

SPECIFICATION FOR EQUIPMENT
BELL TELEPHONE LABORATORIES, INC.
SYSTEMS DEVELOPMENT DEPT., NEW YORK
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GENERAL ENGINEERING REQUIREMENTS
FOR
INSTALLATION OF
LEAD LINED WOOD TANK STORAGE BATTERIES
POWER SYSTEMS

REASONS FOR REISSUE

1. To replace the information on the glass oil insulator and vitrified brick with information on the procelain oil insulator pedestal. (Paragraph 4.01, Fig. 1 and Fig. 3).
2. To cover the differentiation between styles A and C tanks in the use of bus bar supports (paragraph 4.103).
3. To include more detailed information on the installation of wood end spacers (paragraph 7.2).

1. GENERAL

1.1 Scope of Specification

- 1.11 This specification together with supplementary specifications and drawings listed herein covers the engineering requirements for the practices to be followed in the installation of storage batteries of the open cell type.
- 1.12 These specifications shall be followed except in cases where modifying information is contained in the supplementary specifications, drawings or order. In cases where these specifications do not agree with the supplementary information, the supplementary specification, the drawings or the order shall be followed. In case the supplementary specifications and drawings do not agree the supplementary specification shall be followed.

2. ASSOCIATED SPECIFICATIONS

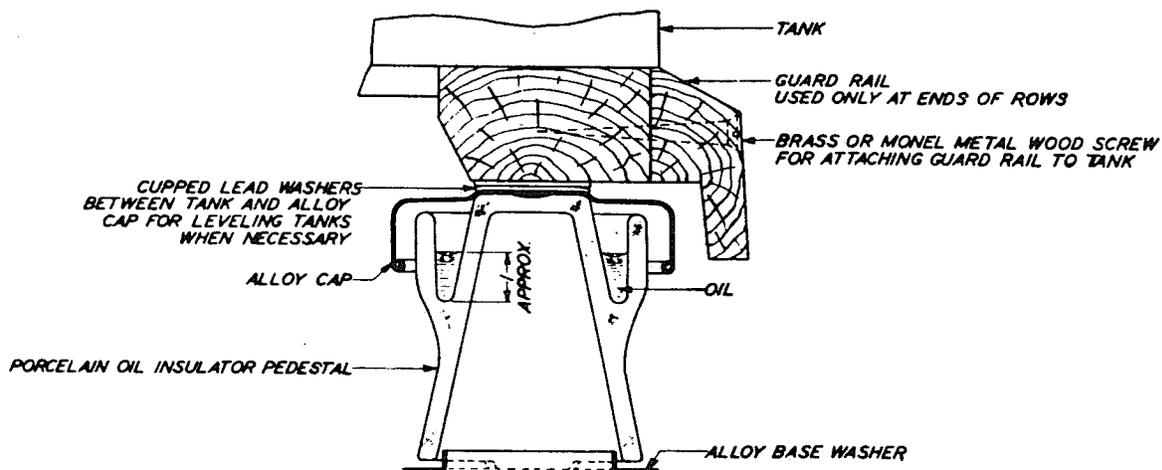
- X-65530 - Classified List of General Engineering Requirements Specifications for Central Office and P.B.X. Equipments.
- X-65139 - Initial Charge of Storage Batteries of the Open Cell Type
- B.S.P. - Al28.004 Bell System Maintenance Practices for Apparatus used in telephone and telegraph power plants

3. CARE OF MATERIALS

- 3.1 Battery plates shall be kept clean and dry and not allowed to come in contact with foreign materials that would cause injury to the plates.
- 3.2 Wood separators are shipped wet and shall not be allowed to dry. Any necessary moistening shall be with water approved for storage battery use.

4. MOUNTING AND ASSEMBLING CELLS

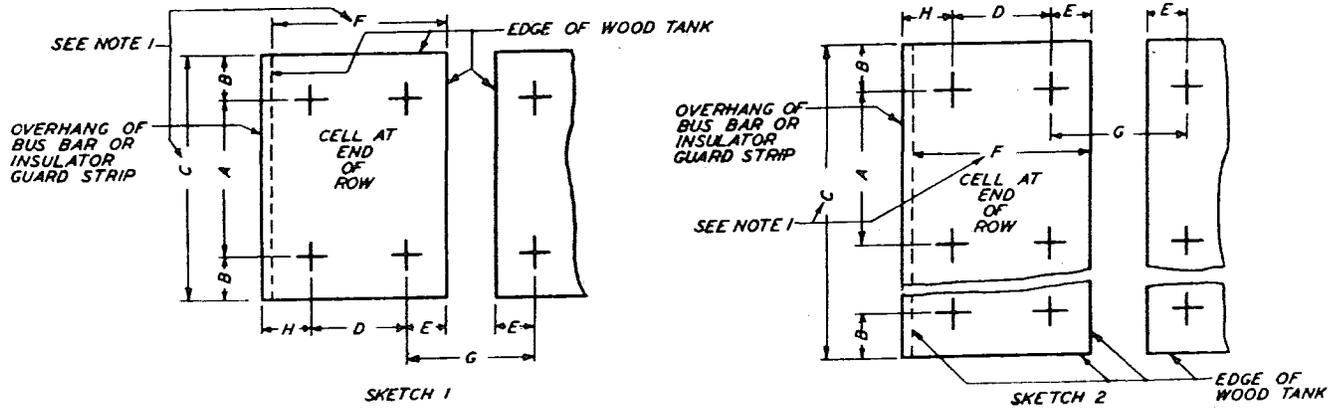
- 4.01 Insulator assemblies shall be set up as shown in Figure 1. The pedestals shall be clean and dry before filling with oil. On a mastic floor, tiles shall be placed under the pedestals. The tiles shall be installed with the corrugated side down and shall rest evenly on the floor.



OIL INSULATOR SET UP

FIG. 1

- 4.02 After shipping strips have been removed all unused nail and screw holes in the wood tanks shall be plugged with wood pegs and the surface painted over with two coats of approved black storage battery paint.
- 4.03 The bottom of each tank shall be level. Not more than 1/2" of lead washers between the tank and the alloy cap of the insulator shall be used for leveling. Where more than 1/2" difference in height exists between insulators, earthenware discs shall be used between the alloy cap and the tank.
- 4.04 Insulator guard rails shall be attached to the tanks at the ends of the rows. (See Figure 1)
- 4.05 Glass plate supports shall be equally spaced from either end of the tank and shall be installed with the smaller tapered end down. The bottom edge of each plate support shall rest on the bottom and against the side of the tank lining. (See Figure 3). Supports shall be installed with the rough side facing the lead lining on its side of the tank. Where more than one glass plate support is used on a side the top edges shall be at the same height within 1/16", and shall have a separation of not more than 1/16" at the top.
- 4.06 Two hard rubber wedges shall be placed between each glass plate support and the side of the tank. (See Figure 3).
- 4.07 The plates shall hang plumb in the tanks, and the plate lugs shall be aligned so that the vertical edges of all plates will be fully protected by the separators.

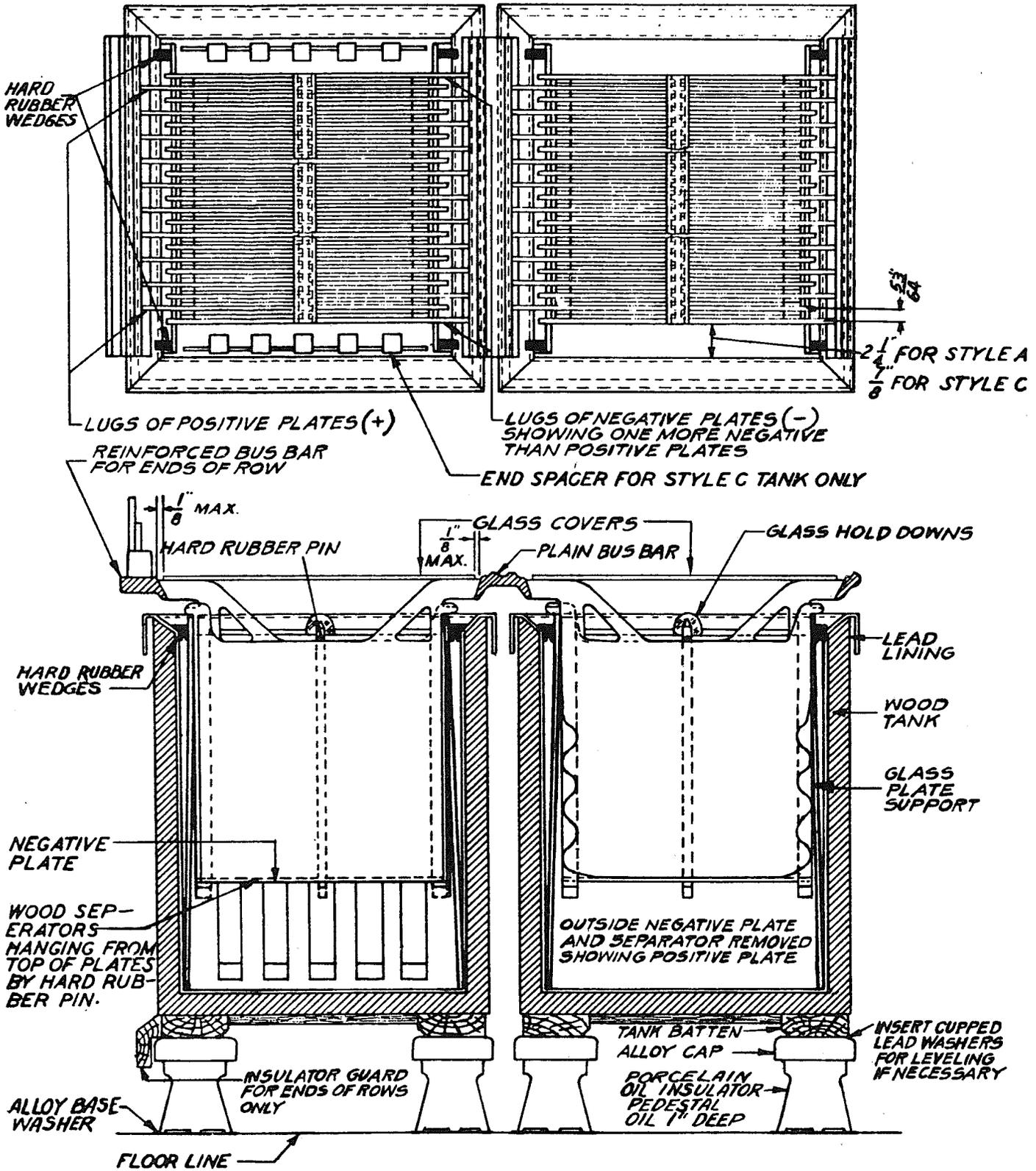


NO. OF INS.	NO. OF PLATES	TYPE G STYLE A (SKETCH 1 AND 2)								NO. OF INS.	NO. OF PLATES	TYPE H STYLE C (SKETCH 2)							
		A	B	C	D	E	F	G	H			A	B	C	D	E	F	G	H
4	11	7 3/16	3 25/32	1-3 1/8						4	21	11 3/16	5 19/32	1-10 3/8					
	13	8 3/8	4 3/16	1-4 3/4	1-3 1/4						23	1-0	6	2-0					
	15	9 1/16	4 15/32	1-6 1/8							25	1-0 1/16	6 3/32	2-1 1/8					
	17	10	5	1-8							27	1-1 3/8	6 1/8	2-3 1/4					
	19	11 3/8	5 11/16	1-10 3/4							29	1-2 7/16	7 7/32	2-4 7/8					
	21	1-0 3/16	6 3/32	2-0 3/8							31	1-3 5/16	7 21/32	2-6 5/8					
	23	1-1	6 7/8	2-1 2/8							33	1-4 1/4	8 1/8	2-8 1/4					
	25	1-1 13/16	6 29/32	2-3 3/8							35	1-4 15/16	8 15/32	2-9 7/8					
	27	1-2 1/16	7 1/32	2-5 3/8							37	1-5 1/2	8 3/8	2-11 1/2					
	29	1-3 1/2	7 3/4	2-7							39	1-6 5/8	9 5/8	3-1 1/4					
6	31	1-4 1/8	8 3/8	2-8 3/8	2 1/4			6 1/2		41	1-7 1/8	9 3/8	3-2 3/8						
	33	1-5 1/2	8 1/8	2-10 1/2						43	1-1 1/2	6 1/2	3-4 1/2	1-3 1/2	2 5/8	1-8 3/4	7 1/4	4 1/8	
	35	1-6	9	3-0	1-4 1/2				1-8 3/4	3 11/16									
	37	1-0 9/16	6 1/2	3-1 3/8						45	1-2 1/4	6 13/16	3-6 1/8						
	39	1-1 1/8	6 1/8	3-3 1/4						47	1-2 3/8	7 1/8	3-7 1/8						
	41	1-1 5/8	6 13/16	3-4 2/8						49	1-3 1/4	7 3/8	3-9 1/2						
	43	1-2 3/16	7 1/8	3-6 3/8						51	1-3 3/2	7 13/16	3-11 1/8						
	45	1-2 3/4	7 3/8	3-8 1/4						53	1-4 1/4	8 1/8	4-0 1/2						
	47	1-3 5/16	7 3/8	3-9 7/8						55	1-4 1/2	8 3/8	4-2 1/2						
	49	1-3 13/16	7 15/16	3-11 1/2						57	1-5 1/8	8 1/8	4-4 1/8						
8	51	1-4 1/8	8 1/8	4-1 1/2						59	1-5 5/8	9	4-5 1/2						
	53	1-5 1/4	8 3/8	4-3 5/8						61	1-6 3/8	9 3/8	4-7 3/8						
	55	1-5 1/2	8 5/8	4-5 1/2						63	1-7	9 1/8	4-9 3/8						
	57	1-6 1/8	9 1/8	4-6 7/8						65	1-7 3/8	9 3/4	4-10 1/2						
	59	1-2 3/8	7 1/8	4-8 3/8						67	1-8 1/8	10 1/16	5-0 3/8						
	61	1-2 1/4	7 3/8	4-10 1/4						69	1-3 3/4	7 7/8	5-3						
	63	1-3	7 7/8	4-11 3/8						71	1-4 1/2	8 1/8	5-4 1/2						
	65	1-3 3/8	7 15/16	5-1 1/2						73	1-4 5/8	8 1/4	5-6 3/8						
	67	1-3 7/8	7 31/32	5-3 1/2						75	1-5	8 1/2	5-8						
	69	1-4 1/4	8 1/8	5-4 3/8	1-3 1/2	3			1-9 1/2	8	1-5 7/8	8 3/8	5-11 3/8						
10	71	1-4 3/8	8 1/8	5-6 1/2						77	1-5 11/16	8 1/2	5-9 3/8						
	73	1-5	8 1/8	5-8 1/8						79	1-5 7/8	8 3/8	5-11 3/8						
	75	1-5 1/8	8 3/8	5-9 1/8						81	1-6 1/4	9 1/8	6-1	1-3 3/4	3	1-9 3/4	8 1/4	4 1/4	
	77	1-5 5/8	8 15/16	5-11 1/2						83	1-6 3/8	9 3/8	6-2 3/8						
	79	1-6 1/4	9 1/8	6-1 1/8						85	1-7	9 3/8	6-4 1/4						
	81	1-3	7 3/8	6-2 1/2						87	1-7 1/4	9 1/4	6-6						
	83	1-3 1/8	7 3/8	6-4 1/8						89	1-7 3/8	10	6-7 5/8						
	85	1-3 3/8	7 1/8	6-6						91	1-4 1/4	8 1/8	6-9 1/4						
										93	1-4 3/8	8 3/8	6-10 7/8						
										95	1-4 7/8	8 1/2	7-0 1/2						

NOTES:
1. DIMENSIONS C AND F COVER THE LENGTH AND WIDTH OF THE WOOD TANKS ONLY

LOCATION OF INSULATORS FOR STYLES "A" AND "C" WOOD TANKS

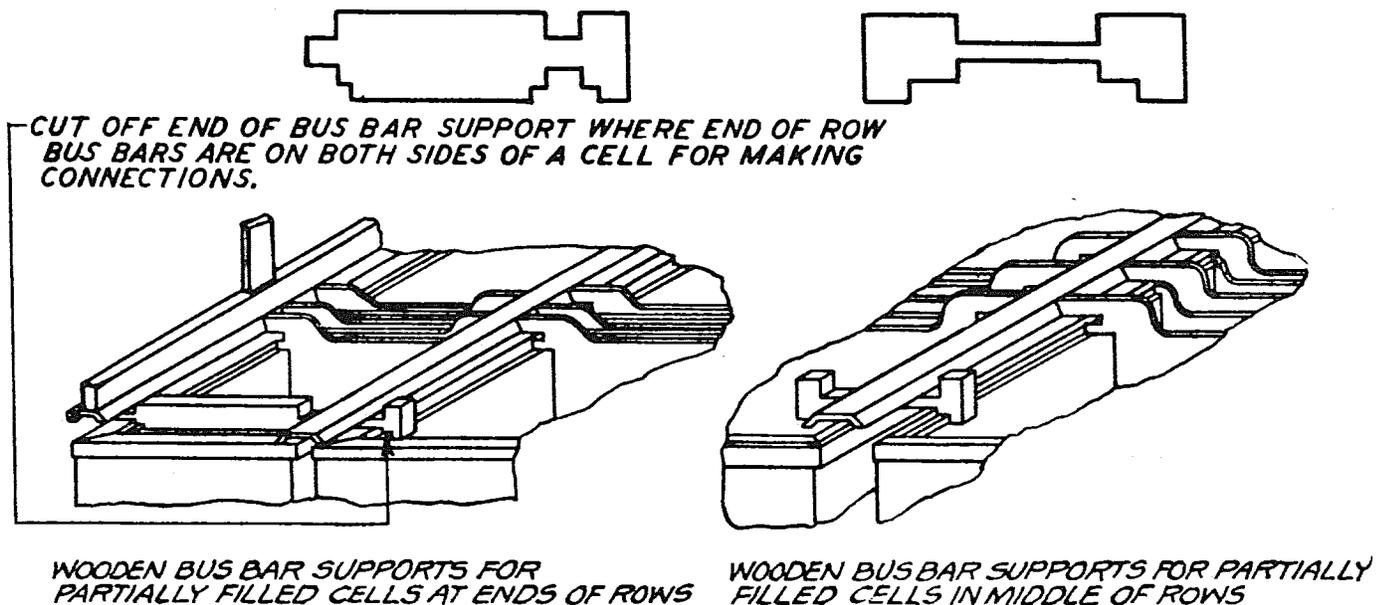
FIG. 2



TYPICAL CONSTRUCTION OF LEAD LINED
WOOD TANK STORAGE BATTERY CELL

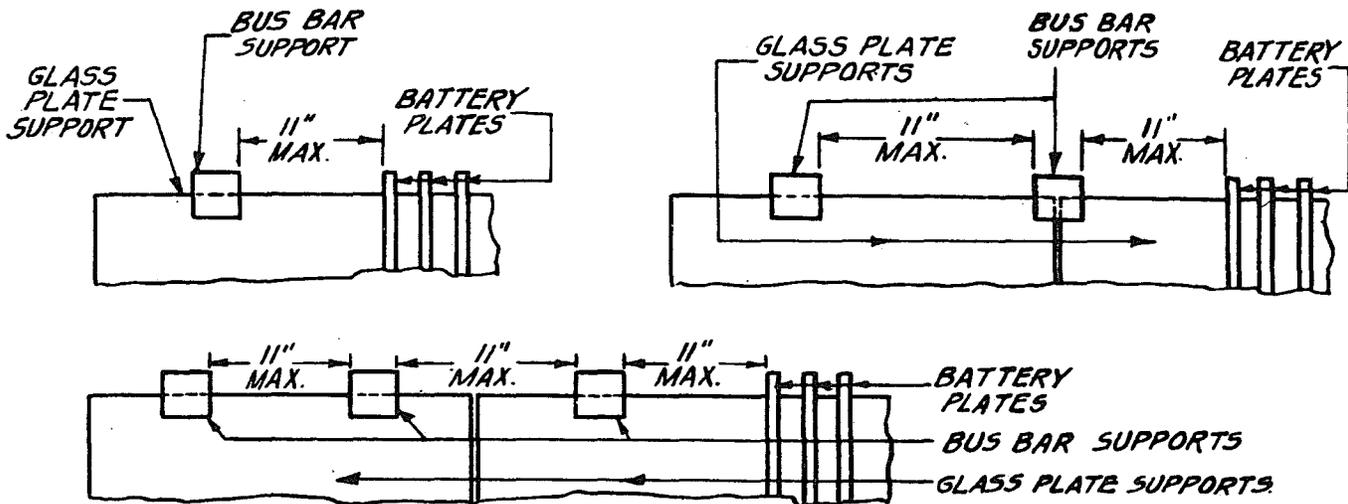
FIG. 3

- 4.08 The bus bars between tanks and at the ends of rows shall be level and parallel. The reinforced bus bars shall have their lead coated copper bus bar vertical.
- 4.09 The connection lug of a cell-plate shall be burned to the bus bar with pure lead which shall make a continuous and solid connection to the bus bar of a section equal to that of the plate lug.
- 4.10 Where cells are only partially equipped with plates the following shall apply:
- 4.101 For cells that are accessible from one side only the plates shall be placed in the tanks on that side which faces the passage way.
- 4.102 For cells that are accessible from both sides the plates shall be mounted on that side of the cell which is toward the center, or main passage way.
- 4.103 When the unequipped number of plates is 8 or more in style A tanks and 10 or more in style C tanks the unequipped ends of the bus bars shall be supported by wood bus bar supports. Also the bus bar supports shall hold the glass plate supports in position and shall clear the top edges of the tanks. (See Figures 4 and 5).



ARRANGEMENT OF BUS BAR SUPPORTS

FIG. 4



SPACING OF BUS BAR SUPPORTS

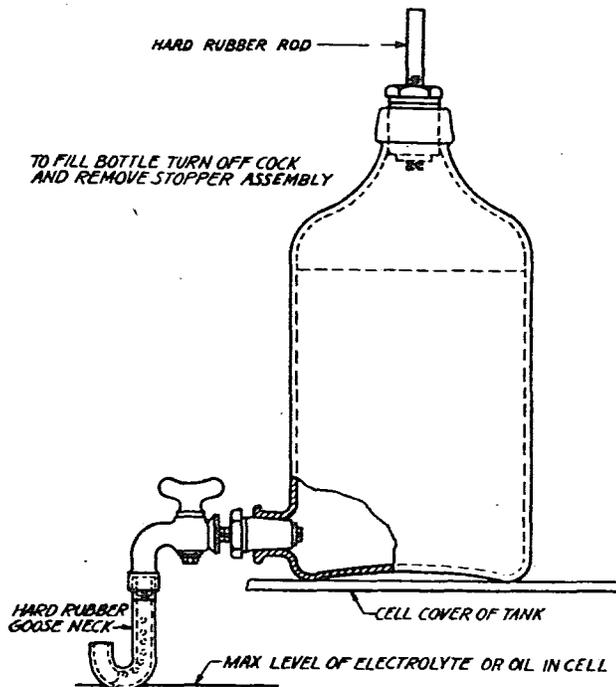
FIG. 5

- 4.11 Glass covers shall be only slightly larger or smaller than the width of the space between the inside upper edges of the cell bus bars: when the covers are smaller than the space, the difference shall not exceed $1/8$ " on either side. (See Figure 3). If one side of the glass is rough, it shall be installed with the rough side down.
- 4.12 An electrolyte height indicator shall be mounted on one of the glass plate supports on the passage way end of each tank.
- 4.13 When oil is furnished for the electrolyte and the initial charge is to conform with the requirements of the specification on the initial charging of storage batteries the oil shall be poured to a depth of $5/16$ " before the initial charge. If oil is added after the initial charge it shall be poured to a depth of $1/4$ ".

5. PILOT CELLS

- 5.1 Each pilot cell shall be equipped with an hydrometer, automatic water filler and with a floating thermometer having a gravity correction scale. The hard rubber goose neck on the automatic water filler shall be adjusted to maintain the maximum level of electrolyte or oil at the tip of the height indicator.
- 5.2 Displacement tanks shall be installed in pilot cells which lack four plates or more of being fully equipped. Displacement tanks shall rest evenly on the bottom of the tank and have a clearance of not less than 2" for style "A"

tanks and 7/8" for style "C" tanks between the ends of the displacement tank and the last negative plate. Displacement tanks shall be filled with electrolyte of $1.215 \pm .005$ sp. gr. (corrected to 60° F.), at the same time as the battery tank.



STYLE "C" AUTOMATIC WATER FILLER
FIG. 6

6. TESTING

All cells shall be thoroughly tested for short circuits between elements and lead linings and between lead linings and ground after the bus bars have been burned in and before the separators and electrolyte are added.

7. SEPARATORS AND END SPACERS

7.1 Separators that are cracked or warped shall not be used except that small tight cracks at the edges not over 1-1/2" long, are permissible.

7.2 Wood end spacers shall be installed in each style "C" tank as follows:

Two for all fully equipped tanks and pilot cells of partially equipped tanks.

One for other than pilot cells of partially equipped tanks.

In fully equipped tanks an end spacer shall be installed in each end. In partially equipped tanks, the one end spacer shall be installed at the equipped end of the tank; in the pilot cell, the second end spacer shall be installed between the displacement tank and the end negative plate.

8. INITIAL CHARGING

- 8.1 The cells shall be filled with electrolyte of $1.215 \pm .005$ specific gravity (corrected to 60° F.) and an initial charge shall be given in accordance with the specification on the initial charging of storage batteries.

9. ADDITION OR REPLACEMENT OF PLATES IN OLD BATTERIES

- 9.1 Sediment shall be level.
- 9.2 Additions to F, G and H type batteries which after the additions are to be operated on a constant current charge routine, shall be made by regrouping the plates so that in any cell, the plates of the same polarity will be of the same age. The battery will then consist of any or all of the following types of cells:
- a. Cells with all old negatives and all old positives.
 - b. Cells with all old negatives and all new positives.
 - c. Cells with all new negatives and all old positives.
 - d. Cells with all new negatives and all new positives.
- 9.3 Additions to F, G and H type batteries which after the additions are to be operated on a full floating or constant potential routine, may be made by adding new plates to old plates of the same polarity in the same cells without regard to the age of the plates.
- 9.4 Separators that are damaged (See paragraph 7.1) shall be replaced.
- 9.5 The level of the electrolyte shall be adjusted and the initial charge given in accordance with the specification covering initial charging.

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