

INSTALLING STORAGE BATTERIES

RACK MOUNTED

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1. GENERAL

1.1 Scope

1.11 This section covers the requirements and methods to be followed when placing KS-5361, KS-5553, KS-15544 and KS-15886 rack mounted enclosed type storage cells and batteries. The containers may be of plastic or hard rubber.

1.12 The information in this section is to be used with the other sections in the 17 series.

1.13 D.S. inspection and cleaning instructions are covered in Section 17A.

1.2 Locating Cells

1.21 Unless otherwise specified in job information, the cells shall be located symmetrically in the space designated for them on the shelf or rack.

2. INSTALLING EQUIPMENT

2.1 The required tools and supplies are shown in Section 17A.

3. BATTERY SHIPMENTS

3.1 The individual cell cartons or boxes are opened for initial inspection and cleaning and temporarily reclosed soon after being brought into the building. This is covered in Section 17A.

4. CELL WEIGHTS

4.1 See Table A for grouping of cells and weights.

5. LIFTING STRAPS

5.1 An R-3437 is a reusable and adjustable battery lifting strap. It is made of Neoprene coated "Dacron" and is furnished as part of the R-2667 Battery Hoist and the R-3448 3 Tier Battery Hoist. If the R-3870 Hydraulic Lift Truck is used, the strap should be ordered separately. It is used for lifting the List 300, 400 and 500 Series cells and smaller sizes of cells as necessary. See Figures 1 and 2.

5.2 Examine the strap occasionally to determine that it is in satisfactory condition. Dangerously worn or frayed straps shall be returned to Distributing House for replacement.

6. BATTERY LIFTING ADAPTER

6.1 The R-4096 Battery Lifting Adapter has been made available for use with the R-3870 Hydraulic Lifting Truck. The adapter is made from a piece of structural steel channel to which are welded two arms to facilitate attaching the tool to the forks of the R-3870 truck.

7. SPREADERS

7.1 A spreader for the lifting strap is provided with each shipment of the same size cell and must be used to prevent the cell from slipping out of the strap during the lifting operation. It also removes pressure from the top edge of the cell container which otherwise may break the seal between the jar and the cover. Spreaders are placed as shown in Figure 2.

7.2 In the event a spreader is not received with the cells it may be obtained from the battery manufacturer by ordering a spreader for a particular KS and List number cell.

TABLE A
GROUPING OF CELLS AND WEIGHTS (PAR. 4.1)

KS NUMBER & LIST NUMBER	NO. OF CELLS PER UNIT	NO. OF UNITS	APPROXIMATE WEIGHT OF UNIT CELLS COMPLETE AND UNCRATED			MAXIMUM WEIGHT OF UNIT COMPLETE
			GOULD 12-9-65	C & D 12-23-65	EXIDE 4-12-65	
KS-5361						
L-116	2	1	7.7	8		11
116B	1	1	4.0	4		5
116C	3	1	9.9	11	14	14
120B	2	1	9.1	9	7	9.5
120C	3	1	13.6	12	18	18
130B	2	1	15.8	15	17	17
130C	3	1	21.7	36	25	25
140D	2	1	24.5	22	22	28
140E	2	1	27.0	24	22	28
141D	3	1	36.0	33	32	41
141E	3	1	40.0	36	32	41
150D	2	1	42.0	41	38	50
150E	2	1	47.0	43	38	50
151D	3	1	63.0	61	57	75
151E	3	1	67.0	64	57	75
★151HD	3	1	64.5	61	58	75
★151HE	3	1	69.5	64	58	75
KS-5553						
L-310	2	1	99	82	86	110
311	3	1	155	122	129	165
402	1	1	69	56	54	75
403	1	1	82	72	67	85
405	1	1	107	88	89	115
407	1	1	140	105	110	145
409	1	1	163	135	132	180
501	1	1	195	178	178	225
503	1	1	244	211	225	280
505	1	1	299	244	269	335
508	1	1	368	295	318	415
KS-15886						
L-140D	2	1	25.3	22	22	28
140E	2	1	28	24	22	28
141D	3	1	36.9	33	32	41
141E	3	1	41.5	36	32	41
150D	2	1	42.9	41	38	50
150E	2	1	48.5	43	38	50
151D	3	1	64.1	61	57	75
151E	3	1	68	64	57	75
★151HD	3	1	65.6	61	58	75
★151HE	3	1	70.3	64	58	75
KS-15544						
L-310	2	1	99	82	81	110
★310H	2	1	101			110
311	3	1	155	122	122	165
★311H	3	1	158			165
402	1	1	69	56	53	75
★402H	1	1	71			75
403	1	1	81	72	68	85
★403H	1	1	83			85
405	1	1	106	88	85	115
407	1	1	139	105	112	145
409	1	1	159	135	130	180
501	1	1	193	178	176	225
503	1	1	239	211	205	280
505	1	1	293	244	242	335
508	1	1	360	295	292	415

★ List numbers with an "H" suffix contain high gravity electrolyte and are intended for outdoor use or where the environmental temperature ranges between 50°F and 149°F.

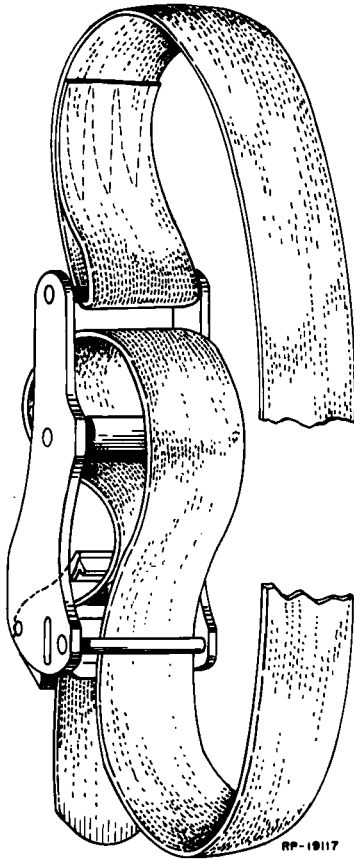


FIG. 1 THREADING THE BUCKLE ON THE R-3437 BATTERY LIFTING STRAP (PARS. 5.1 & 10.3)

8. R-2667, R-3448 AND R-3870 HOISTS

NOTE: Because of extremely high manufacturing costs, the R-2667 Battery Lift was recently rated "Manufacture Discontinued". Existing hoists will be used until it is no longer economical to repair them. As a substitute, the R-3870 Hydraulic Lift Truck and the R-4096 Battery Lifting Adapter should be used. Lift truck and adapter are shown in Figure 5. Use instructions on the R-3870 truck are covered in Handbook 30, Section 50A1.

8.1 The R-2667 and the R-3448 hoist shown in Figures 3 and 4 will operate safely and satisfactorily when maintained in accordance with instructions in Handbook 28.

8.2 The more recent R-3448 three tier battery hoist now in use does not replace the R-2667 but supplements it. See Figure 4. The R-3448 hoist should be ordered instead of the R-2667 for regular jobs having a three tier stand and hardened job sites having two tier stands. The R-3870 or R-2667 should be ordered for use with regular two tier stands. When lifting with either hoist always use the lifting strap and spreader. Except that R-3870 is hydraulically operated, the method of handling the battery cells does not differ from that of the R-2667 hoist.

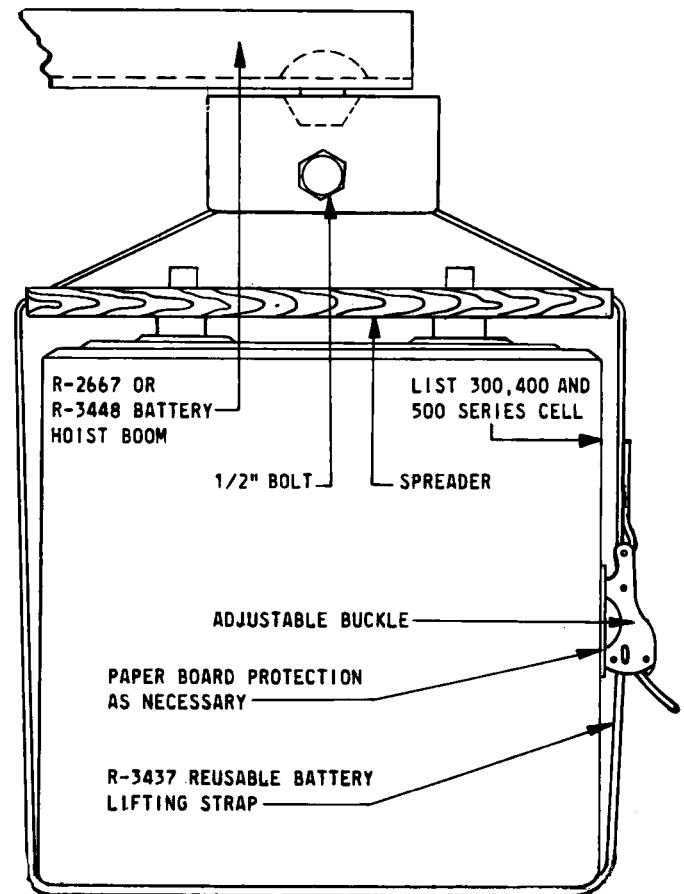


FIG. 2 ARRANGEMENT OF CELL, SPREADER, AND STRAP FOR LIFTING (PARS. 5.1, 7.1 & 10.3)

9. LIFTING AND PLACING KS-5361 AND KS-15886 CELLS

9.1 Break away the sides of the shipping container. Neutralize any spilled electrolyte and wipe the cell clean and dry. Grasp the cell at the junction of the sides and bottom to remove and carry to the desired location. Do not lift by the cell posts or intercell connectors.

10. LIFTING AND PLACING KS-5553 AND KS-15544 CELLS

NOTE: Do not slide plastic cells on rough surface. Sliding will cause scratches and may render the cell container defective.

10.1 Cells are now shipped in paper board containers. Straddle the cell with the hoist, disengage the carriage locking device, remove the container top and break away the four sides.

10.2 Carefully re-examine each cell top and sides for scratched containers, external damage and internal irregularities evident through openings and through transparent containers. See Section 17A. If electrolyte should reappear on any cleaned cell, place the cell on wooden strips over a piece of heavy paper. Permit the cell to remain in this position overnight and re-check the following day before lifting carefully.

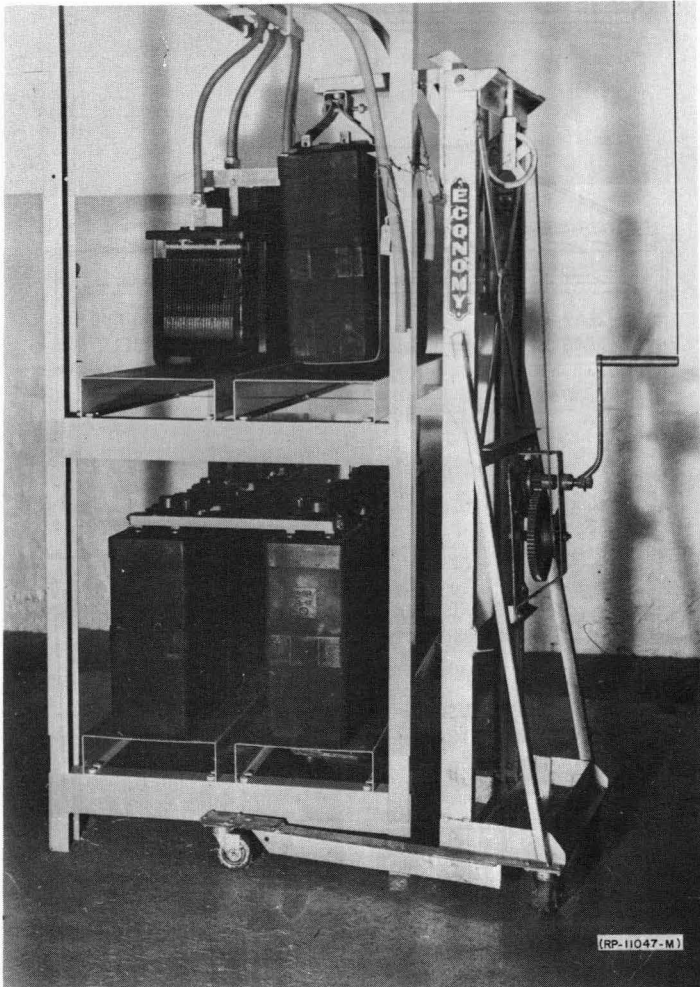


FIG. 3 R-2667 OR R-3870 BATTERY HOISTS IN USE (PARS. 8.1 & 8.2)

10.3 Remove the lifting strap from the box attached to the hoist and thread it as shown in Figure 1. Place the loop over the 1/2" bolt on the hoist boom arranged so that the free end of the strap will hang toward the floor and will be located at the side of a cell to be lifted. Normally it is not necessary to disengage strap and buckle while doing repetitive lifting operations. Place the spreader over the cell posts. Tilt the cell and centrally locate the strap under the cell. Locate the buckle to avoid pressure on the cell. Adjust to required length. Adjusting has been made purposely difficult to insure against slippage in use. See Figure 2.

10.4 Lift the cell far enough to clear the floor and discard the container. With the cell in this low position, roll the hoist and cell close to its final position on the rack. (To facilitate moving and to prevent the cell from swinging it may be lowered onto a temporary wooden platform placed across the two legs on the hoist and steadied by retaining some tension on the strap.) Do not allow the cell to be lowered onto hard surfaces, not even momentarily.

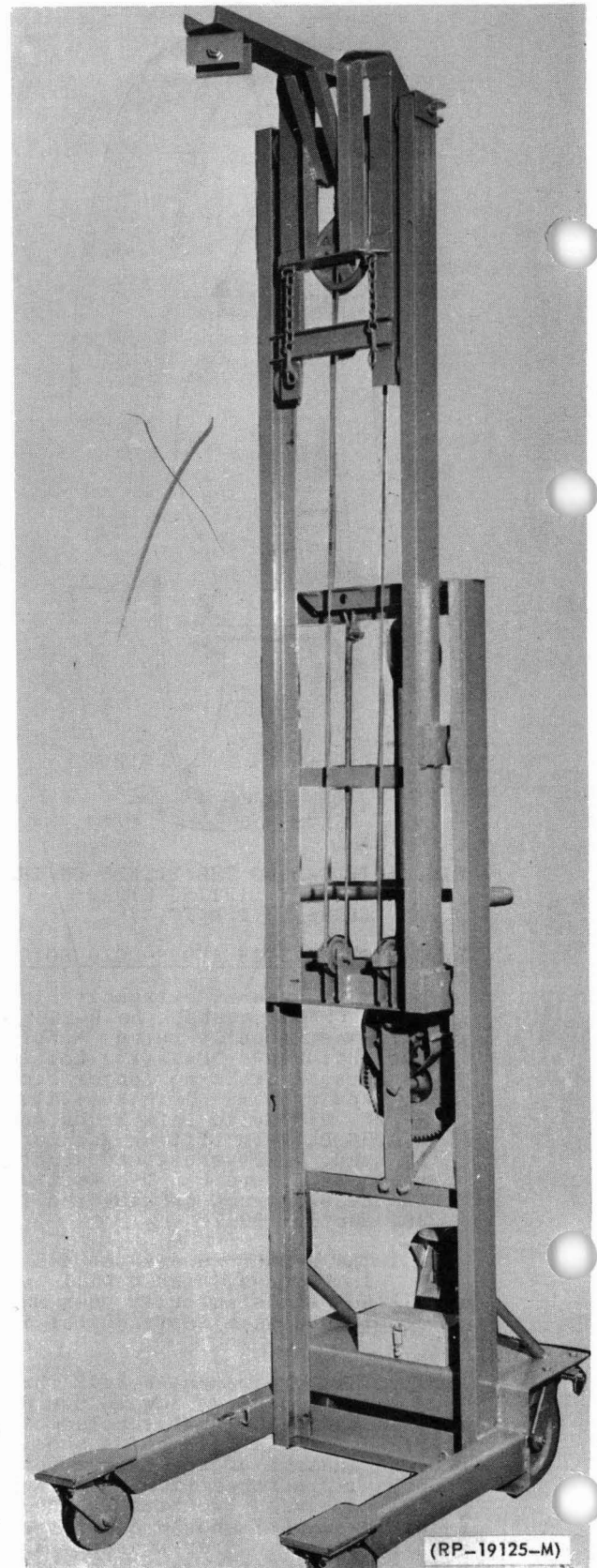


FIG. 4 R-3448 TIER BATTERY HOIST FULLY EXTENDED. (PARS. 8.1, 8.2 & 12.2)

10.5 Before placing a cell on a shelf carefully clean the bottom to remove dirt and grit which would damage the cell and mar the shelf covering.

10.51 Spread talc or soapstone powder on the protective shelf covering when necessary to facilitate alignment.

10.6 Hoist the cell to the proper height. Roll the hoist under the stand with the cell over the correct shelf. Lower the cell onto the shelf and tilt the cell while removing the strap.

11. PLACING

NOTE: "Cell" is used here to denote individual cells, groups of cells and cases of cells.

11.1 Observing polarities, place the cells on the shelf initially to approximate correct alignment and spacing in order to reduce the subsequent and final fractional movements to a minimum.

11.2 Where difficulty is experienced in removing a lifting strap after a cell is on the stand shelf, use two wooden strips thick enough to leave the strap free when they support the cell. Then by slightly tilting the cell one strip and the strap can be removed. Allow that side of the cell to rest on the shelf and tilt the cell enough to permit the removal of the other wooden strip.

11.3 The nominal clearance at the top of the cell, between cells in the same row is $3/8"$, however, this dimension may be exceeded on newly designed cells with thinner plates. To facilitate cell alignment when placing the larger cells on stand shelves, 2 spacers of an appropriate width would be placed between adjacent cells and held by a wooden strip across the top. This will avoid chipping cells from contact with one another. Terminal spacing may be facilitated by applying a template of hard wood equivalent to the intercell connectors. Drill the holes accurately and equip with pins very nearly the same size as the holes in the post.

11.31 Cells shall not touch each other or the stand uprights in their final position.

11.311 Spacing is particularly important when placing the 250 volt battery in cabinets and on racks. Aside from the need for separation to prevent physical stresses in the jars, the higher voltages between cells and between cell and ground necessitates ample spacing to provide adequate electrical insulation. It follows that the importance of cleanliness cannot be over-emphasized. Clean to remove any conducting electrolyte from the top and the sides of the jars. See Section 17A for cleaning and neutralizing instructions.

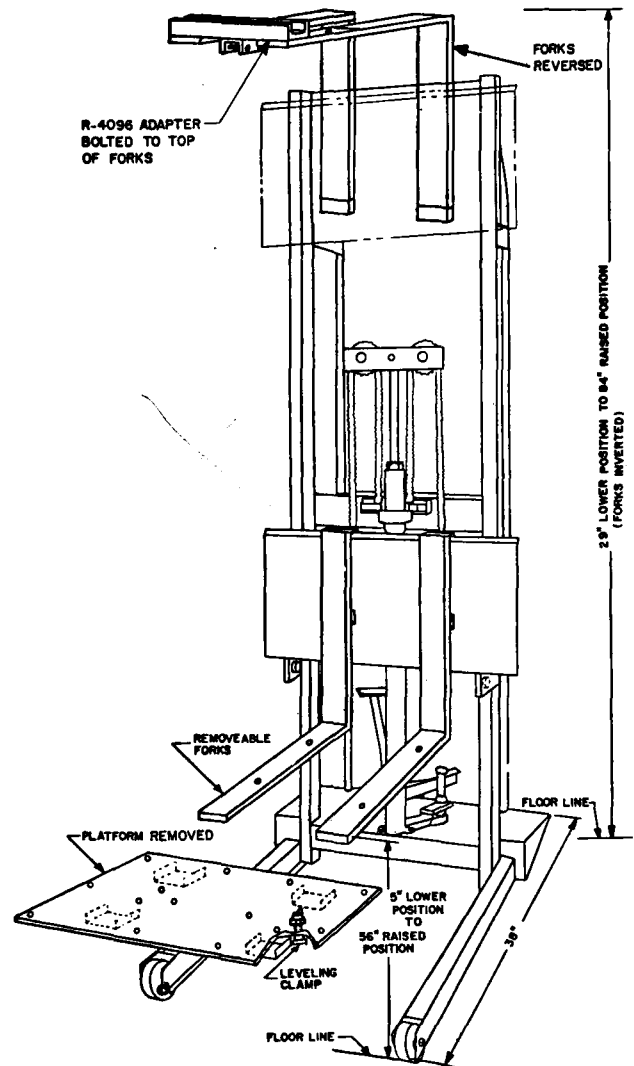


FIG. 5 R-3870 HYDRAULIC LIFTING TRUCK (PARS. 8, 8.2, 12.2)

11.4 When the design of the battery rack allows it, center each row of cells down the center of the shelf with front edges of the covers in close alignment. Gauge by eye. The spacing between rows of cells should be at least $3/4"$.

12. PREPARING HOISTS FOR SHIPMENT

12.1 Wash the lifting strap in a weak soda solution before placing it into the box attached to the hoist. The strap is impervious to acid but the box is not. Place bolt and nut through clasp and install lead seal. A carriage locking device is provided on each hoist as a safety measure when transporting the hoist. Lock the carriage in its lowest position. Remove the crank. Replace it backwards on its shaft and wire or tie it securely.

NOTE: The R-3870 truck is not equipped with a storage box for the strap. When this tool is

→ used, both the R-3437 strap and the R-4096 adapter should be handled as separate tools.

12.2 On the R-3448 hoist remove the floor lock and replace it on the base in an inverted position. See Figure 4.

→ Arrowed lines indicate new or changed information.

[Vertical line at side of paragraphs indicates requirements.

12.3 Refer to Handbook 28 for additional information. Also
→ refer to Section 50A1 in Handbook 30 for information on the R-3870 truck.

Manager, Product Engineering

Reason for Reissue:
To cover use of R-3870 Hydraulic Lifting Truck and R-4096 Lifting Adapter (Pars. 8, 8.2, 12.2 and Fig. 5)

Replaces Section 17C dated 3-21-68.