

TOWER LADDER SAFETY DEVICE INSTALLATION AND USE

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1. GENERAL

1.01 This section covers the description and use of the Tower Ladder Safety Device. It also lists the component parts, their assembly, operation and installation.

1.02 The device is designed to prevent an accidental fall while climbing towers or similar structures. It is intended to be used in conjunction with the Tower Body Belt, which is covered in Section 081-725-200.

2. DESCRIPTION

2.01 The Tower Ladder Safety Device consists of the B Safety Sleeve, (Fig. 1) the B and C Safety Rail, (Fig. 2) and appropriate mounting brackets and hardware.

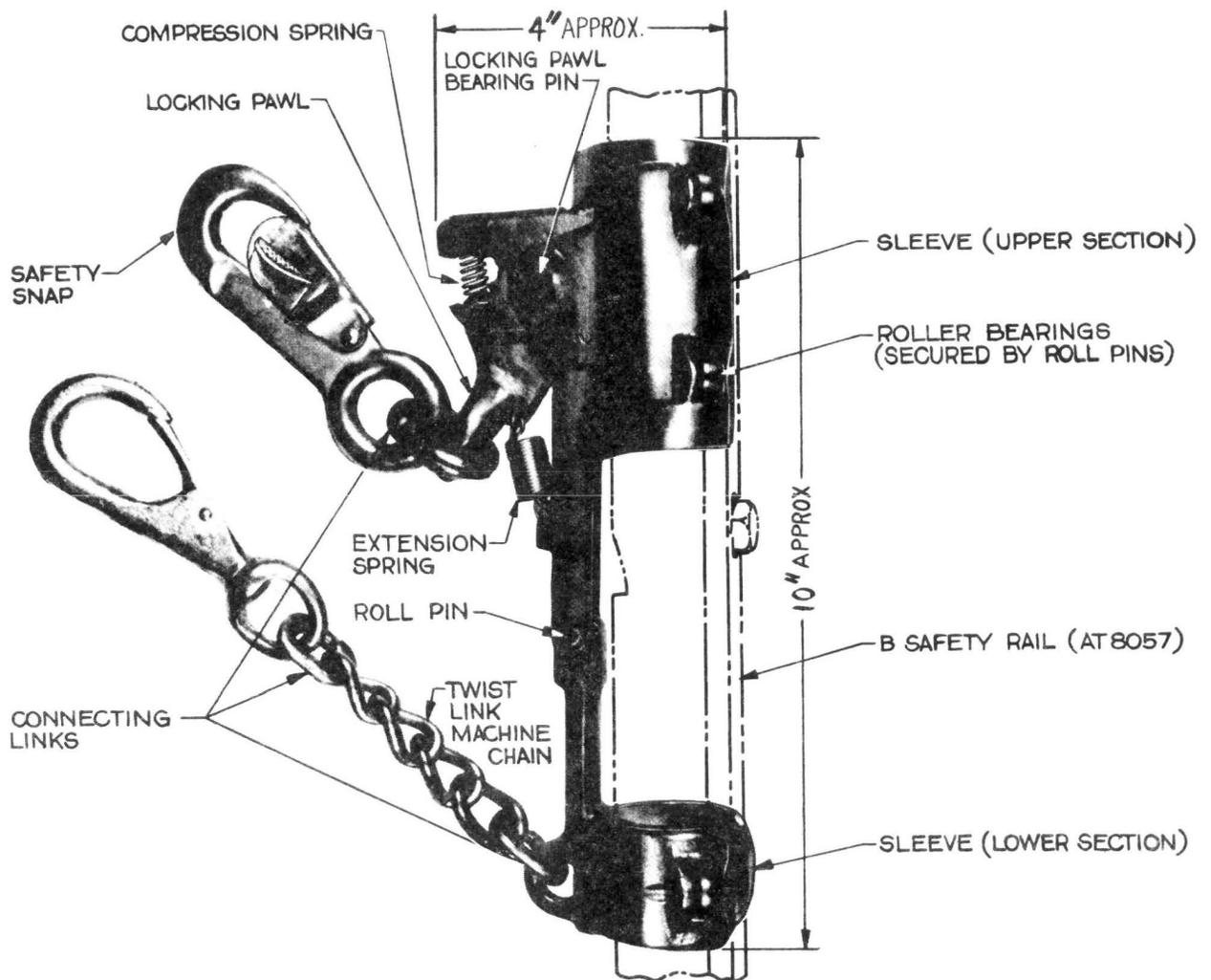


Fig. 1

SECTION 08T-725-105

2.02 The B Safety Sleeve consists of a two-piece bronze alloy casting which is hinged at the center, and is designed to slide along the safety rail.

2.03 The upper portion of the sleeve is fitted with a spring-loaded pawl which engages the notches of the safety rail. Roller bearings mounted in the sleeve ensure free travel on the rail. The backs of both the upper and lower castings are cut out to fit the guide channel on the rail.

2.04 As long as the pawl is held in a retracted position by the outward pull on the upper

shackle, it will not engage. As soon as pressure is released, the pawl spring will pull down, forcing the pawl to engage in the next lower rail notch, thereby limiting a fall to a maximum of six inches (the distance between rail notches). In addition, any weight suspended for the upper shackle tends to further seat the pawl in the notch.

2.05 When the user is climbing, the upper shackle serves to keep the pawl disengaged, the lower shackle supports the sleeve assembly. The unit is hinged for use on structures where rail sections are curved toward or away from the climber. It is not hinged for side-to-side movement.

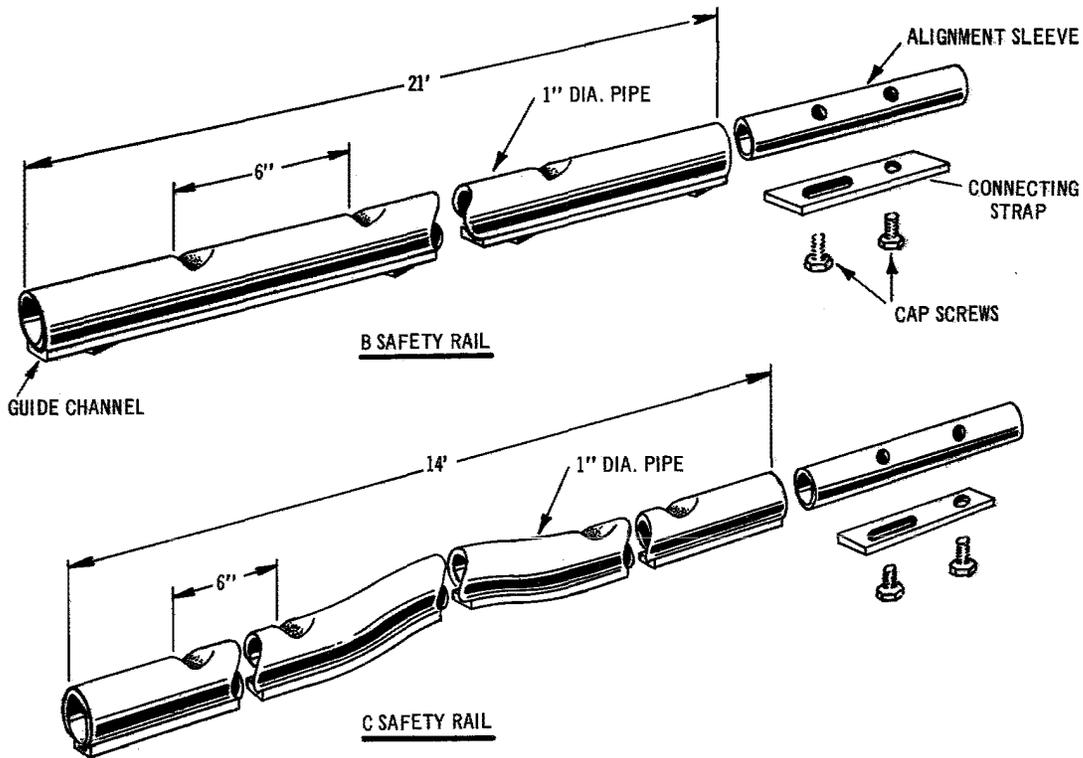


Fig. 2

2.06 The safety rail is composed of 1-inch steel pipe, notched every six inches on one face. A steel guide channel, which serves to keep the sleeve pawl in line with the rail notches, is bolted to the face opposite the notches.

2.07 The safety rail is furnished in 21-foot straight sections, designated as the B Safety Rail, and in 14-foot curved sections, designated as the C Safety Rail. (See Fig. 2.)

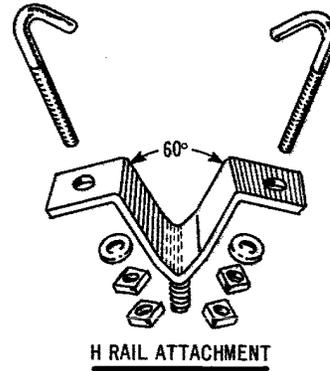
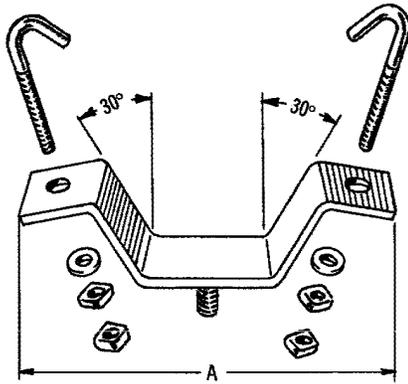
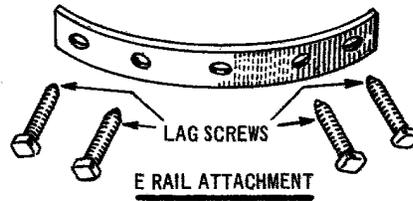
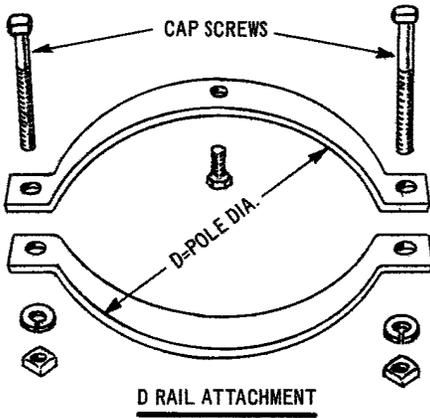
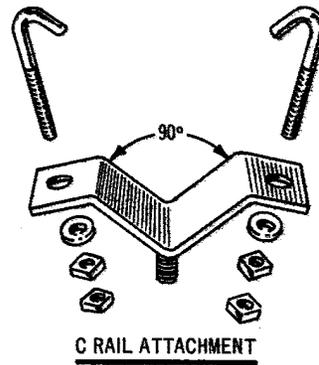
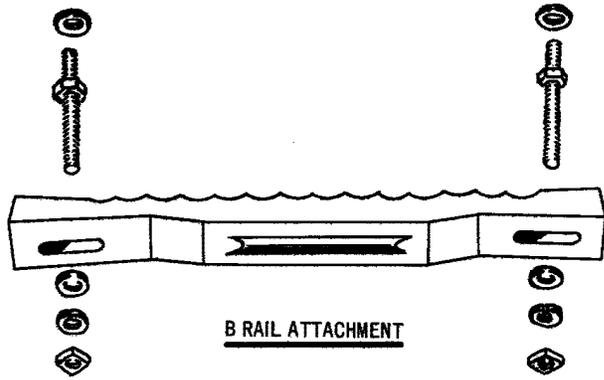
2.08 The B Safety Rail is designed to be installed on tower ladders, tower legs equipped with step bolts, and stepped wood or steel poles.

2.09 The C Safety Rail is specifically designed for use on System Standard guyed towers to bypass guy attachment points so as to form a continuous "run" throughout the height of the tower. However, it may also be suitable for use on other structures. Except for being curved, it is similar to the B Safety Rail.

2.10 Mounting brackets have been developed for attaching the B and C Safety Rails to various structures. These brackets are illustrated in Fig. 3, and their specific uses are described in Table 1.

TABLE 1

TYPE ATTACHMENT	TOWER DESIGN	MAXIMUM ATTACHMENT SEPARATION IN FEET
B	Towers equipped with ladders	7
C	Legs of structural angles of 90° equipped with step bolts – B Self-Supporting Tower	4
D	Metal pole with step bolts	4
E	Wood pole with step bolts	4
F	Legs of bent plate with step bolts – C Self-Supporting Tower	4
G	Legs of structural angles of 60° equipped with step bolts – special standoff bracket used with C Safety Rail on B Guyed Tower.	4
H	Legs of structural angles of 60° equipped with step bolts – B Guyed Tower	4
J	Legs of bent plate equipped with step bolts – C Guyed Tower	4
K	Legs of bent plate equipped with step bolts – special standoff bracket used with C Safety Rail on C Guyed Tower	4



J RAIL ATTACHMENT, A=7-3/4"

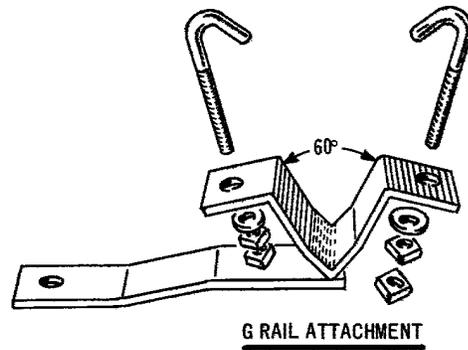
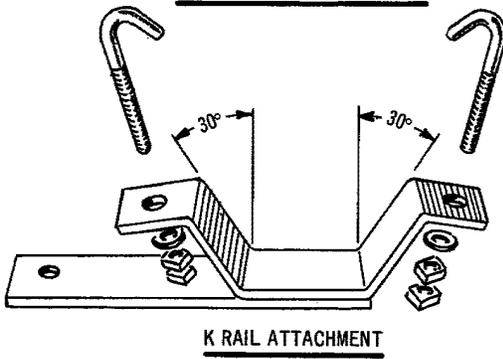
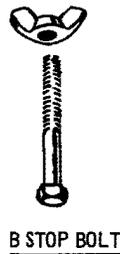


Fig. 3

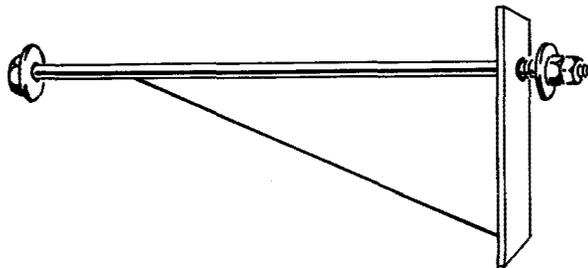
2.11 The B Stop Bolt is designed to prevent the safety sleeve from overriding the top of the safety rail. (See Fig. 4)



B STOP BOLT

Fig. 4

2.12 The B Step Bolt (Fig. 5) is intended for use at guy takeoff points, to replace the ordinary step bolt furnished with the tower. They are installed in back of the curved rail sections, as shown in Fig. 12A.



B STEP BOLT

Fig. 5

3. INSTALLATION

3.01 The material should be laid out on the ground adjacent to the structure on which it is to be installed. A simple block and tackle will be sufficient to hoist the rail sections.

3.02 The mounting brackets should be spaced on the rail sections in accordance with Table 1, and secured. In using the B, D, E, G, and K rail attachments, the bolt that is threaded into the rail shall be tightened with a wrench not exceeding 6 inches in length. Attachments C, F, J, and H should be screwed into the safety rail up to the shoulder of the stud and made hand-

tight, since the method of attaching them to the structure will prevent any backing-off or loosening of the assembly.

3.03 Connections to legs fabricated from bent plates or structural angles are made with J bolts. The length of bolt needed will vary with the size of the leg. Size requirements are shown in Table 2. A typical connection is shown in Fig. 6.

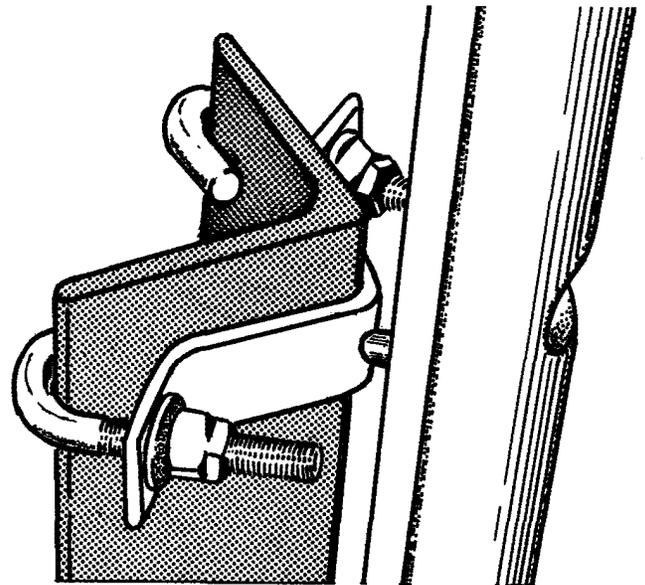


Fig. 6

TABLE 2

J BOLT SIZE	TOWER LEG SIZE (INCHES)
No. 3	3- and 3-1/2 inch angle
No. 4	4-inch angle
No. 6	5- and 6-inch angle
No. 8	8-inch angle

3.04 In the B, C, D, and E Safety Rail Kits intended for installation on System Standard B and C Towers, J bolts are furnished in the correct size.

3.05 One length of the safety rail is marked "Bottom Section". For additional identification, the ends of this section are painted yellow.

low. For straight runs of rail, this section is installed first, starting about two feet above the base of the tower structure. **Raise only one length at a time**; the coupling at the rail union may be damaged if two lengths are raised while connected. **Make sure all safety rails are installed with the sloping part of the notch pointing upward.**

3.06 After the first length has been fastened to the tower, raise the next section above the first and make the connection to the lower rail section before securing the rail mounting brackets to the tower leg (or ladder). Rail sections must be installed in a straight line, and as near to the center of the leg or ladder as possible. Care must be exercised in positioning the sections on the structure or the rail attachments on the

rail, so as to avoid interference with step bolt holes or structural members.

3.07 Attached to the top end of each length of safety rail is a 4-inch connecting strap which holds the rails together at the unions. Before raising any rail sections, loosen the cap screw holding the strap enough so that the alignment sleeve can be slipped inside the rail section. (See Fig. 7.)

3.08 Swing the connecting strap around, with the slotted hole toward the top, and tighten the cap screw to secure the sleeve in place. The cap screw must extend through the bottom hole in the alignment sleeve. (See Fig. 8.) A schematic view of the completed union is shown in Fig. 9.

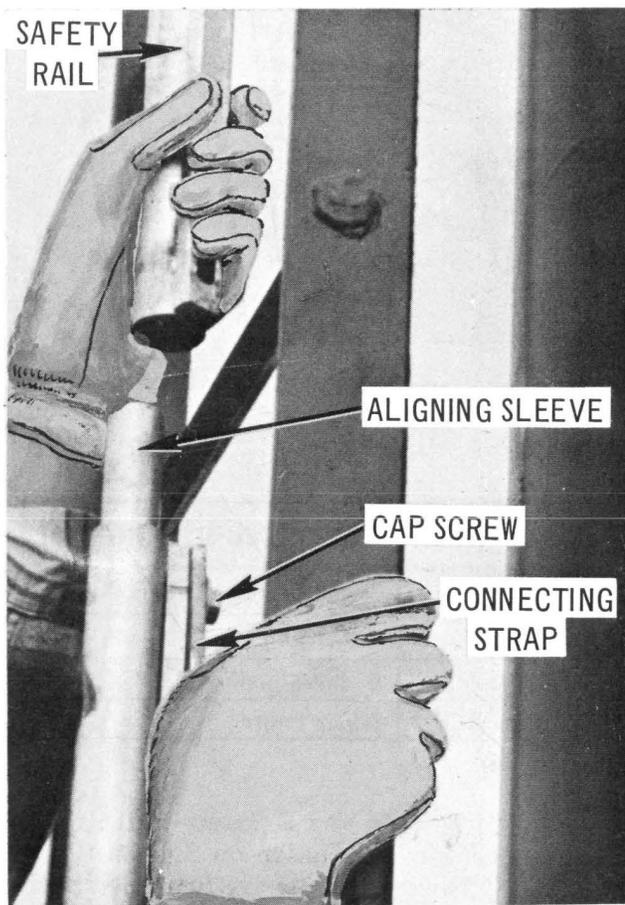


Fig. 7

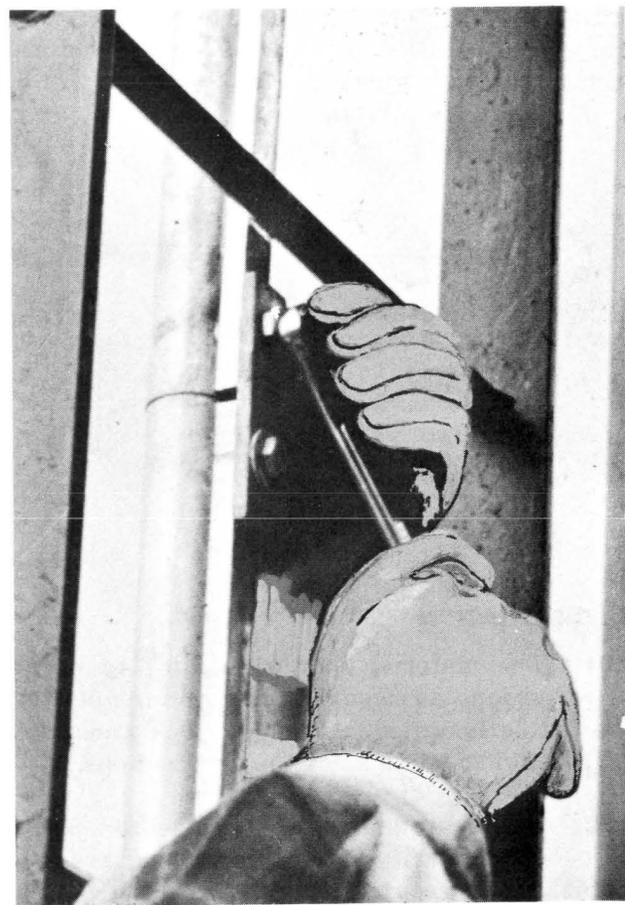


Fig. 8

3.09 Tighten the rail attachment J bolts securely, then prepare and hoist the next rail section.

3.10 If there is a bend (or angle) in the structure leg, the safety rail should not be curved on the ground but, when installed, should be formed to the curvature of the ladder and secured with the required rail attachment. This, of course, does not apply to installations on System Standard Towers or to the C Safety Rail which is furnished with the correct curvature.

3.11 If there is a platform at the top of the tower, the safety rail should extend above the platform approximately 4-1/2 feet. The guide channel is bolted to the safety rail, with the first bolt located one inch below the top of each rail section and then spaced at nine inches throughout the length of the rail. The guide channel should be cut off one inch above the fourth slot from the top of the safety rail, or a total distance of 27 inches. This allows the safety sleeve to pivot around the safety rail so that the climber can transfer from the ladder to the platform without detaching himself from the safety sleeve. This is illustrated in Figures 10A and 10B.

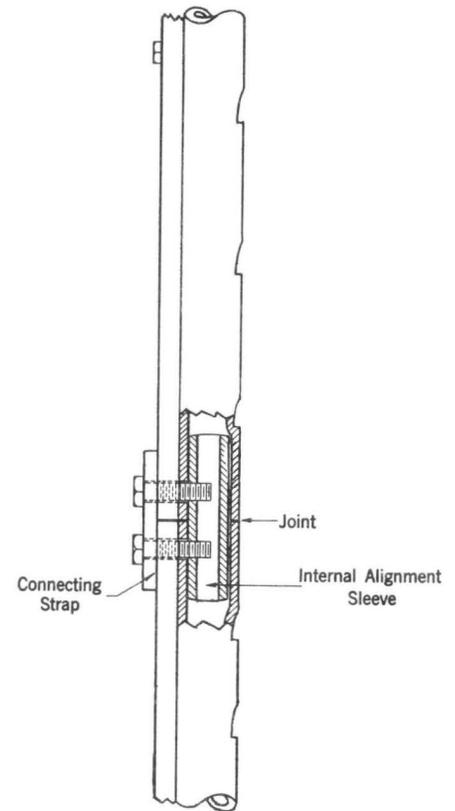


Fig. 9



Fig. 10A

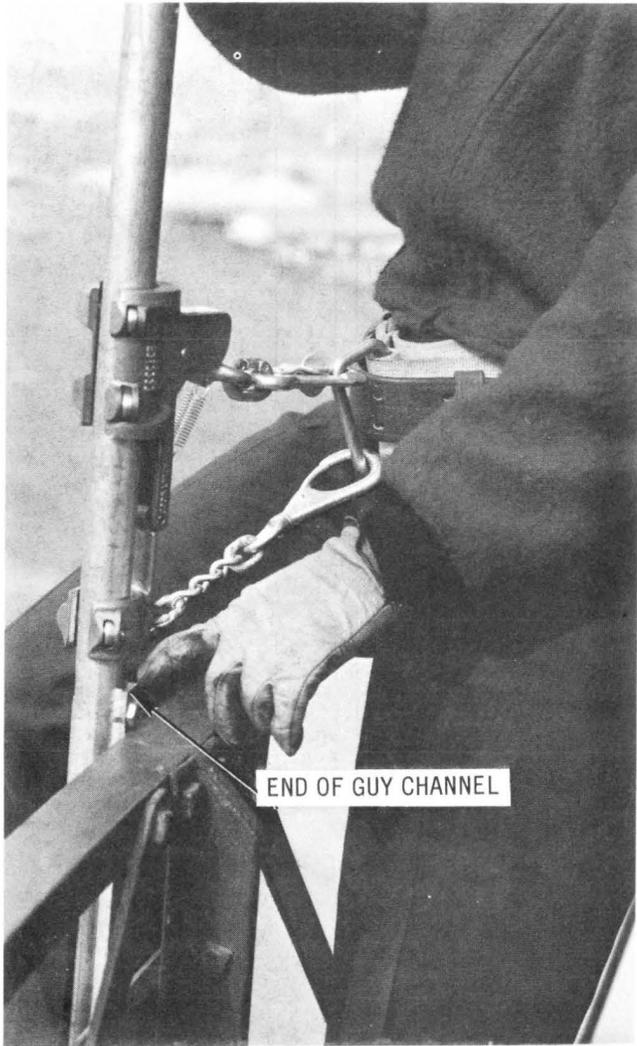


Fig. 10B

3.12 The B Stop Bolt should be installed at the top of the uppermost section of safety rail. A 5/16-inch hole should be drilled approximately 1-1/2 inches below the top of the rail section, parallel to the guide channel. The stop bolt is inserted and the wing nut is pulled up tight. This stop bolt prevents the safety sleeve from inadvertently riding over the top of the rail. (See Fig. 11.) *It should not be removed from the rail.*

3.13 When installed on System Standard guyed towers, the C Safety Rail must be used to bypass the guy attachment points. A section should be installed at the lowest guy point first,

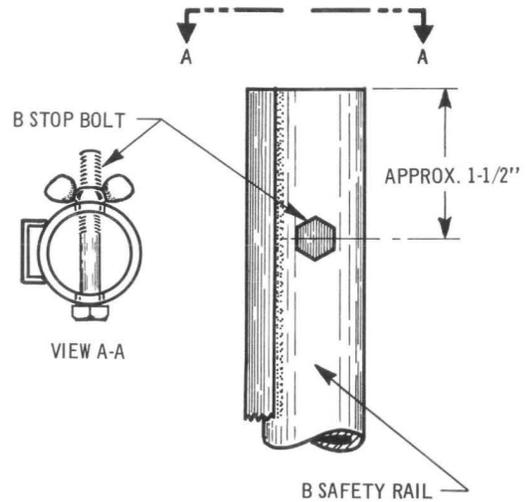


Fig. 11

and then the B Safety Rails should be installed in either direction. This will ensure proper location of the sections on either side of this point. The special G or K brackets should be installed as close as possible to the center of the C rail sections.

3.14 Fig. 12A shows the C rail section installed on a B Guyed Tower. Note that the bolts used to connect the guy shackle to the tower must be installed from left to right, i.e., the bolt head must be on the same side of the tower leg as the rail section. This must be done to ensure clearance for the safety sleeve. Fig. 12B shows the leg from the back, illustrating the J bolt and cap screw connections. All brackets using the J bolts are similarly connected. This is shown in Fig. 6.

3.15 The D rail attachment is used to fasten the carrier rail to a steel pole. (See Fig. 13.) The front half of the band is bolted to the rail, and then the two halves are drawn together with the long cap screws.

3.16 For stepped wood poles, the E rail attachment is used. The curved steel bracket is bolted to the carrier rail and is then fastened to the pole by means of lag screws.

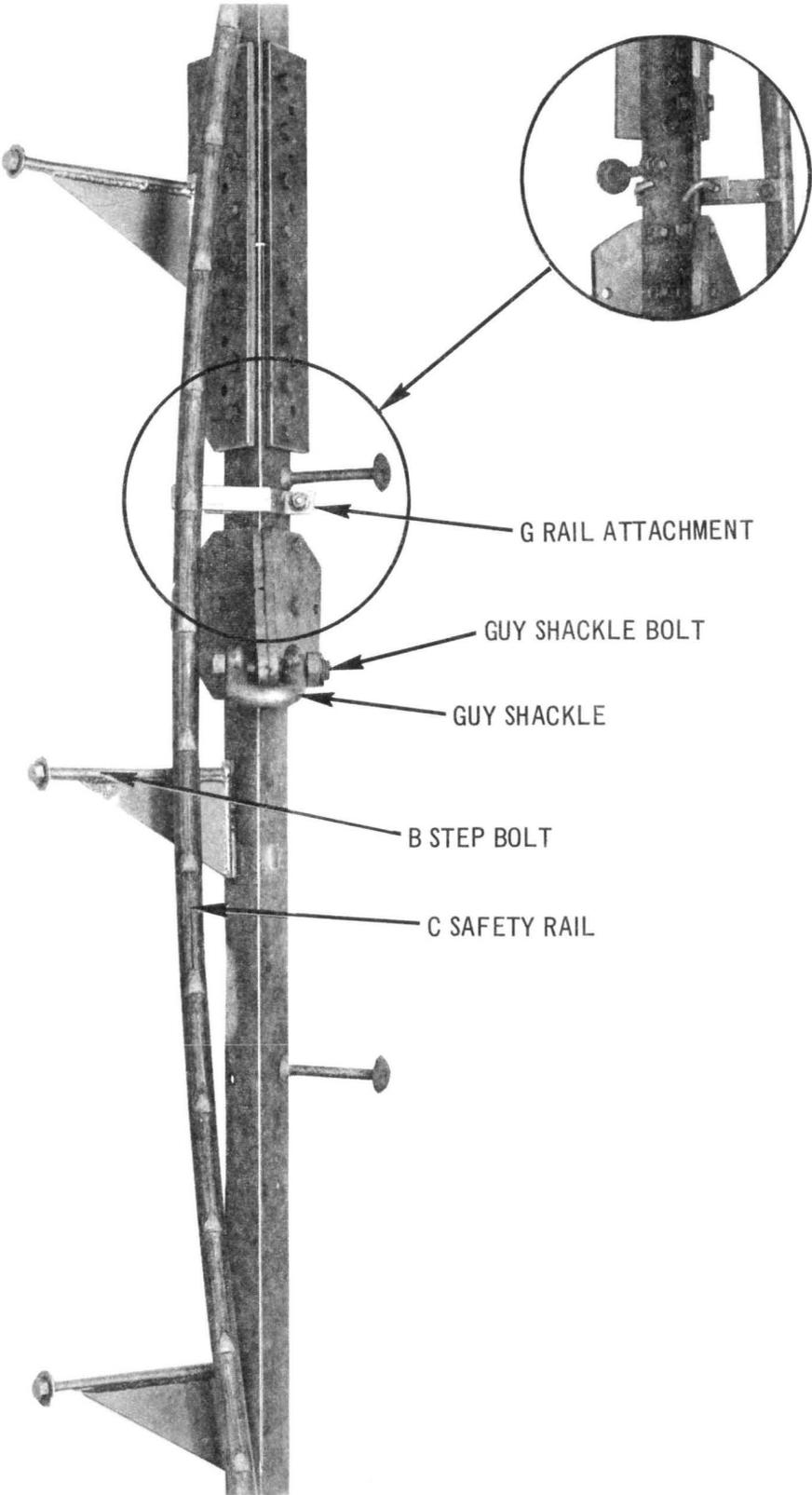


Fig. 12A

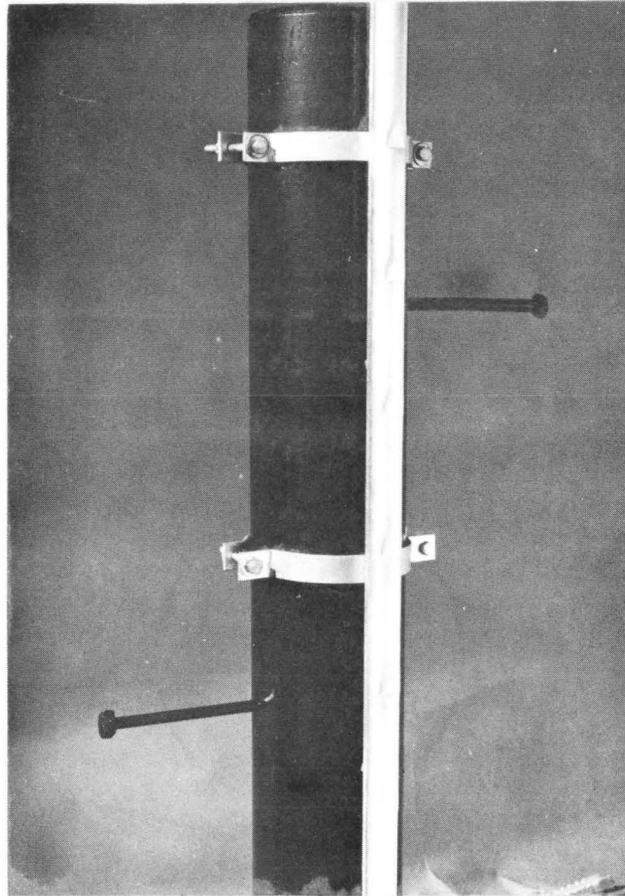


Fig. 13

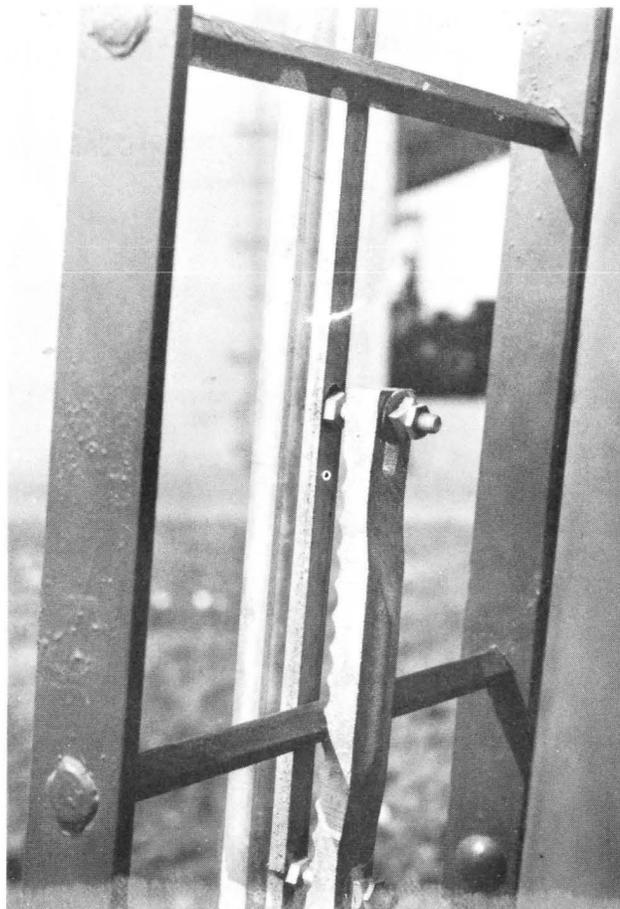


Fig. 14

3.17 For installation on ladders, the short end of each stud of the B rail attachment is inserted into the back of the carrier rail and then tightened up to the shoulder. The rung clamp is then slipped over the studs, and the washers and nuts installed on the studs. The nuts should be drawn up evenly so that the clamp remains parallel to the carrier rail. ***Do not overtighten.*** A completed installation is shown in Fig. 14.

3.18 The B rail attachment may also be used to attach the carrier rail sections to towers where no ladder exists. Structural members of a tower can ordinarily be used to support the sections, using the installation method described for a ladder rung.

3.19 The top rail section of all installations should be secured at its upper end by two rail attachments in adjacent carrier rail holes. In the case of ladders, the two attachments should be made to two separate rungs.

4. USE

4.01 The safety sleeve should be stored in a dry place, with the moving parts oiled. Before use, it should be carefully inspected to ensure that all components are in safe workable condition. It is recommended that the device not be stored on the carrier rail.

4.02 The device is placed on the bottom section of the carrier rail and raised until the pawl engages a notch about waist-high. The pawl will hold the sleeve in place while the upper and lower shackles are snapped on the D ring at the front of the Tower Body Belt (Section 081-725-200).

4.03 When climbing guyed towers, caution should be exercised when approaching guy takeoff points. The climber should follow the curved rail around the left side of the guy. The rail is arranged in relation to the step bolts so that the right leg can be lifted over the guy to the next highest step without undue exertion.

4.04 When the top of the structure is reached, the safety sleeve will remain at the level desired by making sure that the pawl is engaged in a rail notch.

4.05 Before descending, the climber should be sure that the body belt is snug and buckled properly, and that the safety snaps are securely fastened to the D ring on the belt. The descent should be made with the body leaning back into the belt, keeping the pawl retracted from the notches in the rail. ***Do not allow the pawl to drag on the rail when either ascending or descending.***