

## REFERENCE

### LADDERS

#### SAFETY PRECAUTIONS, DESCRIPTION, TRANSPORTING, AND USE

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#### 1. GENERAL

1.01 This section describes the extension ladders and standard attachments used in the Bell System and specifies methods for using the ladders and attachments safely.

1.02 This section is reissued to:

- Add information on the combination foot
- Add information on the double pulley option
- Add information on the B ladder pad
- Add information on the ladder wedge
- Add information on the E ladder support
- Revise information on vehicle mounting
- Revise information on carrying ladder
- Revise text, illustrations, and format to agree with Section 081-740-105.

Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 For detailed descriptive and ordering information, refer to Section 081-740-105.

#### NOTICE

Not for use or disclosure outside the  
Bell System except under written agreement

**2. SAFETY PRECAUTIONS****A. Locating**

**2.01** Where possible, locate ladders on strand from the field side of the cable to avoid vehicular traffic.

**2.02** If the ladder must be placed on the strand from the street side of the cable, the company vehicle shall be parked in gear with the brakes set and wheels chocked to provide maximum protection for the ladder without obstructing traffic. In addition, warning signs, flags, traffic cones, or flashing signals shall be placed to divert traffic as discussed in Section 620-135-010.

**2.03** Avoid placing a ladder in front of a doorway, especially where the door opens toward the ladder. If this is unavoidable, place barricades and block door open, or lock the door closed.

**2.04** Avoid placing a ladder near passageways, moving machinery, or where pedestrians or any type of vehicles may strike or displace it. If this is unavoidable, place warning devices or barricades at these locations.

**2.05** *Do not place a ladder inside or opposite an angle formed by wires or cables where loosening of the wire or cable attachments might cause the ladder to move or fall.*

**2.06** Do not place a ladder against a suspension strand which is held under tension by a strand puller only.

**2.07** Do not place a ladder against the support wire of multiple drop wire.

**2.08** Do not place a ladder where it may come in contact with power lines.

**B. Defective Ladders**

**2.09** Use only approved-type extension ladders.

**2.10** Do not use ladders with defective or missing rungs, defective side rails, or defective hardware items.

**2.11** Do not spill or splatter paraffin on a ladder. Wood or aluminum coated with paraffin is very slippery and can cause an accident.

**C. Handling**

**2.12** Do not carry an extension ladder from one location to another while it is extended. Fully retract the fly (upper) section, secure the ladder rope, and then extend it again at the new location.

**2.13** Point the spurs forward and downward when carrying a ladder on the shoulder.

**2.14** Do not swing the ladder into the path of passing vehicles or pedestrians when carrying a ladder or removing it from a vehicle.

**2.15** Extension ladders shall be erected with the fly section on top (toward the climber) of the base (lower) section in the overlap area.

**2.16** Keep hands and feet off the rungs when raising or lowering the fly section. Stand clear when the fly section is being lowered so it will not strike the feet (see Part 5).

*Note:* Do not allow fly section to free-fall while lowering.

**D. Securing Ladder**

**2.17** Ladders shall not be used to gain access to a roof unless the top of the ladder is extended at least 3 feet above the point of support, at eave, gutter, or roofline.

**2.18** Make certain that ladder locks are engaged properly and the ladder rope is tied securely to one of the rungs of the bottom section before climbing an extension ladder.

**2.19** If the ladder is equipped with ladder hooks and the ladder is to be used on aerial cable, turn the hooks to the working position before the ladder is raised. Ladder hooks shall be placed on the cable strand unless ladder is to be lashed as covered in Part 5. Do not turn the hooks in before descending the ladder.

**2.20** Ladders not equipped with ladder hooks shall be positioned against the strand with a minimum of 3 feet of ladder length extending

above the strand when the craft person is in position on the ladder.

### E. Precautions While Using Ladders

**2.21** Always select a ladder of sufficient length for the work to be done. The length of the ladder shall be such that the work can be performed when standing no higher than on the fourth rung from the top, thus permitting the side rails to be grasped conveniently. Do not place ladder on boxes, barrels, or other objects to obtain additional height. If the ladder is too short for the work at hand, obtain a longer ladder. The maximum working length for the various sizes of ladders is listed in Table A.

**2.22** Be especially careful when going up or down ladders during wet or icy weather.

**2.23** *Do not climb a ladder while wearing climbers.*

**2.24** Do not hurry when going up or down a ladder. Take one step at a time. Always face the ladder when going up or down and be sure to have both hands free.

**2.25** Only one person at a time is permitted on a ladder.

**2.26** When a ladder is lashed, or otherwise secured so it cannot slip, shift, or fall, the security of the craft person may be improved by placing one leg between the rungs.

**2.27** When the top end of the ladder is secured to suspension strand or other support, the craft person shall secure himself by passing the safety strap around one or two rungs and around one side rail.

**2.28** When the ladder is properly placed on the strand, (hooks over strand or 3 feet above strand) pass the safety strap around the strand and one side rail between two rungs.

**2.29** *The craft person shall always remember to first make the ladder secure and then secure oneself on the ladder to avoid falling, in the event of slipping, loss of balance, or if something else goes wrong.* The manner in which the craft person is secured to the ladder will depend

on the security of the ladder, and the nature of the work to be done.

**2.30** Do not throw tools or materials to a craft person working on a ladder; raise them by means of a handline. Be careful that tools or materials being used aloft cannot fall on persons passing below.

**2.31** Do not attempt to lean to the side so far that the outside shoulder is more than 12 inches beyond the side rail when working on a ladder that is not lashed. Loss of footing in this position may cause loss of balance. The weight being shifted to one side of the ladder may cause it to slip at the top. Descend and move the ladder to the proper location.

**2.32** When working from ladders, do not allow drop wires, lashing wires, handlines, or ladder ropes to dangle to the ground where they may be struck by passing vehicles. A wire or rope caught on a passing vehicle may pull the ladder causing it to fall or it may pull the craft person off the ladder. The handline, when not in use, shall be tied to the lower portion of the ladder or pulled aloft.

**2.33** Do not slide down an extension ladder.

**2.34** Do not tie drop wires or pulling lines to ladders.

**2.35** Do not use a ladder in a horizontal position as a platform, runway, scaffold, or bridge.

### 3. DESCRIPTION

**3.01** Extension ladders and their features are listed in Table B and are shown in Fig. 1, 2, and 3.

### 4. TRANSPORTING

#### A. Transporting on Vehicles

**4.01** When transporting ladders on trucks or other motor vehicles, always fasten them securely in their proper position in the brackets provided for that purpose. Never use wire for securing a ladder to the brackets of a truck. A ladder hanging loosely on the brackets of a truck will be marred, cracked, and weakened by road shocks.

**Warning:** *The E fiberglass extension ladder shall be transported only on vehicles equipped with brackets designed for the fiberglass ladder or on vehicles whose brackets have been modified to accept the fiberglass ladder. Failure to use proper brackets may damage the ladder.*

**Note:** Ladder brackets designed to be used with both wood and fiberglass ladders shall be adjusted to fit the type of ladder being transported.

**4.02** Mount ladders on vehicles equipped with roof-type ladder brackets as illustrated in Fig. 4.

**4.03** Mount ladders on vehicles equipped with ladder aid and roof-type ladder brackets as illustrated in Fig. 5.

**4.04** Drivers of motor vehicles transporting ladders shall exercise caution to avoid letting the ladder strike trees, posts, walls, or other objects, especially when backing or turning corners. Any ladder subjected to such a shock shall be carefully inspected prior to use in accordance with Section 081-740-105.

**4.05** If an extension ladder extends an excessive distance (3 feet in most cases) beyond the rear of a motor vehicle, attach a warning flag or light to the projecting end of the ladder.

#### **B. Transporting by Hand**

**4.06** Carry extension ladders as shown in Fig. 6 or 7.

**4.07** An alternate one-person method of carrying an extension ladder is shown in Fig. 8.

### **5. USE**

#### **A. Selecting Footing**

**5.01** Before attempting to position a ladder, select the appropriate position (spur or pad) of the combination feet to provide maximum security of the base (Fig. 31).

**5.02** Exercise care when positioning ladders before climbing. The correct angle is obtained

when facing the ladder with your toes placed against the siderails; you should be able to grasp the siderails with your hands by reaching straight out (Fig. 9 and 10). When this is accomplished, the ratio of B/A should be approximately 1/4.

**5.03** Set the ladder only on secure footing. Set both feet of the ladder at the same level and on a line parallel to the surface on which the top of the ladder rests. If necessary, a B ladder leveling wedge on a B ladder foot for wooden ladders may be used to level the base of the ladder (Fig. 11, 34, and 41) or earth may be removed from beneath the high side to bring it to the level of the lower side. **Do not increase the length of a side rail by nailing, clamping, or tying a board to it.** If a ladder leans to the right or left, it is not properly placed. A ladder properly placed is shown in Fig. 12.

**5.04** When it is impossible to avoid placing the base of the ladder on a surface where it might slip, such as on wet or oily pavement, a smooth floor, or icy or metal surfaces, tie the base of the ladder securely in place. If this is impractical, the ladder must be held by another craft person. The person holding the ladder shall be on the alert at all times to protect the person on the ladder and anyone passing below. Never leave a raised ladder unattended under these conditions. The ladder might slip and cause injury, damage, or both.

#### **B. Supporting Upper End**

**5.05** Objects against which the top of the ladder will be placed shall be sufficiently rigid and have ample strength to support the ladder and the craft person performing necessary work operations.

**5.06** Before placing a ladder against suspension strand, test the strength of the strand and its supports as outlined in Section 627-295-500.

**5.07** When using a ladder on a strand having a fairly steep slope, secure the ladder with rope to prevent the top of the ladder from sliding along the strand. Before raising the ladder, throw or place a handline over the strand and secure one end of the handline to the second rung from the top of the fly section. After placing the ladder on the strand, pull the other end of the handline taut and secure it to an adequate support on the

uphill side of the ladder, such as a pole, tree, or digging bar firmly anchored in the ground. If no such anchorage is obtainable, secure the ladder to the cable and strand by throwing the handline over the strand again, so the rope passes twice around the cable and strand. Tie the rope securely to a rung on the base section of the ladder.

**5.08** When a ladder is placed against the strand and heavy work such as pulling or lifting is to be done, lash the ladder to the strand with a short length of rope, as shown in Fig. 13. Where the cable is supported in rings, pass the lashing rope around the strand only; where the cable is lashed, pass the lashing rope around the strand and cable. ***Do not move the base of the ladder after the upper end has been secured to the strand.***

**5.09** When pushing or pulling heavy loads from a working position on a ladder, exercise care not to place undue stress on the ladder which would tend to dislodge it.

**5.10** When using a ladder on a suspension strand that is attached to a building wall, wherever possible, place the ladder so it will tend to push the wall attachment against rather than away from the building wall.

**5.11** When placing a ladder against a tree, select the tree trunk or its larger limbs for support. When it is necessary to place a ladder so the top rung rests against a tree trunk or similar object, a handline may be thrown or placed with a wire-raising tool or tree pruner handle over a tree limb, tied to the top rung of the ladder, and used to assist in raising the ladder. After the ladder has been placed, tie the free end of the handline to one of the lower rungs, thus holding the ladder until a more secure lashing is made. The ladder shall be lashed securely at one or two points to prevent the ladder from twisting or sliding when the craft person's weight is put on one side. The lashing can be made in the following manner with a second rope (Fig. 14):

- (a) Make a slip noose about 15 feet from the free end of the rope so the noose will tighten when the free end of the rope is pulled.
- (b) Place the slip noose over the top end of one side rail.

- (c) Pass the free end of the rope down behind and under the top rung, then toward the front of the ladder, around the rail, and then back of the tree or pole.

- (d) Make two complete wraps around the tree or pole, then pass the rope twice around the opposite rail below the first rung and then up behind the rung.

- (e) Reverse the direction of wrapping and make two half-hitches on the rail so the ladder is lashed tightly to the tree or pole.

**5.12** An alternate method for lashing a ladder to a pole is shown in Fig. 15. This method makes it possible to lash the ladder prior to climbing.

**5.13** Do not place an extension ladder against a window sash. If it is impractical to avoid a window, lash a board to the ladder as shown in Fig. 16 to provide support on each side of the window frame.

**5.14** Ladder strand hooks (Fig. 29) shall be used on lashed, ring-supported, and self-supporting cable when the ladder is not lashed to the strand.

**Caution:** *When using ladder hooks on aerial cable, make certain the ladder is placed on firm and level footing to prevent the ladder from twisting or sliding along the strand.*

A greater margin of safety is provided with the hooks in the working position even if the ladder is lashed to the strand and especially when placing and removing the ladder.

**Note:** Turn ladder hooks in between rails when the ladder is to be placed against building walls or other flat surfaces, mounted on trucks, or stored.

**5.15** To prevent possible damage to a building having fragile siding, such as enameled aluminum, asbestos, etc, attach a **B ladder pad** (Fig. 37) to the top section of the ladder before it is placed against the structure.

**5.16** The **D and E ladder supports** are used to support the upper end of the ladder permitting the craft person to sit or stand between

the ladder and the cable using the C or D ladder platform (see Fig. 40 through 46).

**C. Raising and Lowering (One-Person Method)**

**5.17** The one-person method of raising an extension ladder, 28 feet or less, to a suspension strand is illustrated in Fig. 16 through 21.

**5.18** The one-person method of raising an extension ladder, 28 feet or less, to a wall or building is illustrated in Fig. 22, 23, and 24.

**5.19** The one-person method of lowering an extension ladder is illustrated in Fig. 25 and 26.

**D. Raising and Lowering (Ladders Over 28 Feet)**

**5.20** Under certain ideal conditions, it may be possible for one craft person to safely raise and lower ladders longer than 28 feet (see paragraphs 5.17, 5.18, and 5.19).

**5.21** The two-person method of raising an extension ladder is illustrated in Fig. 27 and 28.

**6. OPTIONS AND ACCESSORIES**

**6.01** The options and accessories available for use with extension ladders are listed in Table C and are shown in Fig. 29 through 47.

**6.02** The installation and the use of extension ladder accessories, where applicable, are contained in Part 5 of this section.

TABLE A

WORKING LENGTHS OF EXTENSION LADDERS		
SIZE OF LADDER (FEET)	MAXIMUM WORKING LENGTH (FEET)	MINIMUM NUMBER OF RUNGS OF OVERLAP
16	12	4
20	16	4
24	20	4
28	24	4
32	28	4
36	31	5
40	35	5

TABLE B

EXTENSION LADDERS

EXTENSION LADDER	RATING	MATERIAL		AVAILABLE SIZES (FT) (NOTE 1)						FIG. NO.	
		RAILS	RUNGS	16	20	24	28	32	36		40
C	STD	Solid wood (Treated)	Solid wood (Treated)	X (Note 2)	X	X	X	X	X	X	1
E	STD	Fiberglass	Aluminum			X	X				2
D	MD	Laminated wood	Aluminum			X	X				3

**Note 1:** The size shown is the sum of the length of the two sections, not the length the ladder is designed to reach.

**Note 2:** Rope for raising top section is not provided with 16-foot ladder.

**TABLE C**  
**EXTENSION LADDER ACCESSORIES**

ACCESSORY	RATING	FIG. NO.	FOR USE WITH EXTENSION LADDER	COMMENTS
Rail coating (protective finish)	STD	—	E	Factory option — to protect against prolonged adverse environmental effects
Ladder hooks	STD	29	C and E	Factory option — enables ladder to be used for work on aerial cables
Double pulley arrangement	STD	30	C and E	Factory option — provides an increased mechanical advantage in raising or lowering fly section of ladder
Combination foot	STD	31	C and E	Factory installed — provides secure footing on various surfaces
B ladder pulley kit	STD	32	All 20-, 24-, 28-, 32-, 36-, and 40-foot	Same as double pulley arrangement installed locally (see Fig. 33)
B ladder foot	STD	34	C and D	Temporarily installed to provide level footing on uneven surfaces
B ladder tread	STD	35	All	Provides more comfortable footing and reduces fatigue when working at constant height for extended period of time
B ladder leveling wedge	STD	36	All	Provides level footing on uneven surfaces
B ladder pad	STD	37	All	Improves stability and protects siding such as aluminum, asbestos, and vinyl against scratches and dents
C ladder platform	STD	38	All	Provides a seat for the crafts-person while aloft (used with D or E ladder support) (Note 1)
D ladder platform	STD	39	All	Reduces fatigue when working at constant height for extended period of time (Note 1)

*Note 1:* If the platform support hooks or lower supports and their associated latches do not slip readily over the rungs of the fiberglass ladder, they may be adjusted by spreading with a standard 1-inch iron pipe (1-5/16 inch od). The platform shall fit freely at all bearing points and the latches should readily engage.

TABLE C (Contd)  
EXTENSION LADDER ACCESSORIES

ACCESSORY	RATING	FIG. NO.	FOR USE WITH EXTENSION LADDER	COMMENTS
D ladder support	STD	40	C and D	Clamps to strand to support upper end of ladder providing area for sitting or standing between ladder and cable (See Fig. 40 thru 43) — cannot be used with E fiberglass extension ladder
E ladder support	STD	44	All	Clamps to strand to support upper end of ladder providing area for sitting or standing between ladder and cable (see Fig. 45 and 46)
Ladder pad	MD	47	C and D	Superseded by B ladder pad
B ladder support	MD	Not shown	C and D	Superseded by D ladder support—cannot be used on 6.6M strand
C ladder support	MD	Not shown	C and D	Superseded by E ladder support—cannot be used on 6.6M strand

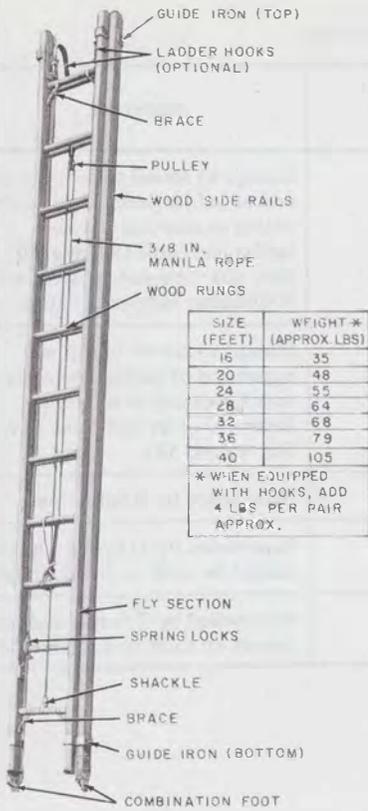


Fig. 1—C Extension Ladder

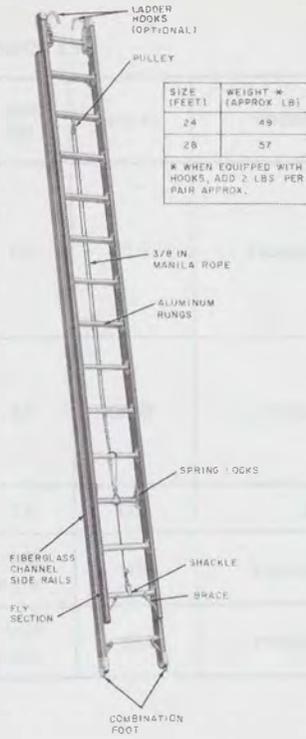


Fig. 2—E Extension Ladder

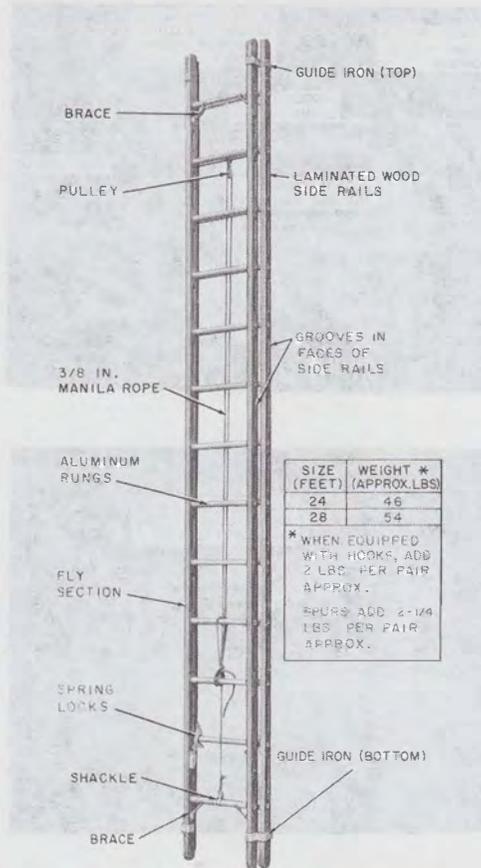


Fig. 3—D Extension Ladder (MD)



Fig. 4—Mounting Ladder on Roof-Type Ladder Bracket



Fig. 5—Mounting Ladder on Roof-Type Ladder Bracket—Vehicle Equipped With Ladder Aid



Fig. 6—One-Person Method of Carrying an Extension Ladder

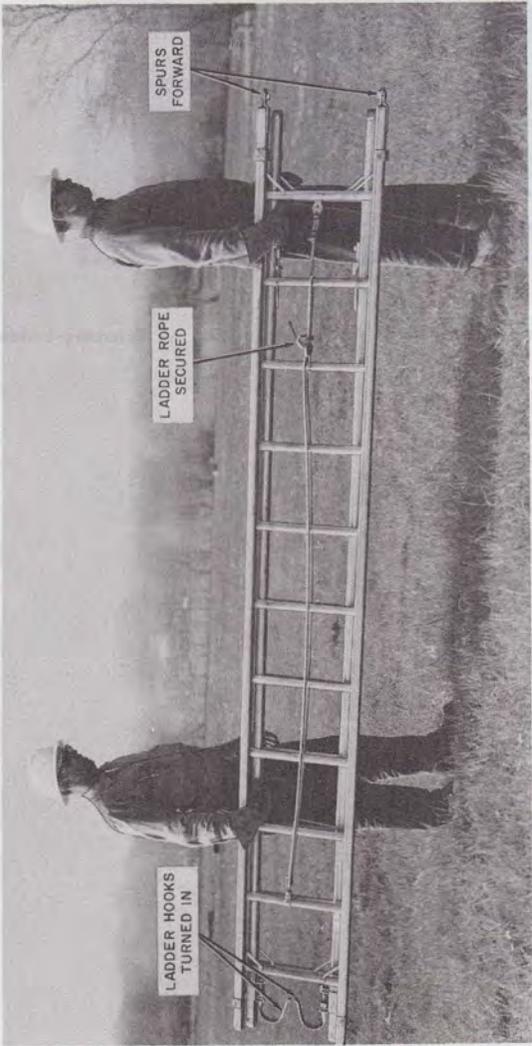


Fig. 7—Two-Person Method of Carrying an Extension Ladder

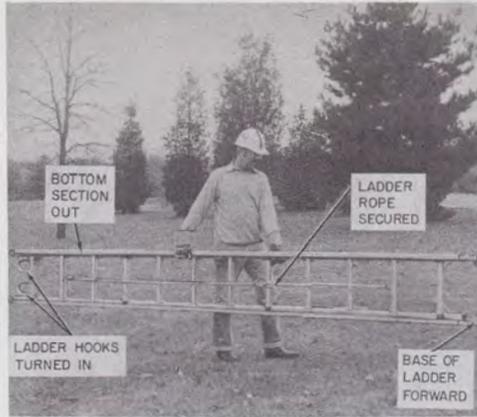


Fig. 8—Alternate One-Person Method of Carrying an Extension Ladder

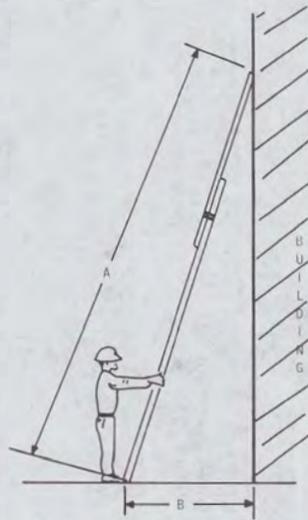


Fig. 9—Ladder Placed Against Wall

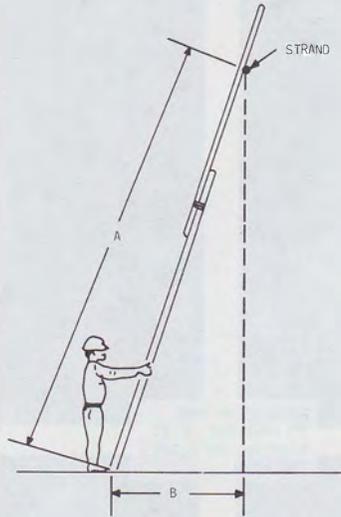
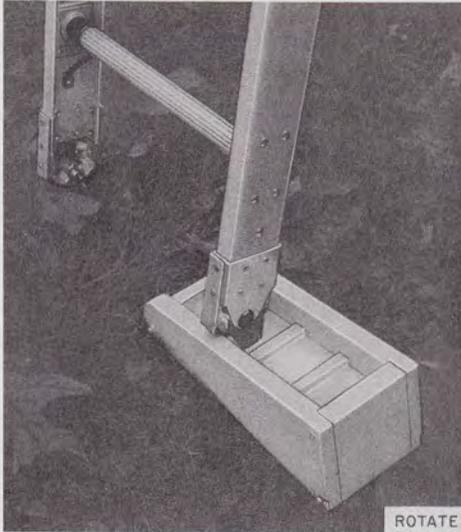


Fig. 10—Ladder Placed Against Strand



ROTATE WEDGE  
TO PROVIDE LEVEL  
FOOTING ON SLOPED  
TERRAIN

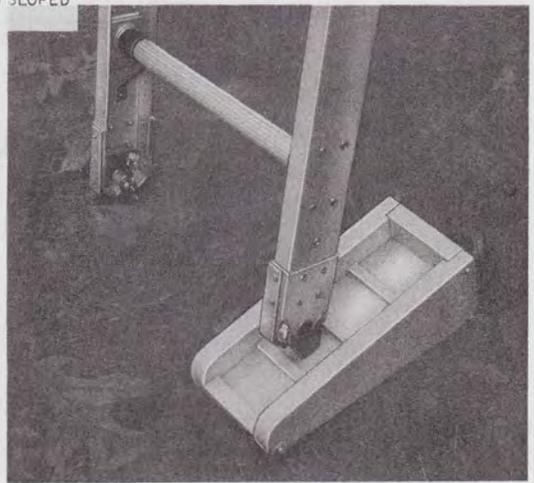
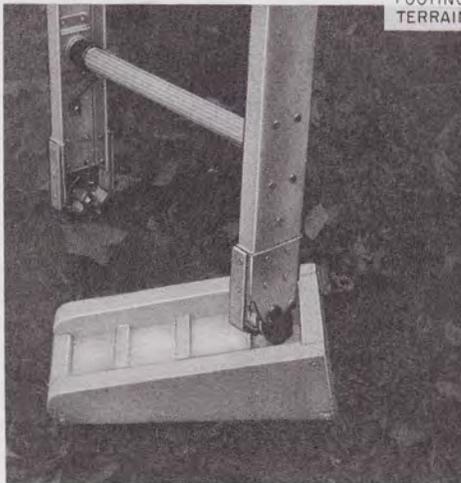
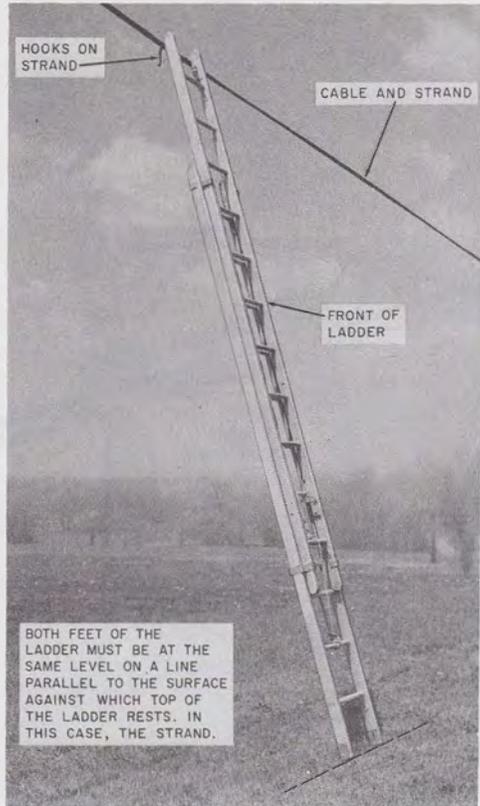


Fig. 11—B Ladder Leveling Wedge in Use



**Fig. 12—Base of Ladder Properly Positioned**

NOTE:  
PLACE THE LADDER SO  
AT LEAST TWO RUNGS  
EXTEND ABOVE THE  
STRAND WHEN IN  
POSITION FOR LASHING

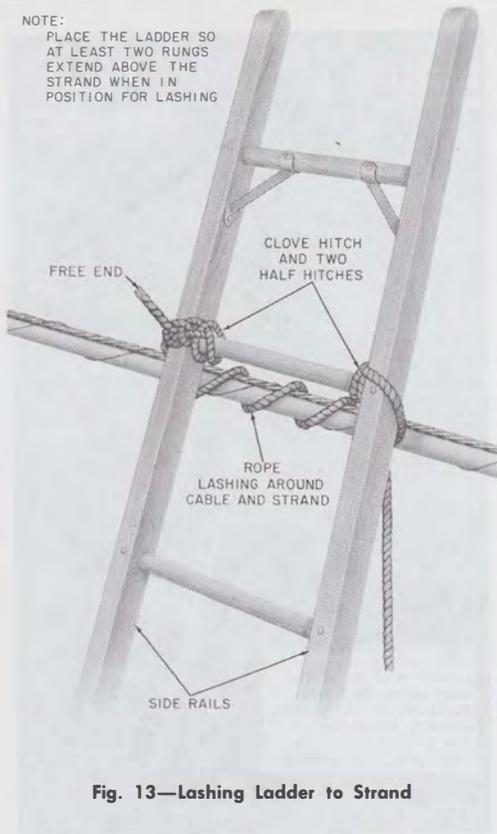


Fig. 13—Lashing Ladder to Strand

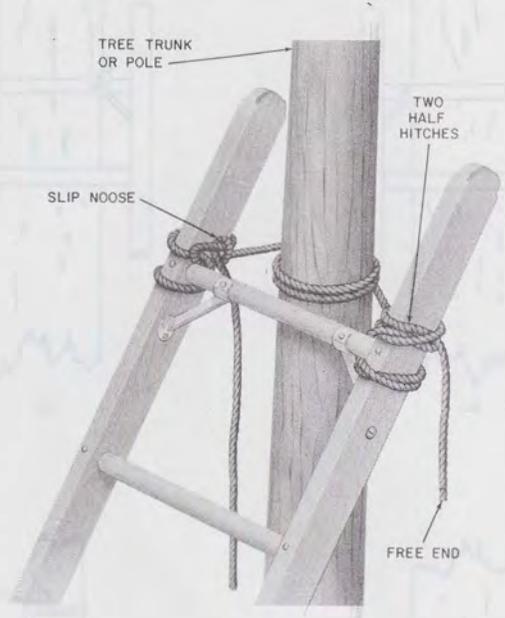
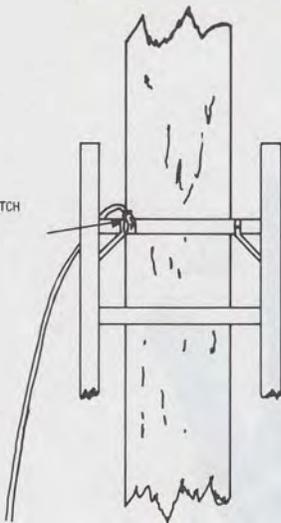
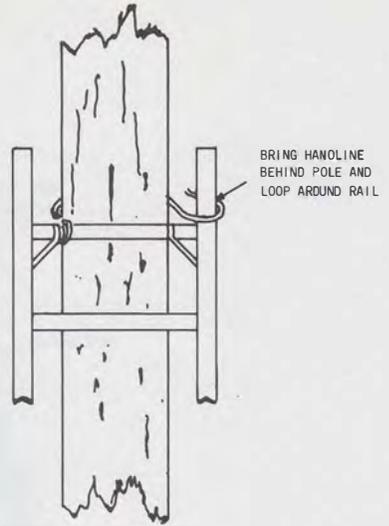


Fig. 14—Ladder Lashed to Tree or Pole

SECURE END OF HANDLINE WITH CLOVE HITCH AND TWO HALF HITCHES PRIOR TO RAISING LADDER.



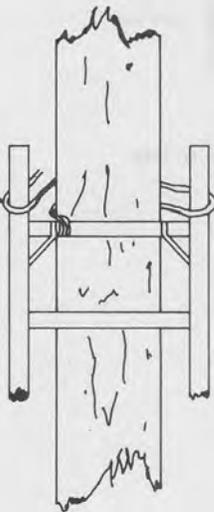
(A)



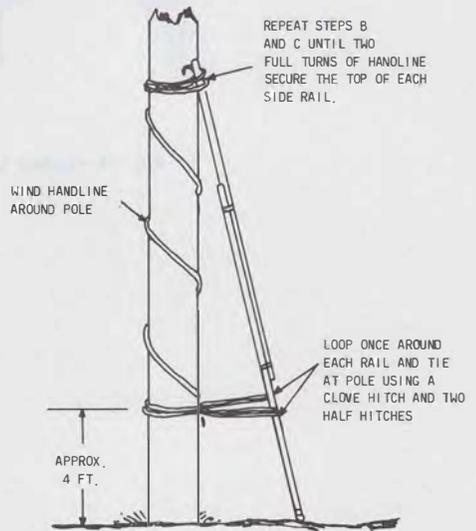
BRING HANDLINE BEHIND POLE AND LOOP AROUND RAIL

(B)

BRING HANDLINE BACK BEHIND POLE AND LOOP AROUND RAIL



(C)



REPEAT STEPS B AND C UNTIL TWO FULL TURNS OF HANDLINE SECURE THE TOP OF EACH SIDE RAIL.

WIND HANDLINE AROUND POLE

LOOP ONCE AROUND EACH RAIL AND TIE AT POLE USING A CLOVE HITCH AND TWO HALF HITCHES

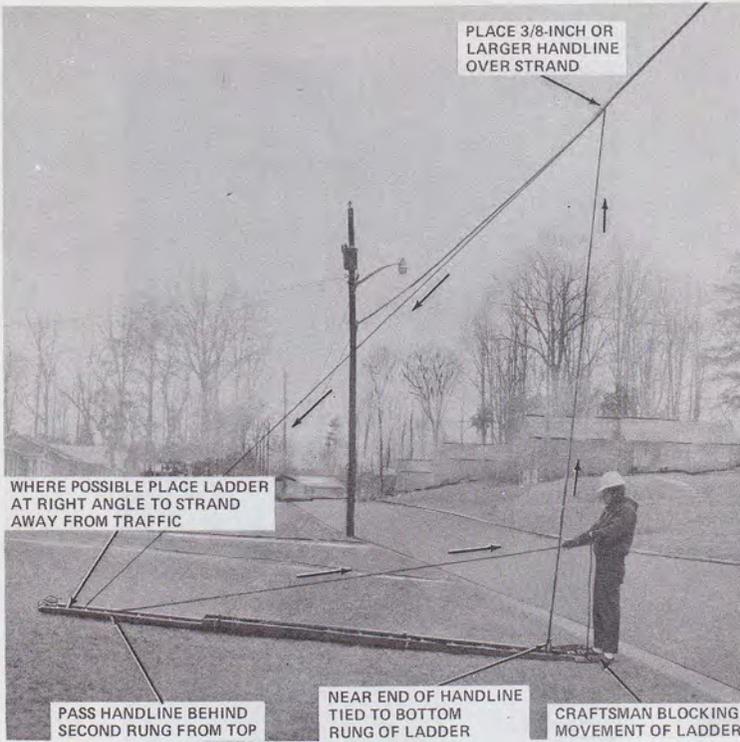
APPROX. 4 FT.

(D)

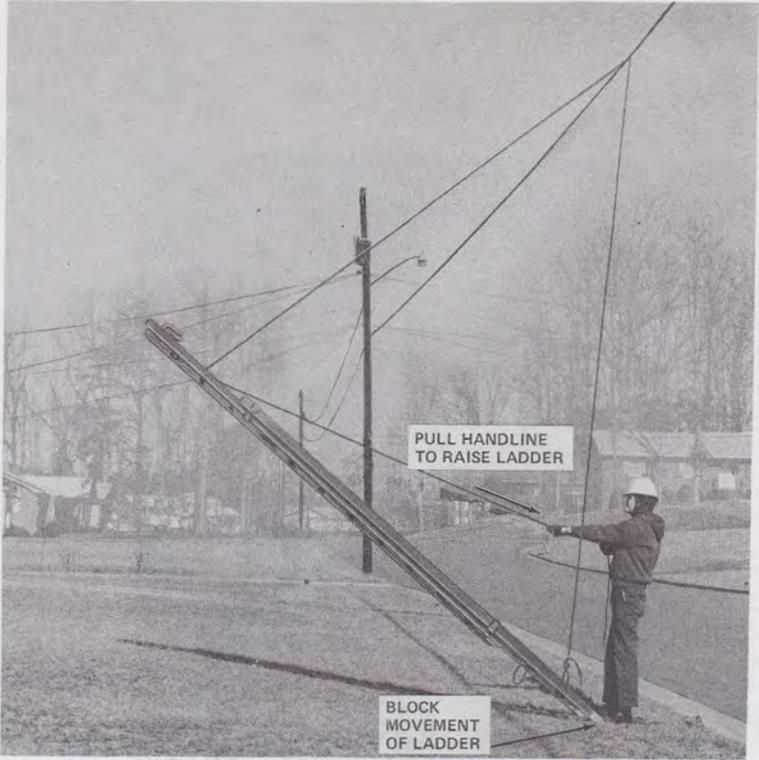
Fig. 15—Alternate Method of Lashing Ladder to Pole



**Fig. 16—Ladder Placed in Front of Window**



**Fig. 17—Preparing to Raise Extension Ladder**



**Fig. 18—Ladder Partially Raised**



Fig. 19—Ladder in Vertical Position



**Fig. 20—Method of Securing Handline**



Fig. 21—Ladder in Working Position



Fig. 22—One Person Raising Ladder



Fig. 23—Preparing to Extend Fly Section

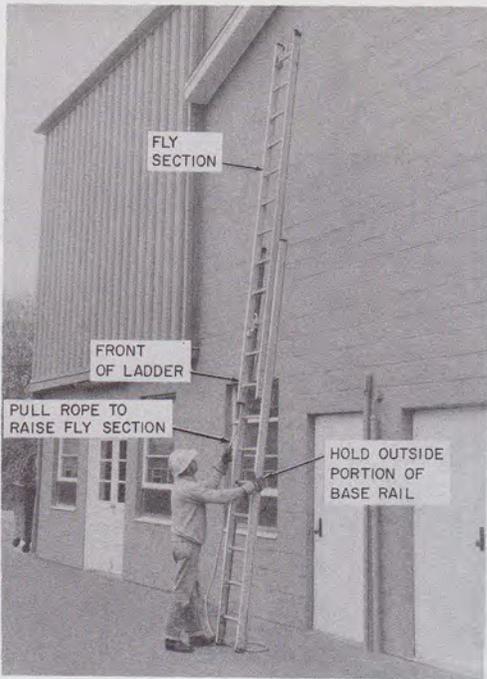


Fig. 24—Fly Section Extended



Fig. 25—Preparing to Lower Fly Section

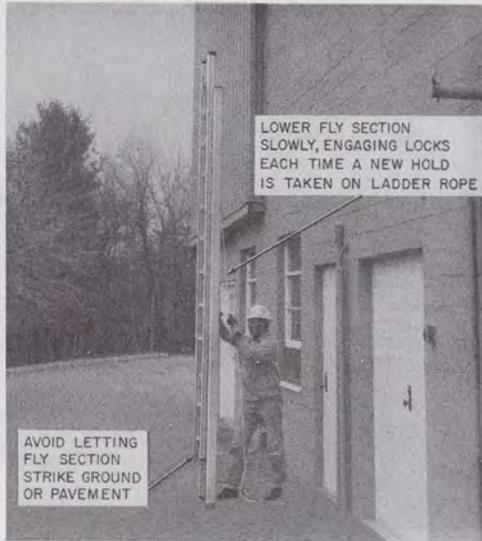


Fig. 26—Fly Section Lowered



**Fig. 27—Two Persons Raising Ladder**

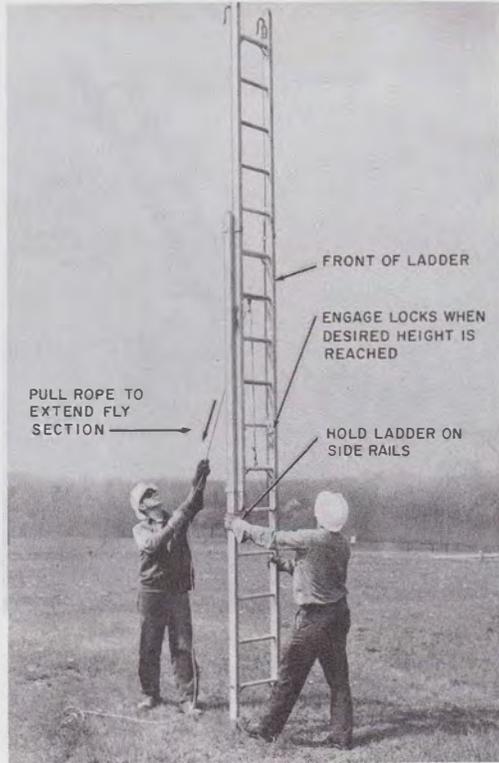


Fig. 28—Two-Person Method of Extending Fly Section

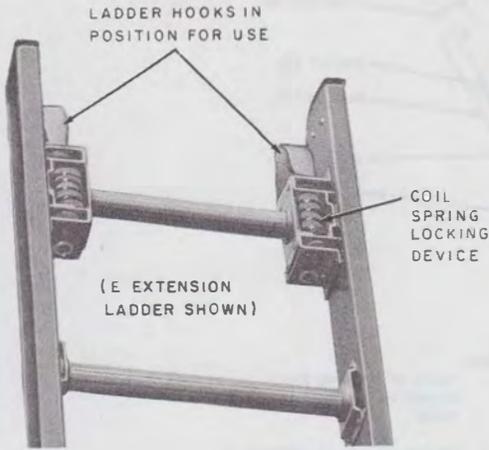
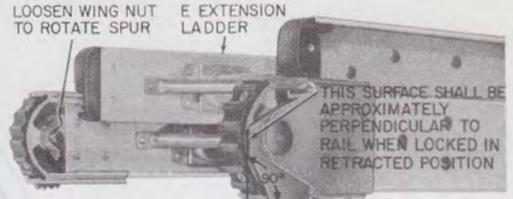
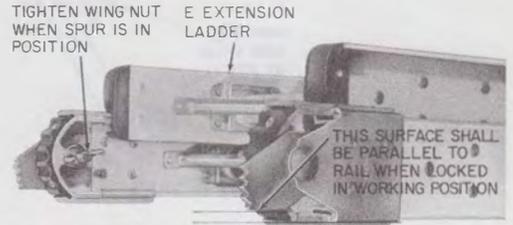


Fig. 29—Ladder Hooks



SPURS IN RETRACTED POSITION



SPURS IN WORKING POSITION

Fig. 31—Combination Foot

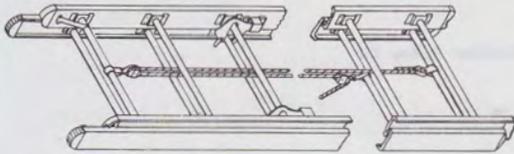
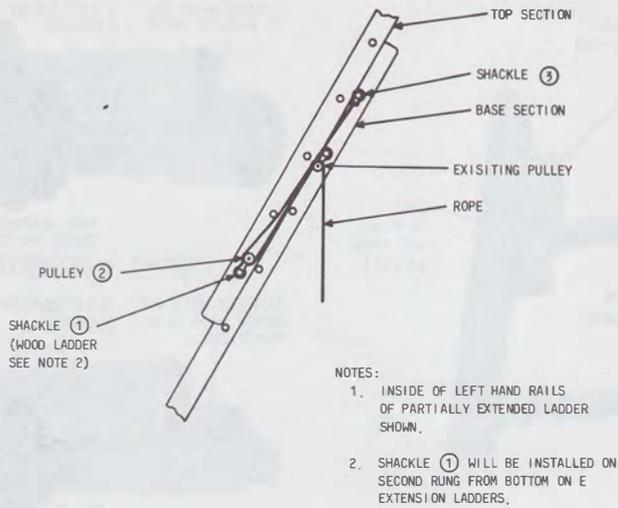


Fig. 30—Double Pulley Arrangement



Fig. 32—B Ladder Pulley Kit



ASSEMBLY PROCEDURE:

1. REMOVE EXISTING LADDER ROPE BY REMOVING NUT AND BOLT FROM SHACKLE ① .
2. INSTALL PULLEY SUPPLIED IN KIT ② IN SHACKLE ① .
3. INSTALL SHACKLE SUPPLIED IN KIT ③ ON TOP RUNG OF BASE SECTION AND ATTACH THE ROPE TO THIS SHACKLE WITH 1/4-20 NUT AND BOLT PROVIDED.
4. THREAD ROPE THROUGH PULLEYS AS SHOWN ABOVE.

Fig. 33—Installing B Ladder Pulley Kit

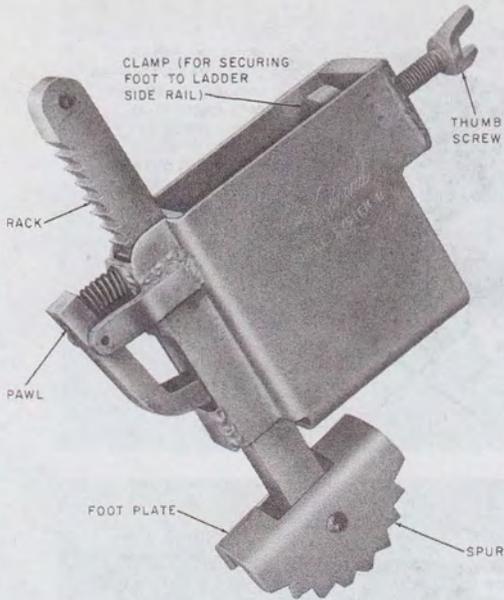


Fig. 34—B Ladder Foot

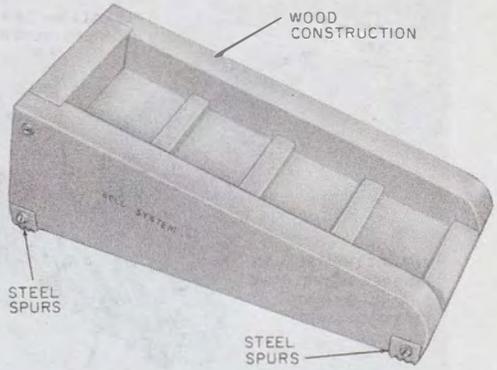


Fig. 36—B Ladder Leveling Wedge

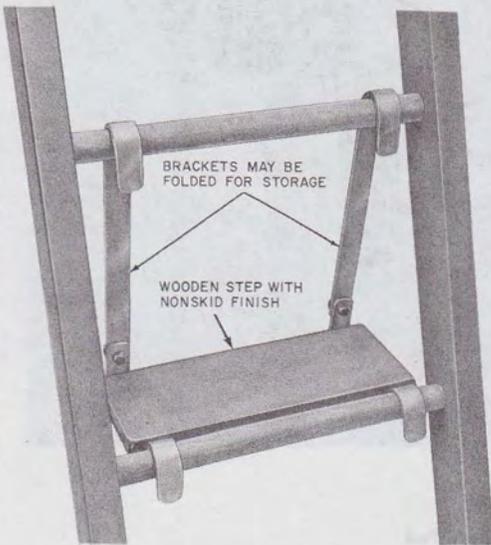


Fig. 35—B Ladder Tread in Working Position

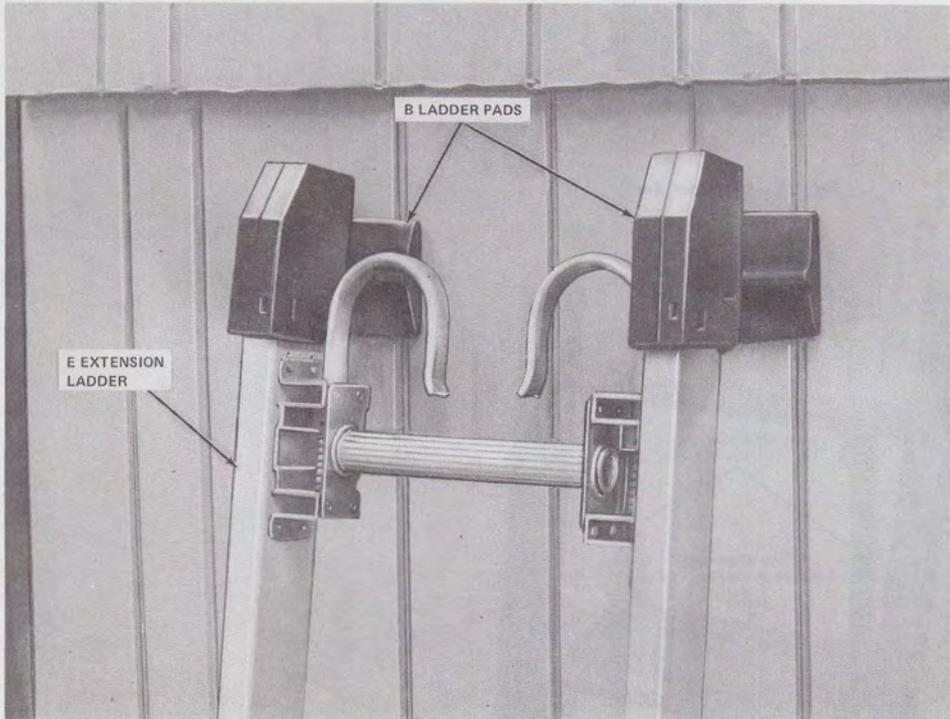
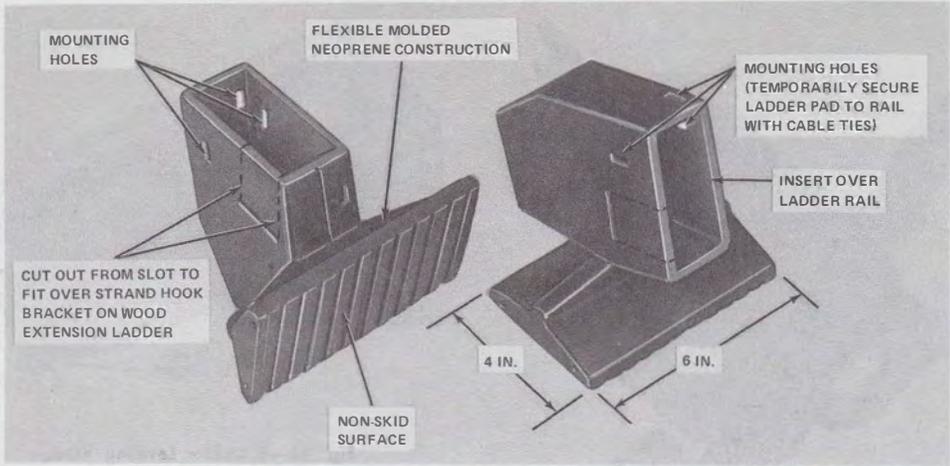


Fig. 37—B Ladder Pad

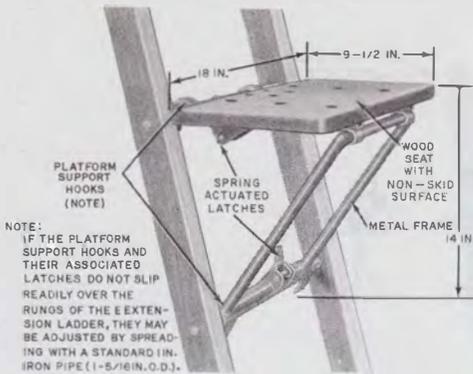


Fig. 38—C Ladder Platform

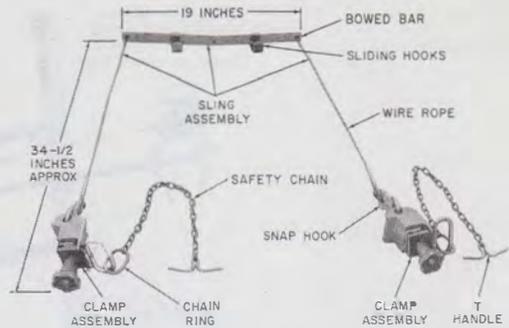


Fig. 40—D Ladder Support

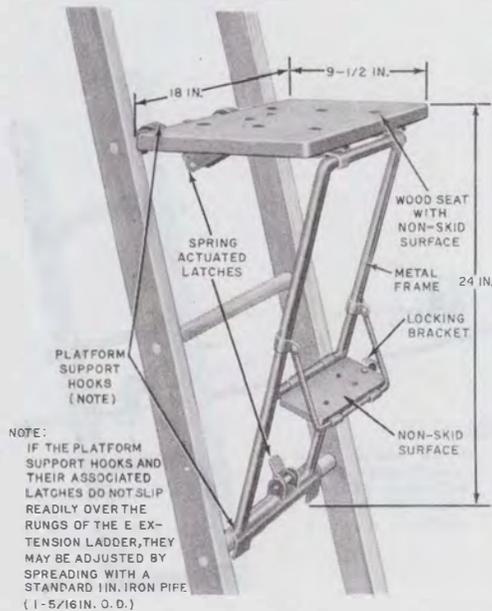


Fig. 39—D Ladder Platform

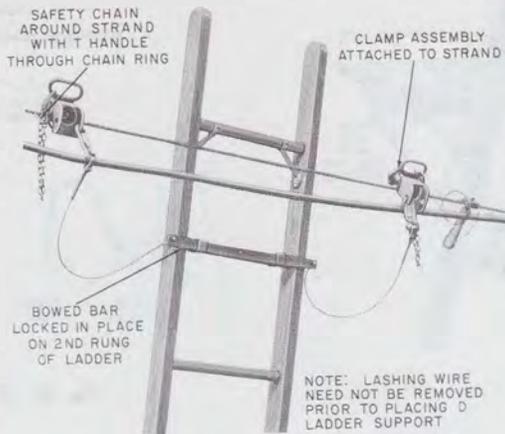


Fig. 41—D Ladder Support Attached to Strand

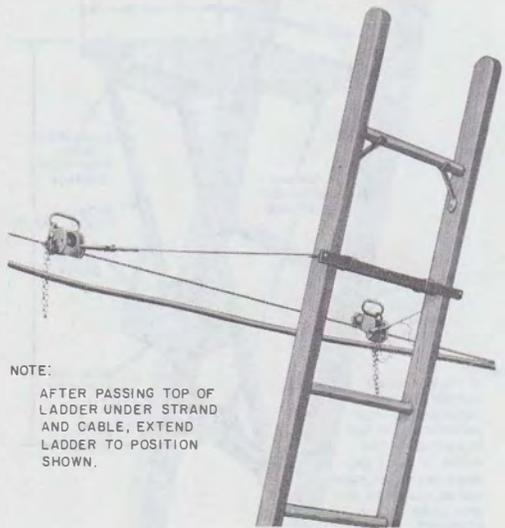


Fig. 42—D Ladder Support in Use

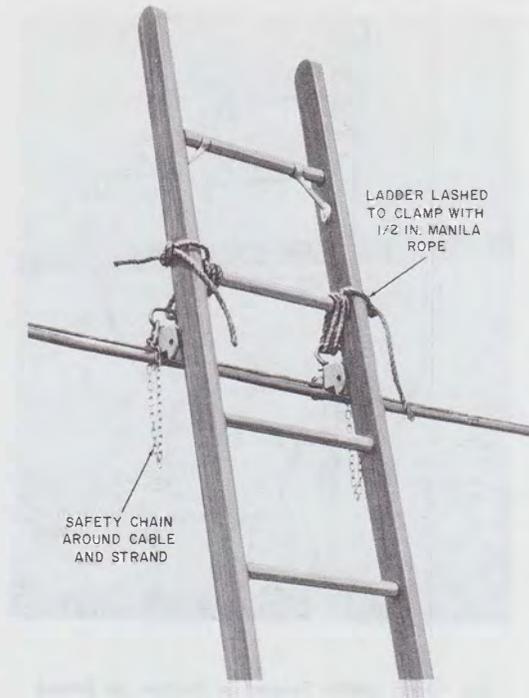


Fig. 43—Ladder Attached to Strand With D Ladder Support Clamps

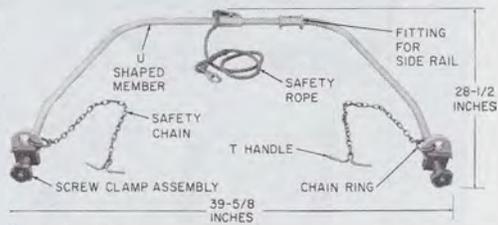


Fig. 44—E Ladder Support

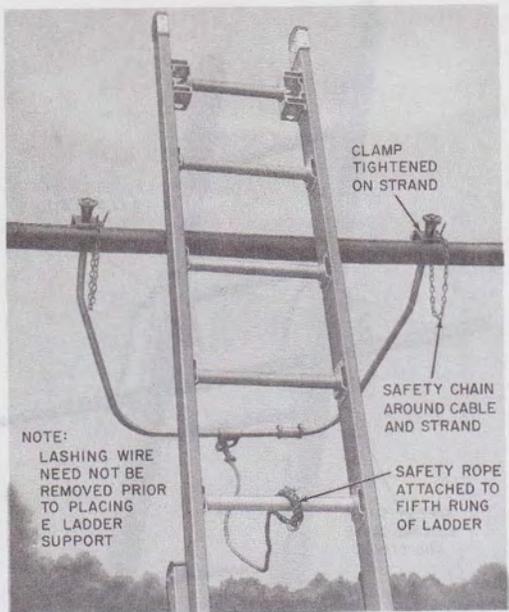


Fig. 45—E Ladder Support in Position on Strand

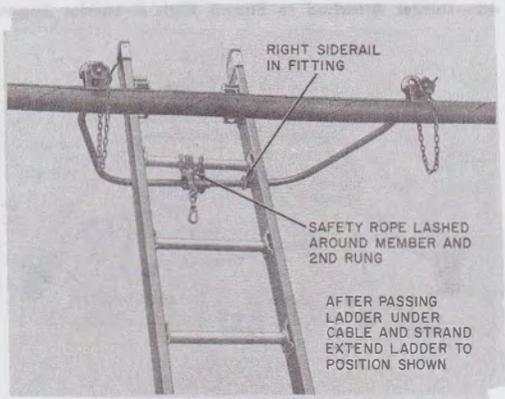


Fig. 46—E Ladder Support in Use

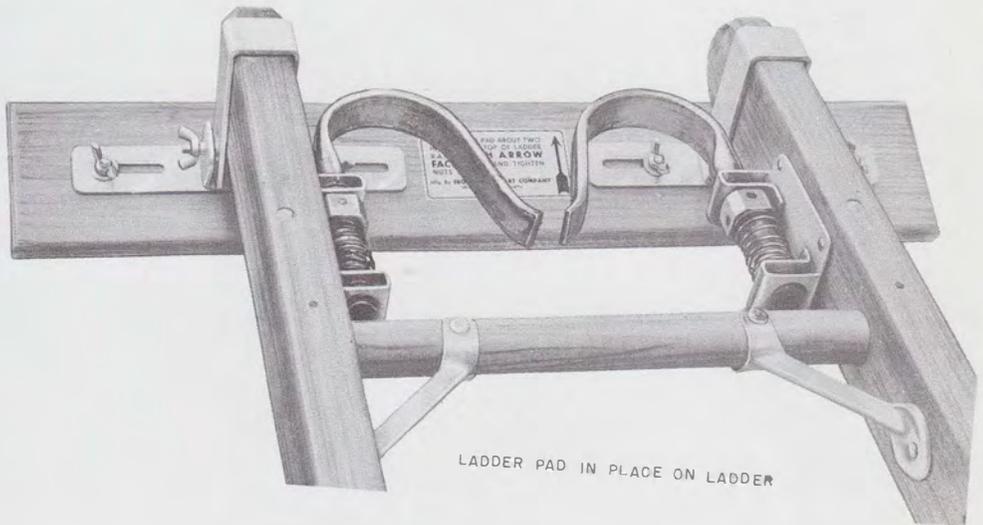
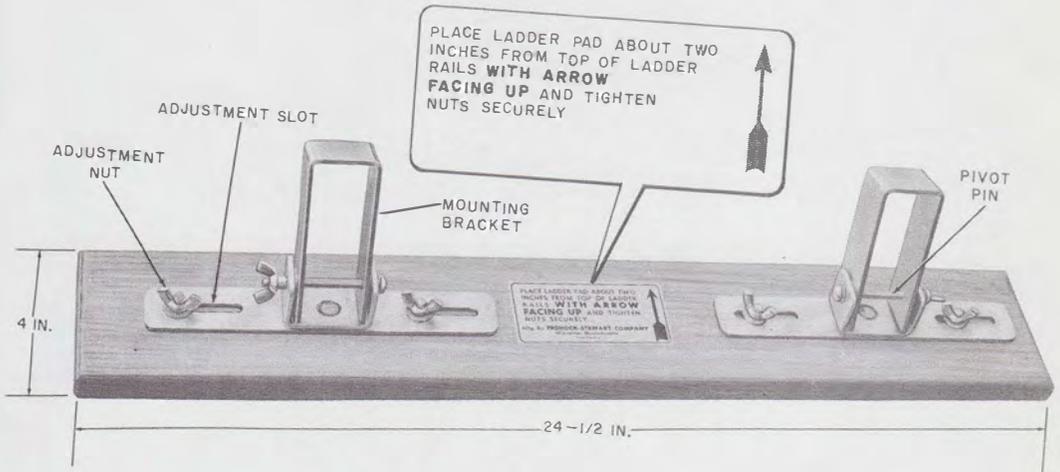


Fig. 47—Ladder Pad (MD)