

STEP-BY-STEP AND PBX SHELVES AND LINE FINDER UNTIS
MOUNTING WITH R-3015 HOIST

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2.	<u>GENERAL</u>	2.23	Handbook 28, Section 701 on Inspection; Maintenance and Use of the Hoist.
2.1	<u>Scope</u>	2.24	Packaging information of Handbook 3, Section 70D.
2.11	This section covers the methods for mounting shelves and line finder units on SXS and PBX jobs where the R-3015 Step-by-Step Shelf Hoist is used.	2.3	<u>Verification</u>
2.2	<u>Associated Information</u>	2.31	Items for the verification of the equipment installed by the operations covered in this section are listed in Section 50V.
2.21	Job equipment specifications and drawings.	2.311	The items in Section 50V may also be used as a self-check guide when performing operations covered by this section.
2.22	Section 50A on common information.		

2.4 Precautions

2.41 General safety precautions against personal injury and equipment damage are outlined in Handbook 0 and the "General" section in this handbook and are to be observed at all times as they apply to the operations being performed. Specific precautions to be taken are covered in this section.

2.42 Important: The inspection items contained in Handbook 28, Section 701 and also on Detail 9 Chart inside the R-3015 shipping case should be checked before the Hoist is put into use. If any defects are found, the hoist should be returned to Regional Installation Stockkeeping for corrective action.

2.5 Arrangement of Tools

2.51 Prior to starting operations covered by this section, the tools and other items required should be arranged at the work locations so as to minimize fatigue and inconvenience.

3. INSTALLING EQUIPMENT

3.1 The following tools will be required for the operations covered by this section:

R-2510 Truck, Dolly (Part of R-3015 Set)
 R-58442 Screwdriver, T Handle
 R-3015 Set, SXS, Shelf Hoist
 R-2092 Chisel, Ripping
 R-1625 Screwdriver, Spiral Ratchet
 R-9572 Receiver & Cords, Tester's
 R-3154 Protective Sheeting

4. SEQUENCE OF OPERATIONS

4.1 The following sequence of operations is outlined in skeleton form for ready reference.

- (1) Assemble R-3015 Hoist in apparatus aisle and attach to frame.
- (2) Attach shelf hook or line finder hook to hoist cable.
- (3) Remove top of shipping case.
- (4) Place case on R-2510 dolly truck.
- (5) Roll case into wiring aisle.
- (6) Attach hoisting hook to top angle of shelf or unit and center properly.
- (7) Take up slack on hoisting cable and then remove packing details inside of case.

2.

(8) Attach P-32B425 Cable Bracket

(9) Raise unit clear of case.

(10) Roll case out of aisle.

(11) Raise or lower unit to final location.

(12) Center mounting holes with drift pin, R-2297 if necessary.

(13) Run in and tighten mounting bolts.

(14) Disengage hoisting hook.

5. PREPARATION

5.1 Whenever possible, the arrangement of incoming units should be such they they can be hoisted into place without an intermediate storage area and in the sequence in which they are to be placed on the frames. Normally this planning should have been done before the truckmen start delivering the material. In any event, make sure that the truckmen bring in the cases in a sequence that will provide for an even flow of work for the job.

5.2 The job specification and the "SXS Shelf Analysis" sheets furnish the necessary cross-reference information relating to the box numbers and the shelves required for each Bay.

5.3 When hanging additional shelves or units on a partially equipped frame in a working office, dismount obstruction details that may be readily removed in order to obtain sufficient working space.

CAUTION: THE UNIT FRAMEWORK OF THE OLDER NON-UNIVERSAL TYPE SELECTOR AND CONNECTOR SHELVES MAY BE INSULATED FROM THE FRAME UP-RIGHTS. RINGING CURRENT OR BATTERY MAY BE CROSSED TO THESE UNIT FRAMEWORKS. BEFORE HANGING ADDITIONAL SHELVES ADJACENT TO NON-UNIVERSAL TYPE SHELVES WHICH ARE IN SERVICE, CHECK THE ADJACENT WORKING SHELVES FOR THE PRESENCE OF THE ABOVE CONDITION WITH TEST PICKS AND RECEIVER. WHERE RINGING CURRENT OR BATTERY IS DETECTED ON THE INSULATED FRAMEWORKS USE AN R-3154 PROTECTIVE SHEETING TO COVER THE FRAMEWORK. THE PROTECTIVE SHEETING SHOULD COVER THE BACK OF THE FRAMEWORK ADJACENT TO THE WORK AREA.

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- 5.4 On line finder frames, install battery and ground feeders in the uprights before the units are mounted, in order to avoid difficulties encountered in pulling them in later.
- 5.5 When mounting shelves and units on existing frames having unequipped switch positions, it is advisable to tie a piece of fiber or plywood in front of the unequipped positions to prevent damage to the bank insulators. This might also be necessary on equipment just previously mounted if the shelves are mounted from the bottom up. However, it is felt that mounting from the top down is preferable.
- 5.6 On additions, where packing cases are to be moved through aisles having units and shelves mounted at the bottom position, it might be advisable to protect the unequipped switch positions with fiber or plywood to prevent damage to the bank insulators.
- 5.7 When specified on the drawing, shelf frameworks are insulated from the supporting angles and should be assembled before the shelves are hung. ED-30589-70 illustrates the methods of mounting the various shelves on the universal switch frame.

NOTE: Insulators are not used between the frame uprights and mounting bars of universal type shelves.

6. ASSEMBLY AND OPERATION OF HOIST

- 6.01 Assemble the R-3015 hoist in the apparatus aisle at the frame being equipped. Mount the Golo Power Winch into the Detail 34 Adapter Plate with the four mounting bolts and nuts furnished with the Winch. See Figures 1 and 2.
- 6.011 A detailed list of parts required for various hoist arrangements are shown in Figure 1.
- 6.012 Det. 28 Base should be placed under floor flange Det. 25 for all frames where cable racks are over the auxiliary framing. On T.C.E. jobs where cable racks are at the same height as the auxiliary framing, Det. 28 is omitted.
- 6.013 Boom assembly fastening arrangements are shown in Figures 3, 4 and 5.

3.

- 6.014 Guard rail clamp assembly, Det. 5A can be used to secure the bottom of the hoist to either a sheet metal base or to an angle type guard rail. See Figure 6 or 7 for the required fastening arrangement.
- 6.02 Slip the guard rail clamp assembly Det. 5A over the end of upright section Det. 21. Place the hook end of Det. 5A up or down as required for securing the bottom of the hoist to either a sheet metal base or to an angle type guard rail. See Paragraph 6.014 and Figures 6 and 7.
- 6.03 Run the floor flange Det. 25 on to the threaded end of upright section Det. 21. Pin the required tube sections and boom assembly Det. 8 or Det. 8A together with clip assemblies Det. 27. See Figures 1 and 2.
- 6.04 Thread the cable over the pulleys. To unwind the cable from the drum, set the Remote Central Toggle Switch in the "Down" mode and push the control button. See Figure 2.

CAUTION: BEFORE USING THE HOIST, INSPECT THE CABLE FOR WEAR. IF ANY WIRES ARE BROKEN AND THE CABLE IS BADLY KINKED OR BADLY WORN IT SHOULD BE REPLACED. TO REPLACE CABLE, UNWIND IT FROM THE DRUM, LOOSEN THE CABLE SECURING BOLT AND SEND THE CABLE TO THE REGIONAL STOCKKEEPING FOR REPLACEMENT.

- 6.05 Place a piece of thin cardboard on the floor where the base will rest. Spot the base of the upright on the cardboard while holding the upright assembly sideways, then raise it to an upright position while sliding the boom assembly under the cable rack.
- 6.051 The location of the upright assembly with respect to the frame should be determined by the balance of the unit being hoisted. For fully equipped L.F. units the balance is about 4" from center toward the relay field.

CAUTION: BE SURE THAT THE CABLE LOOP DOES NOT FALL OFF THE PULLEYS WHEN UPENDING THE HOIST. TEMPORARILY SECURE THE CABLE IN PLACE ON THE BOOM WITH TWINE OR FRICTION TAPE.

- 6.052 If difficulty is encountered in setting the hoist upright, run floor flange Det. 25 up on the threads of the column. After the column is vertical hold the boom assembly Det. 8 or Det. 8A firmly in place and then run the floor flange Det. 25 down to rest on the floor or onto the Base Det. 28 when it is used.
- 6.06 Secure boom assembly Det. 8 or Det. 8A in place.
- 6.061 Boom assembly Det. 8 is to be fastened to the cable rack with the cable rack clamp assembly Det. 4 as shown in Figures 3 or 4.
- 6.0611 Figure 4 shows boom assembly Det. 8 fastened to a 12" cable rack. To aid in placing the clamp, hold the saddle Det. 42 open at the threads, spread the clamp Det. 41 and slip it on the boom from the underside. If cables are on the rack, remove the two wing nuts and saddle and slide the clamp on the boom between the cable rack stinger and cables. Re-assemble and tighten securely. Be sure that the clamp is approximately vertical. See Figure 3.
- 6.0612 On some PBX jobs where the R-3015 hoist is used it has been noticed that the pulley in the boom assembly will ride on the frame top member. Where this occurs place a piece of wood under the base of the upright. The wood should be sufficiently thick to raise the cable rack high enough so that the pulley will clear the frame top member.
- 6.0613 Figure 4 shows boom assembly Det. 8 fastened to a 5" cable rack where the cable rack and auxiliary framing are at the same level. This fastening arrangement requires the use of Details 43,44,45 and 46.
- 6.062 Boom assembly Det. 8A is to be fastened to the channel top member as shown in Figure 5. This fastening arrangement requires the use of carriage bolt Det. 86, hex. nut Det. 87 and clip Det. 89. Use the reversible ratchet handle R-2806 and the 5/8" socket wrench R-2819, Det. 5 to tighten hex. nut Det. 87. Where the cable rack is arranged so that the boom can not rest against it the fastening to the frame channel top member is sufficient.
4. 6.063 Two positions for the load pulley and axle are provided on Dets. 6 and 8A boom assemblies as shown in Figures 3,4 and 5. To shift the pulley, it will be necessary to remove only one Det. 83 cotter pin.
- 6.0631 The position or hole closest to the frame uprights is required for the top unit or shelf. This permits the top unit to be pushed back into position against the frame uprights with the least difficulty.
- 6.0632 The outer hole should be used when mounting all but the top-most shelf because this permits the cable to clear the wiring on the mounted units. When for some unusual reason shelves cannot be mounted from top down, or in case a shelf is to be mounted above a shelf on a partially equipped frame, it will be necessary to hold the shelf being mounted away from the equipment below.
- 6.07 Secure the upright to the guard rail with guard rail clamp assembly, Det. 5A as shown in Figures 6 or 7.
- 6.08 Line up the cable coming off the hoist drum with the upright and the pulleys by loosening the bolts Det. 32 and swivel the winch support assembly Det. 3 around on upright section, Det. 21, if necessary. See Figure 2 for correct height of hoist.
- CAUTION:** BE SURE THAT THE BOLTS, DETS. 32 AND 34, WHICH HOLD THE WINCH, ARE TIGHT. SEE FIGURE 2.
- 6.09 Attach either the shelf hook Det. 6 or the line finder unit hook Det. 7A to the cable loop by sliding the loop through the slot at the top and down over the stud below. Lock the loop in place by dropping the taper pin which is attached to the hook with a chain into the hole in the stud from the top. See Figure 8. Be sure that the pin blocks the loop on either side of the stud.
- 6.10 Line Finder unit hook assembly Det. 7A can be used on line finder units having either 1-1/2" x 1-1/2" x 1/6" channel or 1-1/2" x 1-1/2" x 1/8" angle for the unit frame-work top member.

NOTES: A. SEE PAR. 6.012. B. SEE FIGURE 4. C. SEE FIGURES 3, 4 AND 5. D. SEE FIGURE 5. E. DET. 5A CAN BE USED ON BOTH ANGLE TYPE GUARD RAILS OR SHEET METAL BASE ASSEMBLIES. SEE FIGURES 3, 7 AND 8. F. SEE FIGURES 3 AND 6.	FRAMEWORKS									SEE NOTE
	11'-6" HIGH			9' HIGH			7' HIGH			
	WITH FRAME CHANNEL TOP MEMBERS & OVER-FRAME OR OVER-AISLE CABLE RACK.	WITH 12" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS	WITH 5" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS	WITH FRAME CHANNEL TOP MEMBERS & OVER-FRAME OR OVER-AISLE CABLE RACK.	WITH 12" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS	WITH 5" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS	WITH FRAME CHANNEL TOP MEMBERS & OVER-FRAME OR OVER-AISLE CABLE RACK.	WITH 12" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS, ALSO PBX FRAMES	WITH 5" CABLE RACK & WITHOUT FRAME CHANNEL TOP MEMBERS	
DET. 21, UPRIGHT SECTION - 49"	1	1	1	1	1	1	1	1	1	
DET. 22, UPRIGHT SECTION - 30"	2	2	2	1	1	1	1	1	1	
DET. 23, UPRIGHT SECTION - 24"	1	1	1	1	1	1	0	0	0	
DET. 25, FLANGE	1	1	1	1	1	1	1	1	1	
DET. 27, CLIP ASSEMBLY	4	4	4	3	3	3	2	2	2	
DET. 28, BASE	1	1	1	1	1	1	1	1	1	A
DET. 3, WINCH ASSEMBLY	1	1	1	1	1	1	1	1	1	
DET. 41, CLAMP	0	1	0	0	1	0	0	1	0	B
DET. 42, SADDLE - 3"	0	1	0	0	1	0	0	1	0	B
DET. 43, $\frac{1}{4}$ "-20 WING NUT	0	2	2	0	2	2	0	2	2	C
DET. 44, SADDLE HOOK	0	0	1	0	0	1	0	0	1	D
DET. 45, SPACER	0	0	1	0	0	1	0	0	1	D
DET. 46, CLAMP	0	0	1	0	0	1	0	0	1	D
DET. 5A, GUARD RAIL CLAMP	1	1	1	1	1	1	1	1	1	E
DET. 8, BOOM ASSEMBLY	0	1	1	0	1	1	0	1	1	C
DET. 8A, BOOM ASSEMBLY	1	0	0	1	0	0	1	0	0	F

FIG. 1 R-3015 PARTS REQUIRED FOR VARIOUS HOIST ARRANGEMENTS IN STEP-BY-STEP ON PBX OFFICES (PARS. 6.01, 6.011, 6.03)

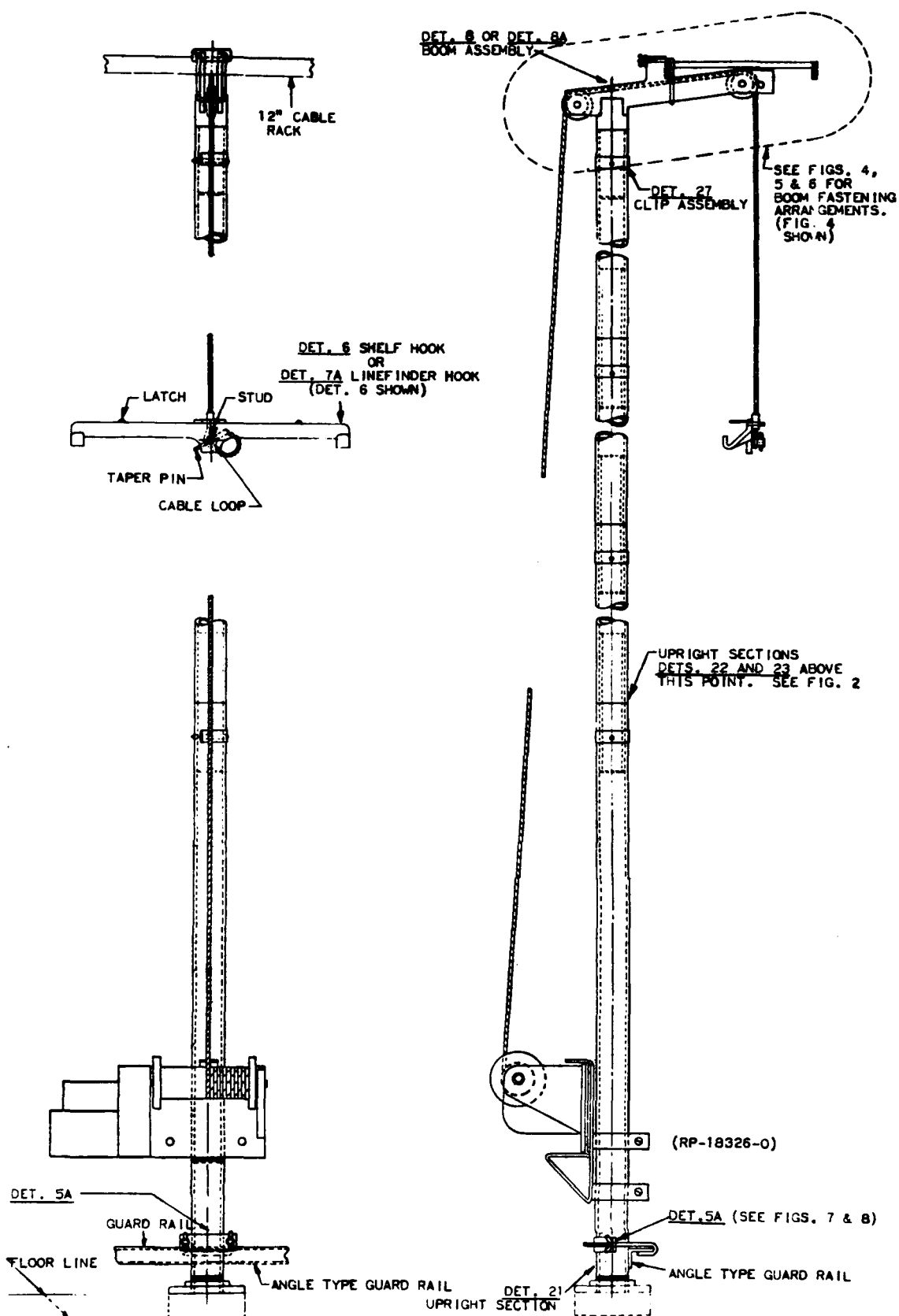


FIG. 2 ASSEMBLY OF R-3015 HOIST

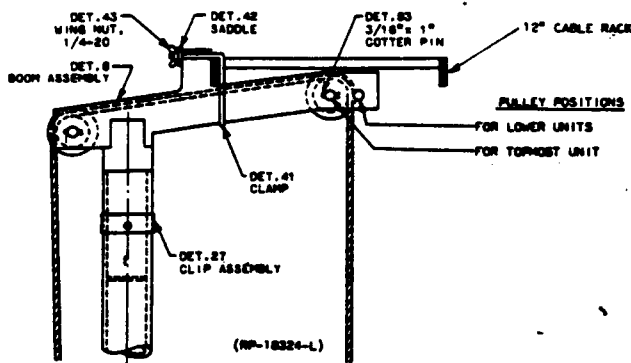


FIG. 3 FASTENING BOOM ASSEMBLY, DET. 8 TO 12" CABLE RACK

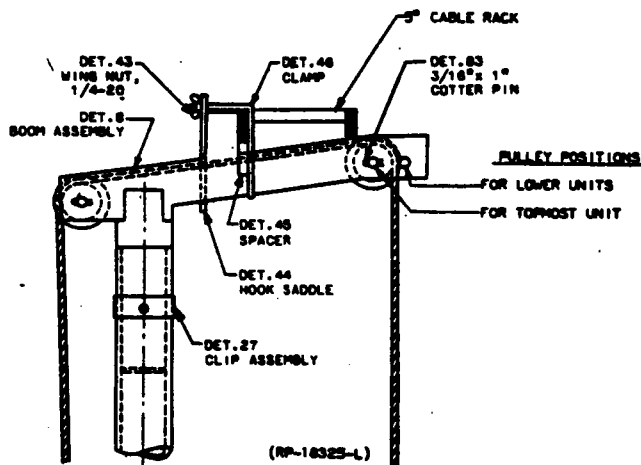


FIG. 4 FASTENING BOOM ASSEMBLY, DET. 8, TO 5" CABLE RACK

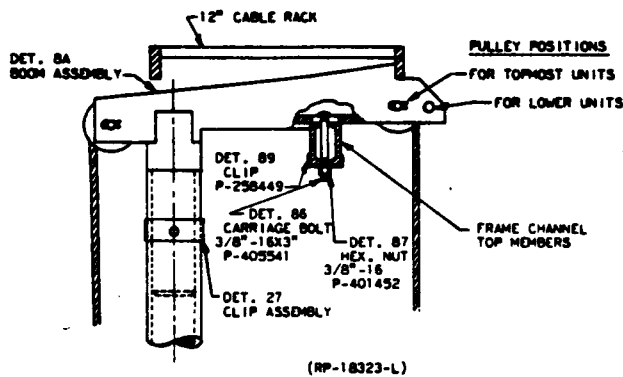


FIG. 5 FASTENING BOOM ASSEMBLY, DET. 8A, TO FRAME CHANNEL TOP MEMBERS

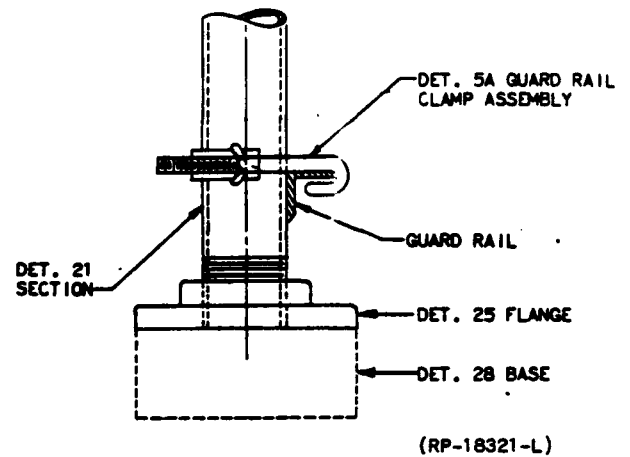


FIG. 6 FASTENING GUARD RAIL CLAMP ASSEMBLY, DET. 5A, TO ANGLE TYPE GUARD RAIL

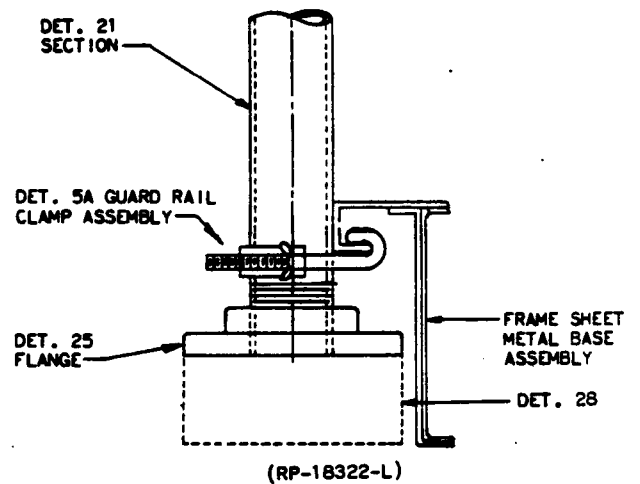


FIG. 7 FASTENING GUARD RAIL CLAMP ASSEMBLY, DET. 5A, TO SHEET METAL BASE ASSEMBLY

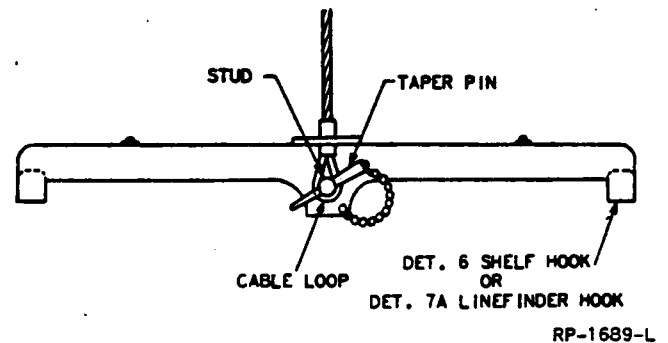


FIG. 8 ATTACHING HOISTING HOOK TO CABLE LOOP.

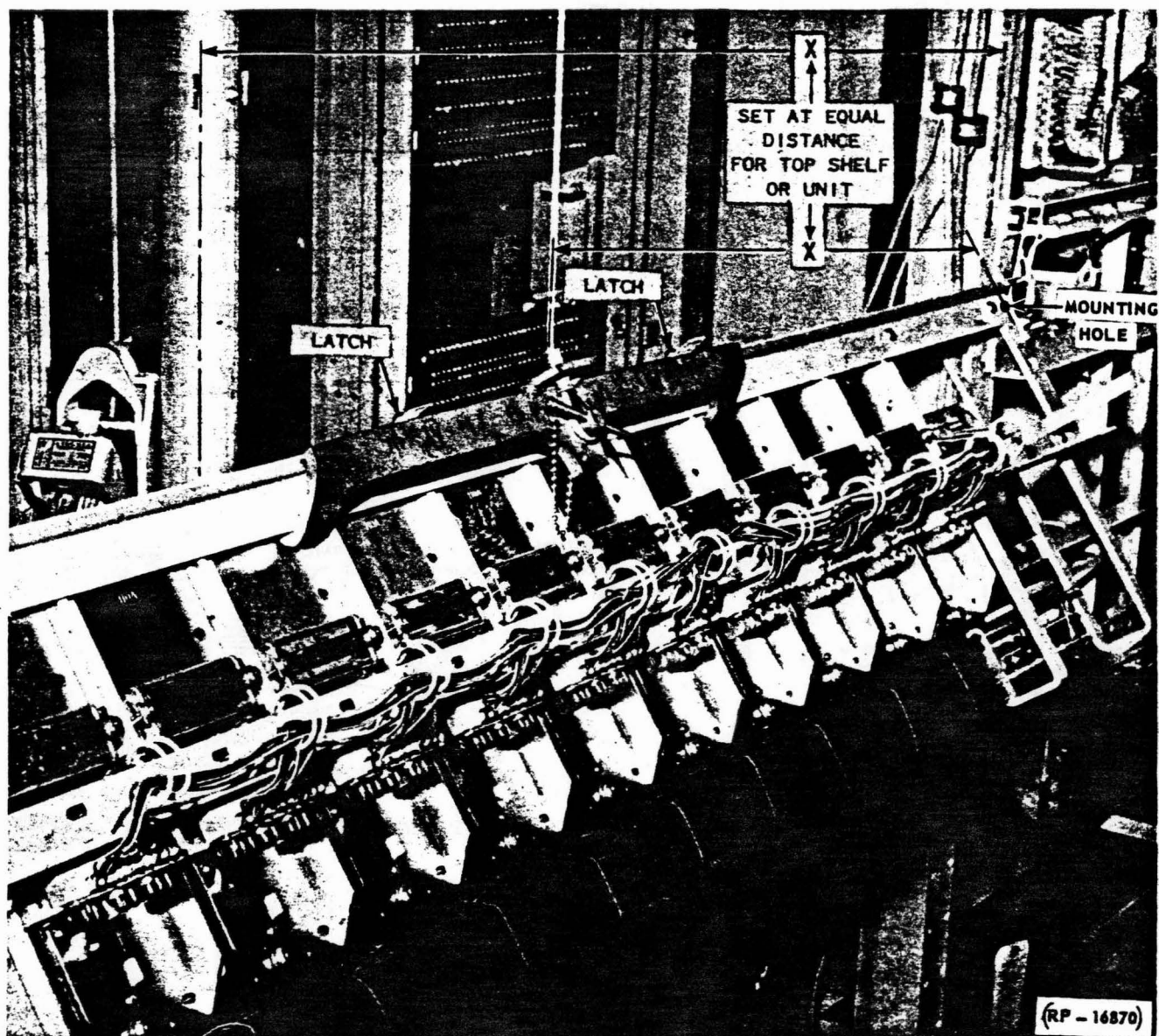


FIG. 9 HOISTING HOOK ATTACHED TO SHELF
OR UNIT

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- 6.11 To operate the Golo Power Winch turn the toggle switch of the Remote Control Unit into the desired "UP" or "DOWN" position and press the control button.
- 6.12 When hoisting line finder units on double sided frames, such as in PBX offices and the selector shelves have been mounted, the covers from switches 4 and 5 of the selector should be removed to provide clearance for the upright of the R-3015 Hoist. See Figure 11. When 570-type keys are mounted on switches for units used on double-sided frames, it may be necessary to remove a switch so that the R-3015 Hoist will butt up against the cable rack as shown in Figure 3.
- 6.13 To assure that the hoist is in satisfactory operating condition, the first shelf, unit or equipment being hoisted should be raised just a few inches and then lowered again. This shall be done several times.

7. HOISTING LINE FINDER UNITS, SELECTOR AND CONNECTOR SHELVES

NOTE: The information in the following paragraphs may also be applied to hoisting shelves and line finder units in PBX offices where the R-3015 Hoist is used. Any information which applies to these PBX offices only, will be so indicated. See Figure 3 for arrangement of R-3015 Hoist in a PBX office.

- 7.01 Remove the top of the packing case with a ripping chisel and unscrew the can cover retaining strips (wooden).
- 7.02 Place the packing case on the dolly truck so that the truck and case will enter the wiring aisle with the can cover side next to the uprights on which the equipment is being mounted,

CAUTION: PLACE THE PACKING CASE ON THE R-2510 DOLLY TRUCK WITH ITS GREATER LENGTH PARALLEL TO THE LONG SIDE OF THE TRUCK. BALANCE THE CASE LENGTHWISE SO THAT THE ENDS OF THE CASE WILL NOT TILT UP OR DOWN WHEN MOVING THE DOLLY TRUCK. CENTER THE WIDTH OF THE CASE MAKING SURE THAT THE WIDTH OF THE DOLLY TRUCK EXTENDS OUT FROM UNDER THE CASE AN EQUAL AMOUNT ON EITHER SIDE. TAKE CARE TO KEEP FEET OUT FROM UNDER THE CASE AT ALL TIMES.

- 7.03 Attach the hoisting hook, either Det. 6 to shelves; or Det. 7A to line finder units as shown in

9.

Figure 9. To keep the hoisting hook from disengaging, turn the latches over the top of the shelf angle and secure the latches in position by tightening the latch screws with a screwdriver.

- 7.031 When mounting shelves, particularly those in low positions on PBX or other 7 ft. frames, it may be advantageous to leave off, or remove the angle guard rail so that the shelves can be placed as closely as possible to the base of the frame.
- 7.032 If the topmost unit on the frame is to be hung, measure the exact distance from the mounting holes on the frame to the center of the hoisting upright and place the hoisting hook on the shelf or unit so that the cable is at the measured distance from the mounting holes on the unit. This is required for top shelves because no slack in the wire rope is available for any sidewise shifting of the unit.

- 7.033 If the measurement in Paragraph 7.032 was not taken correctly it will be necessary to lower the shelf all the way down to the floor. Temporarily support it, shift the hoist as required and raise it up again.

- 7.04 Take up slack in hoisting cable, remove packing details inside of case and then raise the unit slowly out of the packing case. If the shelf is slightly out of balance, it should be guided into place to prevent damage to equipment. Note that all switches and can covers are securely in place.

NOTE: On J32007 Line Finder Units, the P32B425 Cable Bracket should be installed on the unit before the unit is mounted on the frame.

CAUTION: BE SURE THAT THE CABLE IS RIDING FREELY IN THE PULLEY GROOVE ON THE BOOM WHEN THE SHELF WEIGHT IS TAKEN UP BY THE CABLE. IN PBX OFFICES, ALSO MAKE SURE THAT THE CABLE RACK HAS BEEN INSTALLED PROPERLY AND THAT IT IS FASTENED TO THE WALLS BEFORE STARTING HOISTING OPERATIONS.

- 7.041 When starting to lift a shelf or unit, note that the cable is arranged evenly on the drum of the winch and each turn of the rope is in contact with the adjacent turn. If this is done, the rope should automatically guide itself correctly when under load.
- 7.042 Due to the inaccessibility of the bus bar and terminal connections on shelves mounted on double sided frames, consideration should be given to taping as covered in Handbook 18 prior to hoisting the shelf.
- 7.043 Shop assembled and equipped toll transmission shelves and 20 switch capacity double selector shelves are shipped to the field equipped with special shipping details to reinforce the shelf framework. Do not remove the details until after the shelves are permanently mounted on the frame uprights.
- 7.044 Roll the packing case out of the aisle in preparation for the next shelf.
- 7.05 Hoist the shelf to the correct height for mounting, attach the shelf straightening hooks as shown in Figure 10 and push the shelf into place. Use extreme caution when attaching the straightening hooks to prevent damage to unit equipment and wiring.
- NOTE:** When mounted on a universal type frame, the bottom double shelf shall be located so that the lower ends of the switch bank rods are approximately 3" above the top of the sheet metal base of the guard rail angle. This mounting position is one mounting space (2-1/2") above the position formerly specified for this shelf, and will provide the necessary space for bank wiring.
- 7.051 Line up the mounting holes with the aid of the offset drift pins, R-2297, run in the mounting bolts and tighten them with the 9/16" wrench socket combination consisting of:
- 1 - R-2819, Det. 3, 9/16" socket
 - 1 - R-2459 Extension, 5"
 - 1 - R-2806 Reversible Ratchet Handle.
- NOTE:** When mounting connector shelves, note that the bus bar on adjacent shelves are lined up before tightening the mounting screws to prevent difficulty later when the bus bar connecting straps are installed.
10. 7.052 When mounting unequipped double type toll transmission selector shelf frameworks, place a selector switch at both ends of each pair of shelves before permanently fastening the mounting screws, so as to insure alignment of corresponding guide bars for each pair of shelves.
- 7.053 Use the T handle screwdriver for tightening round head mounting screws of line finder units. (Old type mounting).
- 7.06 DTA should be mounted at the same time as its associated shelf. These strips alternate in sequence on the frame; first two strips from one bay and then two from the adjacent bay.
- 7.061 Be sure that the fanning strip assembly screws are tight before mounting these units on the frame.
- 7.07 To assist in determining that the cables are not twisted 360 degrees between the terminal strips and the shelf, three lengths of No. 6 lockstitch have been placed as indicators in each cable. Portions of each length protrude from the tape at different points in line with each other. This line shall be as close as practicable along the top of each cable in the installed position. By keeping these three points in line no twist will be in the cable. This twine cannot be removed, but should be cut off so that the ends are not visible. (J32302 AR-1, Note).
- 7.08 Tighten the cap screws (which hold the distributing rings also) with the R-3071 box ratchet wrench. Where the combination of cable forms and distributing rings interferes with the tightening of these cap screws, the offset box wrench, R-2887 and the open end wrench R-2796 should be used. Noticeable spacing variations may be corrected by moving the assemblies up or down as allowed by play between mounting holes and screws.
- 7.09 To correct occasional bows in assemblies, tighten mounting screws and pry the strips apart at the closest point.
- 7.10 After the shelf is secured in position remove the hoisting hook and release the cable in preparation for the next shelf or unit.

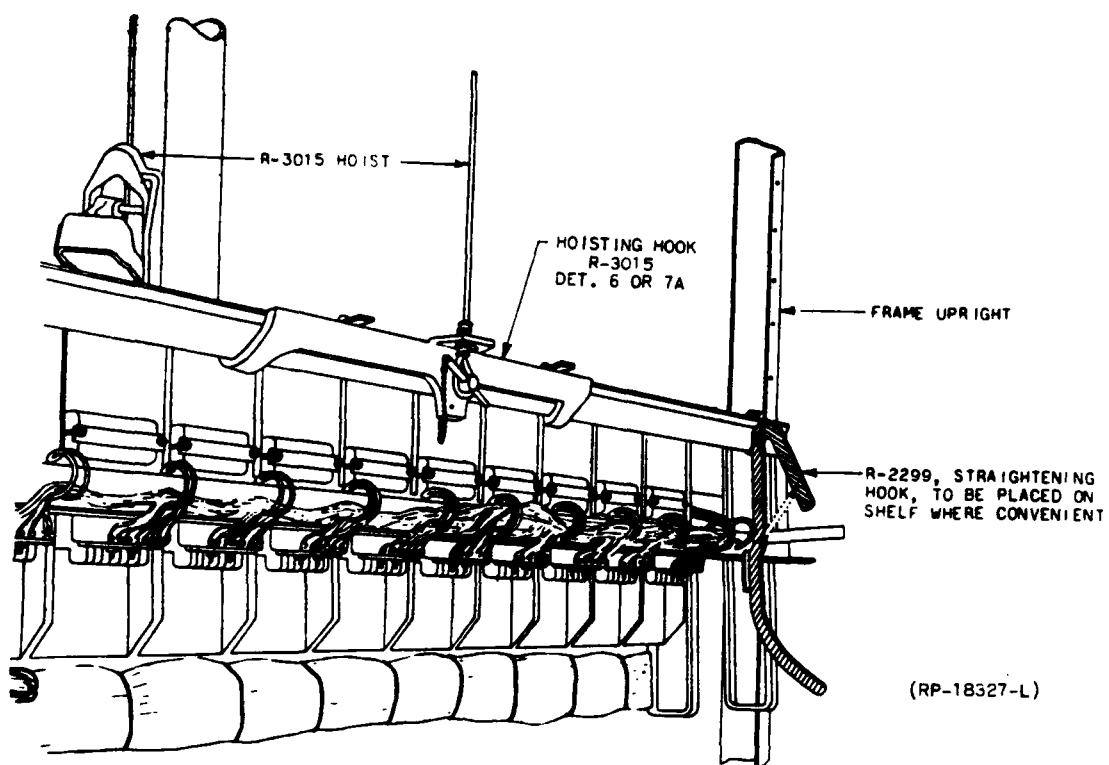


FIG. 10 USE OF SHELF STRAIGHTENING HOOKS

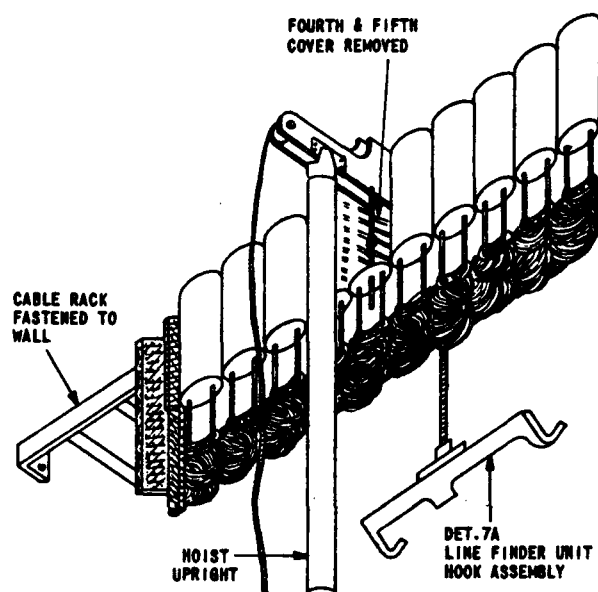


FIG. 11 R-3015 HOIST SET IN A PBX OFFICE

- 7.11 To move the hoist from one frame location to the next, remove the hoisting hook, reel up cable, unfasten the boom and the guard rail clamp assemblies. Run the base flange up on the threads as far as it will go and then slide the base sideways to remove the hoist from under the cable rack.
- 7.12 On toll transmission shelves and 20 switch capacity double selector shelves, carefully remove the framework reinforcing details and store them for shipment to Installation Stockkeeping per Section 14 of the Job Clerical Handbook after the shelves are permanently mounted.
- 7.13 Shelves provided with fiber insulators shall be checked with a buzzer set to determine if they are properly insulated from the frameworks.

→ Arrowed lines not shown due to extensive changes.

Manager, Engineering, Switching Equipment,
Step-by-Step P.E.C.C. and Manufacturing
Power Equipment Shops

Reason for Reissue:
To specify the use of Golo
Power Winch.