

ROLLING LADDERS, BRAKES, AND LADDER TRACK

2A BRAKES

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1. GENERAL

1.1 Scope of Section

1.1.1 This section covers the specific requirements and procedures for installing and adjusting rolling ladder brakes and associated parts.

1.2 General Information Pertaining to Arrangement of Tools, Precautions, Verification, Specifications, Drawings and Figures, and Associated Information

1.2.1 Refer to Section 40A for information pertaining to the above subjects.

2. TOOLS REQUIRED

2.1 The tools and supplies required for operations covered in this section are of the type normally available on the job. In addition, the R-3370 Wire Rope Shear is also required.

3. INSTALLING 2A BRAKES

3.1 Where 2A brakes are specified for assembly on existing ladders having offset hanger steps, they should be assembled by the Installer as shown in Figure 2A. If the existing hanger step is of wood or is the metal type without offset, it shall be replaced with an offset step and associated side plates assembled to the ladder as shown in

Figure 2A. On these ladders the brake assembly will replace the trolleys, hanger and yoke. If, when the brakes are installed on existing ladders, the upper ends of the sides extend more than 1-1/2" above the top of metal hanger step, they should be cut off to 1-1/2" and shaped similar to the original ends.

3.2 The retractile spring assembly of the brake shall be centrally located (horizontally) with respect to the hole in the offset metal hanger step.

4. INSTALLING WIRE FORMED ROPE-GUIDES

4.1 Release rope-guides shall be fastened to the sides of the ladder as shown in Figure 2A. The Wire Formed Rope-Guides associated with the 2A brake shall be located so that the top surface of the guide will be approximately 7/8" above the top surface of each associated ladder step.

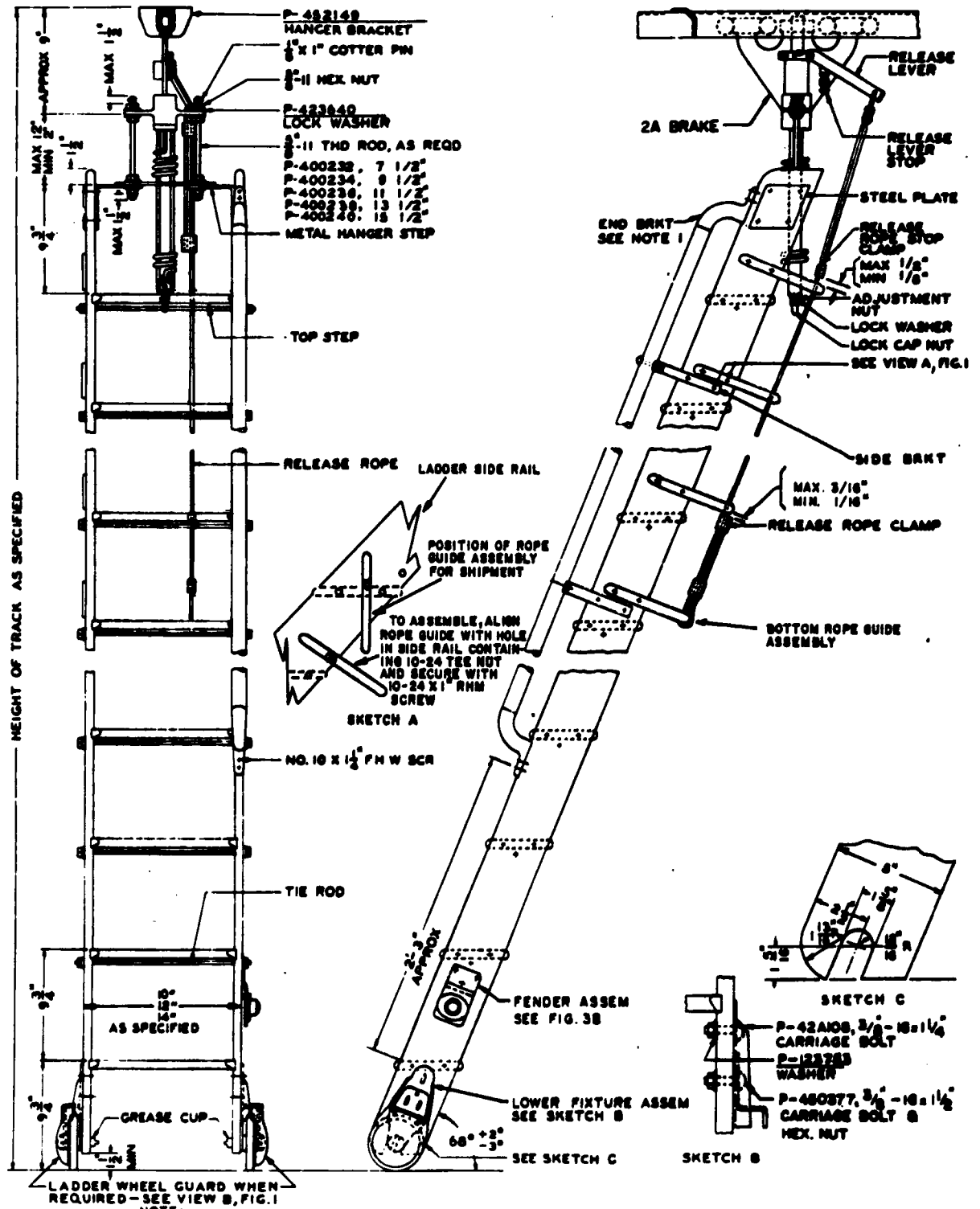
4.1.1 Where interference between handrail side brackets and release rope-guide is encountered, relocate the handrail side brackets as required and plug the old holes in the handrails.

4.2 The lower rope-guide to which the bottom end of the release rope is attached, shall be located above the 6th step from the bottom for 8 and 9 step ladders, and above the 8th step for ladders having 10 or more steps.

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FIG. 2A STRAIGHT-TYPE ROLLING LADDER ASSEMBLY WITH 2A BRAKE PER ED-91563-70, ED-91564-70, AND KS-5049-02, L25 THROUGH L48
 (PARS. 3.1, 4.1, 4.3, 5.2, 6.1, 6.21, 6.5, 6.7, AND 6.8)
 (BSP 800-614-159 Fig. 2A)

4.3 The top rope-guide shall be located above the top wooden step as shown in Figure 2A.

4.4 Intermediate rope-guides shall be attached above each step between the top wooden step and the bottom rope guide.

5. INSTALLING RELEASE ROPE

5.1 Brake release ropes are made from stranded wire covered with nylon. These ropes are extremely hard and injurious to the cutting edges of tools normally available on installations. The R-3370 Wire Rope Shear was, therefore, standardized and should be used in all cases requiring the cutting of nylon covered brake release ropes.

5.11 The following list shows the part numbers for wire covered ropes.

<u>10", 1'-0", 1'2"</u> <u>Wide Ladders</u>	<u>Release Rope</u> <u>Part Number</u>
8 and 10 Step	B-651630-1
9 and 11 Step	B-651630-2
12 Step	B-651630-3
13 Step	B-651630-4
14 Step	B-651630-5
15 Step	B-651630-6

5.2 Install the release rope in the following manner.

NOTE: If brake is to be adjusted, do not make final adjustments on the top clamp and the bottom clamp, and do not cut rope to length until after brake adjustments. See Paragraph 6.

5.21 Thread the rope through the eyes of each rope-guide, the sleeves and the release lever. With a man's weight on the ladder holding the brake in its operated position (release lever up), draw the rope through the lever until the end is approximately 2" above the top guide.

5.22 Place a clamp so that the upper end of the rope will be underflush (maximum 1/8") with the bottom of the clamp. With the release lever held lightly against its

stop (brake released), adjust the rope loop so that the bottom of the clamp is minimum 1/8" to maximum 1/2" from top of top guide as shown in Figure 2A. Tighten the clamp. Nico-press sleeves do not require crimping. Sleeves shall be located as close as possible to the bottom rope guide and to the brake release lever.

5.23 At the lowest rope guide, turn up lower end of rope and adjust it so that there will be about 1" of slack when the brake is fully operated by the weight of a man on the ladder (release lever up). With the loop made as small as practicable, secure this adjustment with a sleeve placed above the lowest guide. Place the clamp so that (with the rope held tightly, between the two lowest guides), the top of the clamp will be a minimum 1/16" to maximum 3/16" below the bottom of the second lowest guide as shown in Figure 2A.

5.24 With wire rope shears, cut off the excess rope so that the end will be underflush (1/8" maximum) with the top of the clamp. See Figure 2A.

6. ADJUSTMENT OF BRAKES

6.1 Make adjustments in the following sequence:

NOTE: The release lever stop screw illustrated in Figure 2A is adjusted in the shop and should require no further adjustment by the Installer.

6.11 Adjust the retractile spring to meet no load requirement. (Paragraph 6.2)

6.12 Check pull required to move ladder. (See Figure 4 and Paragraph 6.3.)

6.13 If pull requirement is not met, readjust retractile spring to meet conditions of both "no load" and pull requirements. (Paragraphs 6.2 and 6.3)

6.14 Locate release rope stop clamp (next to top sleeve) and cut off end of rope. (Paragraphs 6.4 and 6.5)

6.15 Adjust release rope length. (Paragraph 6.6)

6.16 Locate bottom release rope clamp and cut off end of rope. (Paragraphs 6.4, and 6.7)

6.2 Adjust the nut at the lower end of the retractile spring assembly to tension the retractile spring just sufficiently to prevent the brake of the unloaded ladder from dragging at any point along the track when the ladder is moved at a walking pace in either direction.

6.21 The no-load requirement will usually be met if the retractile spring is adjusted so that the hanger pivot bolt lightly touches the top of the 1" circular opening in the frame (see Figure 6A) when there is no load on the ladder. This adjustment is made, with the Installer standing on another ladder, by turning the adjustment nut shown in Figure 2A.

NOTE: When the adjustment nut is turned to the right (which moves the nut in an upward direction), it tends to release the brake or reduce its holding power. If the nut is turned to the left (which moves the nut in a downward direction), it tends to apply the brake or increase its holding power.

6.3 The brake shall be adjusted so that separate loads of 100, 140, and 170 pounds each, applied on the third step from the bottom of 8-, 9-, and 10-step ladders, the fourth step from the bottom of 11-, 12-, and 13-step ladders, and the fifth step from the bottom of 14- and 15-step ladders, will cause the brake to set at any point along the track such that minimum forces of 15, 22, and 27 pounds, respectively, applied approximately horizontally at the loaded step in the direction toward which the ladder is inclined, will be required to start movement of the ladder. Under these conditions, operation of the brake release should reduce the horizontal forces to 7, 12, and 15 pounds maximum, respectively.

NOTE: The ladder brake adjustment shall be made on a level section of the track.

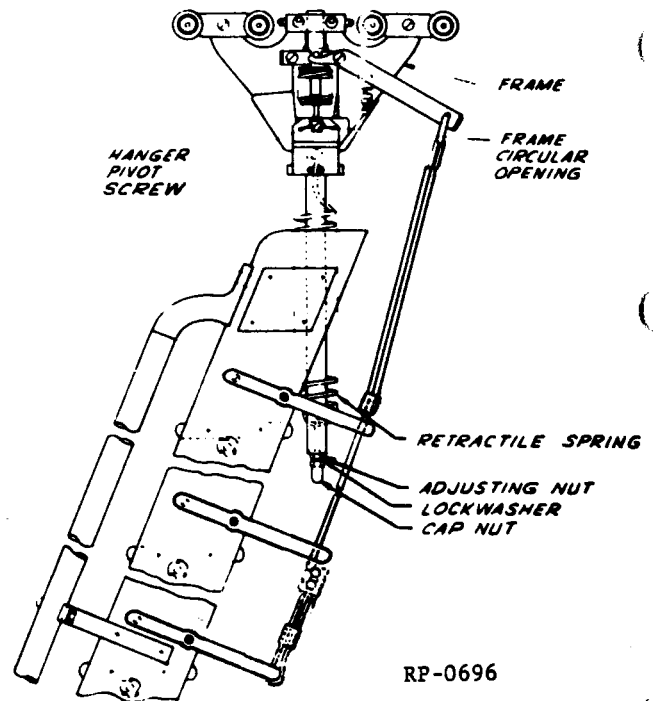


FIG. 6A 2A BRAKE ADJUSTMENT
(PARS. 6.21 AND 6.6)

6.31 If the brake does not meet the above 27 pound pull requirement, the adjustment nut should be slackened off (turned to the left) until the requirement is met. Then recheck the no-load requirement (Paragraph 6.2) and the 15 pound brake release requirement.

NOTE: Failure of brake to hold properly may be due to presence of oil or grease on inside of track.

6.311 With regard to the brake adjustment on continuous track runs which vary in level from 1-1/2 to 2", the brake should be adjusted when it is on either of the level sections of track. The slight change in levels is not sufficient to seriously affect the brake adjustment.

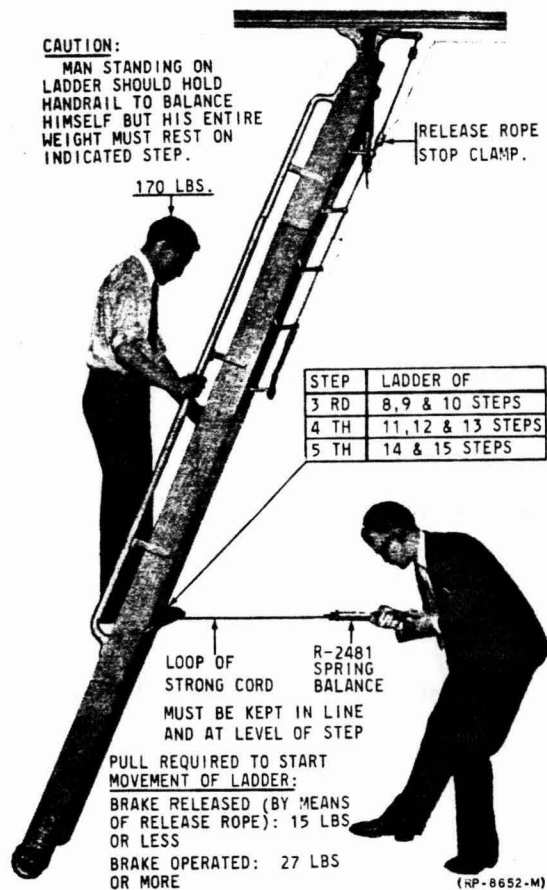


FIG. 4 BRAKE PULL CHECK
(PARS. 6.12 AND 6.3)

6.32 If it is more convenient to place a load of 140 pounds (instead of 170 pounds) on the ladder step, then the force required to start movement of the ladder with the brake applied shall not be less than 22 pounds and the force required to move the ladder under the same conditions, but with the brake released, shall not exceed 12 pounds.

6.4 When adjusting the release rope clamps as outlined in Paragraphs 6.5 and 6.7, set the release rope clamps near the maximum adjustments. This should result in minimum readjustment of the clamps in case the release rope stretches slightly while the ladder is being used during the installation period.

6.5 The clearance between the release rope stop clamp and the top surface of the associated rope-guide for all points along the track should be at least 1/8" and not more than 1/2" (see Figure 2A) when the ladder is loaded just sufficiently to operate the brake and the release lever is operated against the lever stop. This requirement is checked by the Installer after first ascending the ladder to a point where the brake operates and then pulling the release rope until the release lever make contact with the release lever stop.

6.6 The release rope clamps should be placed so as to provide enough slack in the rope to permit unrestricted motion of the release lever at all points along the track, when sufficient load is placed on the ladder to cause the hanger pivot bolt to touch the bottom of the 1" circular opening in the hanger frame. See Figure 6A. The Installer should check this requirement after ascending the ladder to a point at which the hanger pivot bolt touches the bottom of the 1" circular opening. This can be determined by watching the movement of the brake parts adjacent to the pivot bolt while walking up the ladder or by the feel of the ladder striking the bottom of the 1" circular hole. This check should be made at several points along the track.

6.7 Set the bottom release rope clamp to meet the minimum 1/16", maximum 3/16" clearance requirement (see Figure 2A). This must be checked with slack in rope taken up by pulling upward on rope above 2nd (from bottom) release rope guide.

6.8 The loop in the release rope at the release lever and at the bottom rope-guide should be made as small as practicable. The ends of the rope shall, after final adjustment, be cut off underflush (maximum 1/8") with respect to the end of the rope clamps, care being taken to remove any projecting ends of the wire center of the rope.

6.9 After final adjustment, the end of the adjustment screw should be cut off to approximately 1/2" permitting the installation of the cap nut and the associated lock washer.

7. VERIFICATION ITEMS

VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS		REFERENCE	
		PAR. NO.	FIG. NO.
7.1	<u>Assembly of Brakes</u>		
7.11	Assembled to ladder as shown in Figure 2A.	3.1	2A
7.12	On conversions from trolley to brake, modifications made as specified.	3.1	2A
7.13	Retractable spring assembly centrally located with respect to hole in metal hanger step.	3.2	2A
7.2	<u>Rope-Guides</u>		
7.21	Top surfaces of release rope-guides approximately 7/8" above top surfaces of associated ladder steps.	4.1	2A
7.22	Top rope-guides located above top wooden step.	4.3	2A
7.23	Lower rope-guides properly located.	4.2	
	(a) Ladders with 8 or 9 steps - above 6th step from bottom.	4.2	
	(b) Ladders with 10 or more steps - above the 8th step.	4.2	
7.24	Intermediate rope-guides located above each step, between top wooden step and bottom rope-guide.	4.4	
7.25	No interference between handrail side brackets and release rope-guides.	4.11	
7.3	<u>Adjustment of Brake and Release Rope</u>		
7.31	Brake of unloaded ladder does not drag in track.	6.2	
7.32	Operation of brake under loaded condition satisfactory as checked with spring balance.	6.3	4
7.33	Minimum 1/8" - Maximum 1/2" clearance between release rope stop clamp and top surface of the rope-guide under conditions specified.	6.5	2A
7.34	Release rope clamps set for required clearance and to provide sufficient slack in release rope under conditions specified.	6.6	2A
7.35	Loops in release rope as small as practicable and ends of rope cut underflush (maximum 1/8").	6.8	2A
7.36	End of brake adjustment screw cut off to extend approximately 1/2" beyond adjustment nut and lock washer and cap nut on end of screw.	6.9	2A

→Indicates new or changed information.

[Vertical line at side of paragraph
indicates requirements.

Engineering Planning Manager
(Installation)

Reason for Reissue:
To change Paragraph 6.3.