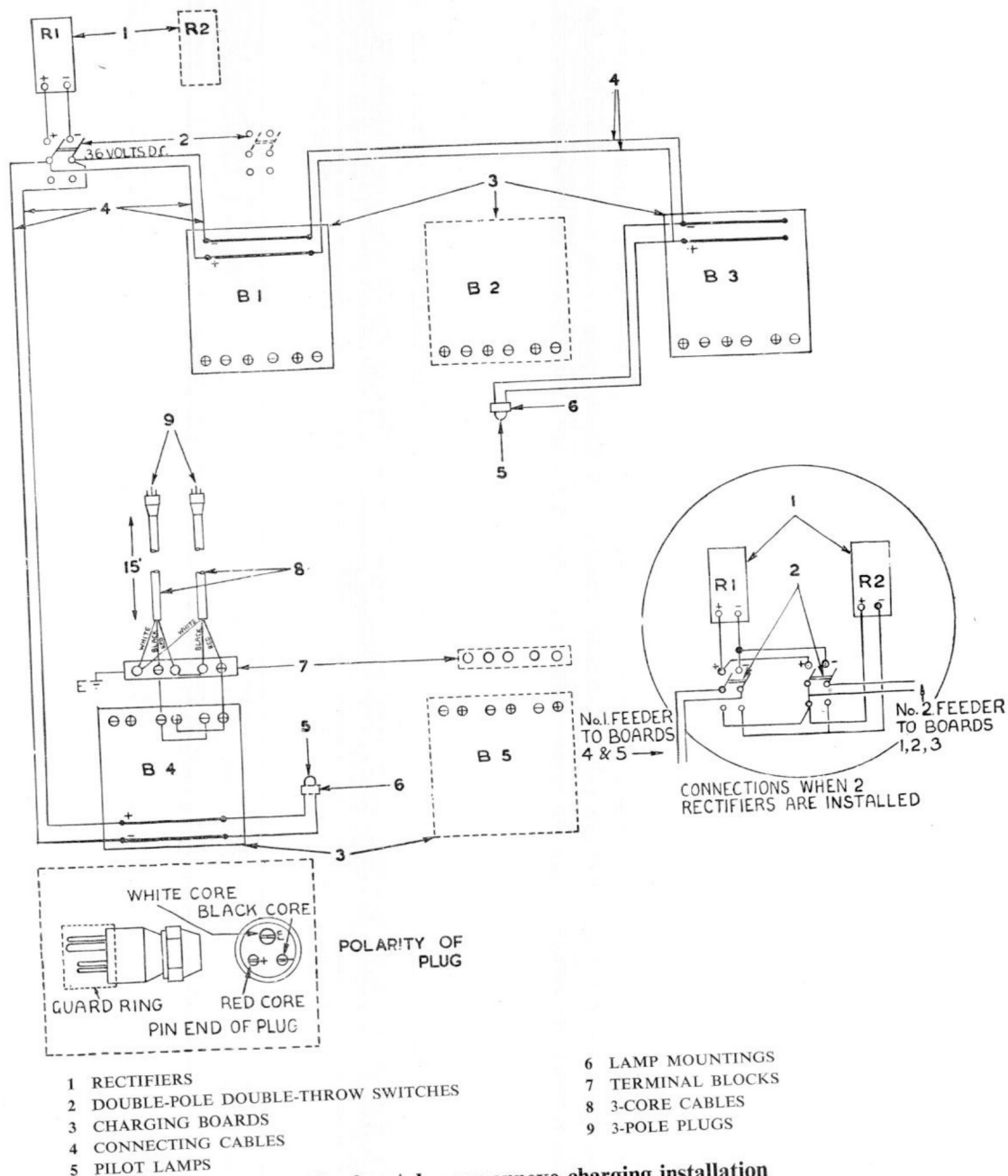


Fig. 3. A hangar annexe charging installation

well-insulated cable of ample cross-sectional area fitted with suitable cable ends. In order to minimize the risk of fire, free ends of cable must not be used for connections and all cable ends must be firmly tightened down. The charging of batteries, or banks of batteries, in parallel is forbidden. Details of

certain types of charging board will be found in A.P.4343G, Vol. 1, Sect. 3. ▶

Rectifiers

13. Where a d.c. supply is not available, rectifiers of the copper oxide, selenium, mercury arc or valve type must be employed.

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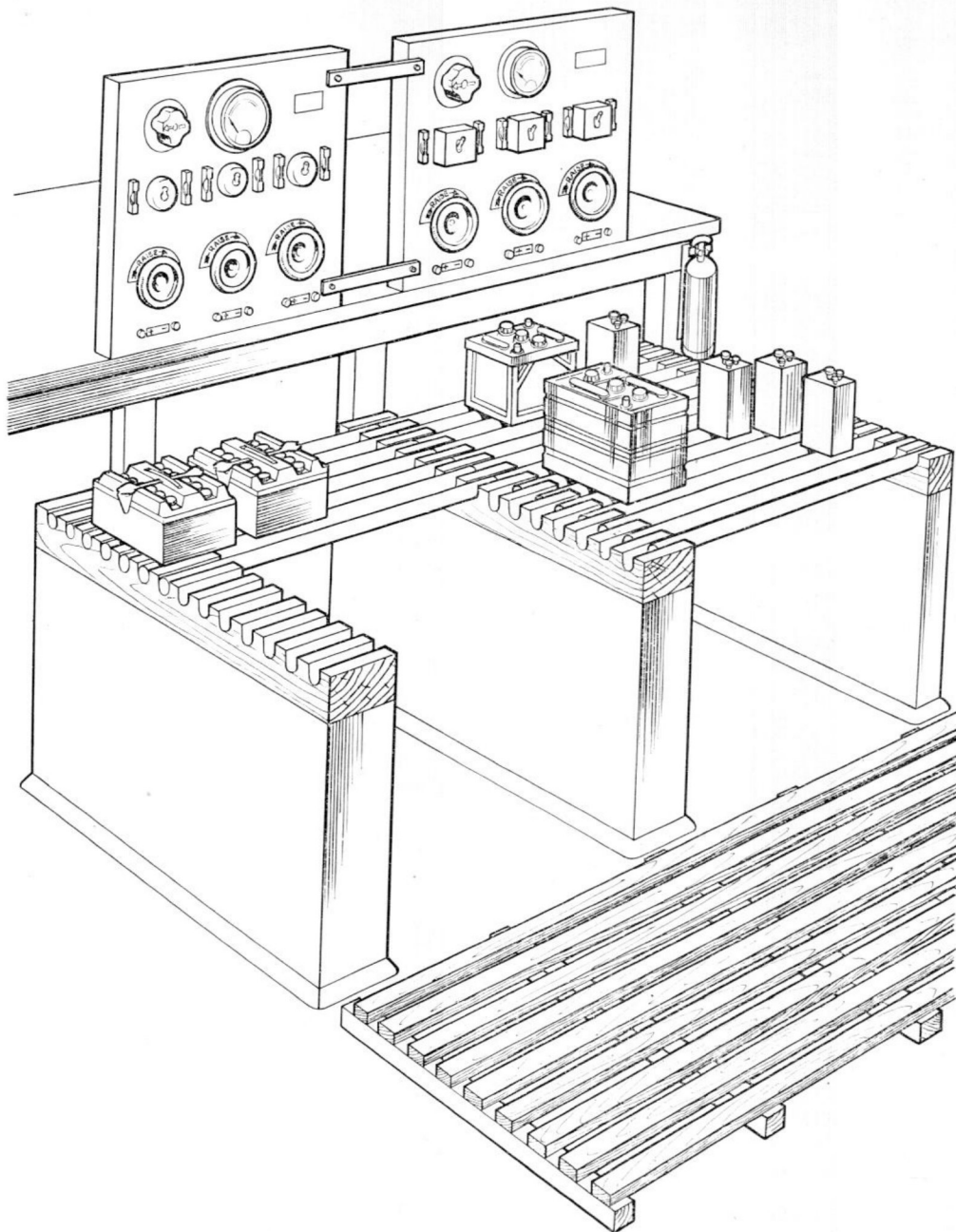


Fig. 4. Slatted type charging bench

These rectifiers are described in A.P.4343G, Vol. 1, Sect. 3. As good ventilation is essential for their proper functioning, the rectifiers should be mounted in a cool position where there is a circulating current of air. When a

fan is included in the rectifier framework, the open portions of the channel should be unobstructed, and in all cases the position chosen should be dry, free from fumes, and where there is as little dust as possible.

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Batteries

14. Adequate space will be required for the storing of new and unused batteries, and a position should be chosen where they are not subject to damage or excessive vibration and where they can be kept clean, dry, and cool, with lead-acid segregated from alkaline types. Instructions for the storage of used batteries are laid down in A.P.830, Vol. 2, Leaflet F2.

Electrolyte

15. Because of the corrosive nature of the fumes of sulphuric acid, carboys or bottles should be kept as far as possible from any electrical apparatus, and should be sealed when not in use. In order to avoid accidental damage to the containers, only the carboy or bottle actually in use should be kept at hand, any reserves being stored in a safe place.

16. Potassium hydroxide used as the electrolyte for alkaline batteries is supplied in solid form in three and seven pound drums. Contamination by carbon dioxide will take place if the solid electrolyte is exposed to the air; a complete drum should therefore always be mixed at one operation, and any unused solution stored in stoppered bottles. Only glass, earthenware or welded iron vessels and rods should be used for mixing or storing this electrolyte. On no account must galvanized iron be used.

Distilled water

17. To avoid contamination, supplies of distilled water (or de-mineralized water) must be stored away from supplies of acid and alkali. Vessels containing distilled water must be kept firmly stoppered when not in use.

Apparatus

18. Mixing jugs, rods, hydrometers, thermometers and voltmeters should not be left lying on benches, but should be cleaned, dried, and put away after use in a cupboard kept for the purpose. Cleaning rags also must not be left lying about but must be kept together in the place reserved for them. A supply of protective PX-7 for use on terminals or other parts likely to suffer from corrosion must also be readily available.

SAFETY PRECAUTIONS**Protective clothing**

19. When handling batteries or electrolyte, rubber aprons and gloves should be worn; in addition, goggles must be worn at all times when handling or dealing with acid or alkali. After use, these articles must be rinsed free of acid (or alkali) and dried thoroughly. To avoid cracking or perishing, they should be stored in a cool place, the aprons being hung with as few folds as possible.

Spilt electrolyte

20. When electrolyte has been spilt on the bench or floor, it should be soaked up with sawdust, which must then be removed and buried. The affected surface should then be washed with water until all signs of electrolyte are removed.

First aid

21. Instructions on first aid for chemical burns are given in Poster 174, which should be prominently displayed.

