LADDERS AND LADDER SEATS
PIECE-PART DATA, REPLACEMENT PROCEDURES, AND MINOR REPAIRS

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1. GENERAL

1.01 This section covers piece-part data, replacement procedures, and minor repairs for ladders and ladder seats.

1.02 This section is reissued to cover the KS-21054 pulpit ladder with a new Fig. 9, to add new 4.50, and to revise the List of Tools, Gauges, Materials, and Apparatus.

1.03 Part 2 of this section covers the two methods by which the KS-5239-03 ladder may be modified in the field and lists the materials required for each method.

1.04 Part 3 covers the piece-part numbers and the corresponding names of the parts which it is practical to replace in the field in maintenance of the ladders. No attempt shall be made to replace parts not designated. Part 3 also contains explanatory figures showing the different parts.

1.05 Part 4 covers the approved procedures for the replacement of parts covered in Part 3.

1.06 Part 5 covers the approved procedures for making minor repairs on the ladders.

1.07 When replacement parts are not designated, arrangements should be made to return the ladder or ladder seat to the branch house for repairs; or the ladder or ladder seat should be replaced completely.

2. MODIFICATION OF KS-5239-03 PORTABLE ROLLING LADDERS

2.01 The KS-5239-03 ladders may be modified in the field by the addition of straps, S-hooks, and cords, as shown in Fig. 1.

2.02 This modification may be accomplished in either of two ways. The first method consists of riveting straps to the existing spreaders and adding straps to the top step support. The second method is similar to the first with the exception that new spreader assemblies are used rather than riveting the straps to the existing spreaders.

2.03 The first method of this modification is performed as follows.

(a) Remove the rivets from the spreader cover on one side and position the P-30H124 strap, as shown in Fig. 1. Rerivet using EP-374635 rivets. Repeat operation on second side.

(b) Using wood screws, attach a P-30H124 strap to the outer side of the top step support, as shown in Fig. 1. Repeat operation on second side.

(c) Insert an S-hook in each strap and, with ladder in open position, tie nylon rope to the S-hooks leaving a slight slack in the rope. (See Fig. 1.)

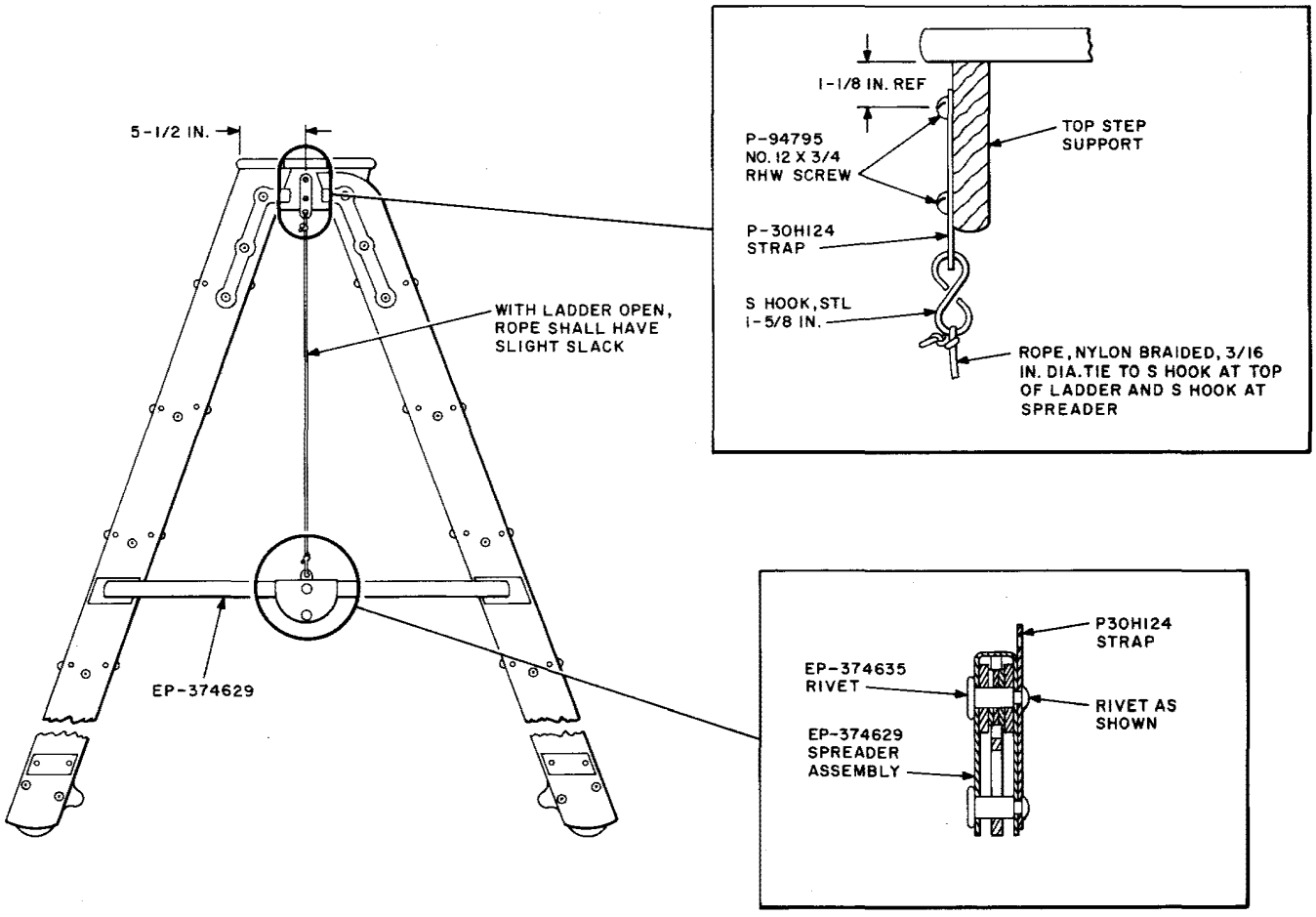


Fig. 1—Modification of KS-5239-03 Ladder

2.04 The following materials are required for the first method:

QUANTITY	DESCRIPTION
4	P-30H124 straps
4	EP-374635 rivets
4	S-hooks (1-5/8 inch)
4	No. 12- by 3/4-inch RHW screws
2	Pieces of 3/16-inch diameter braided nylon rope approximately 3 feet long

2.05 The second method is essentially the same as the first except the spreader assemblies are replaced with new assemblies having straps already added for this alteration. The following materials are required for the second method:

QUANTITY	DESCRIPTION
2	EP-374629 spreader assemblies
2	P-30H124 straps
4	S-hooks (1-5/8 inch)
4	No. 12- by 3/4-inch RHW screws
2	Pieces of 3/16-inch diameter braided nylon rope approximately 3 feet long

3. REPLACEMENT PARTS

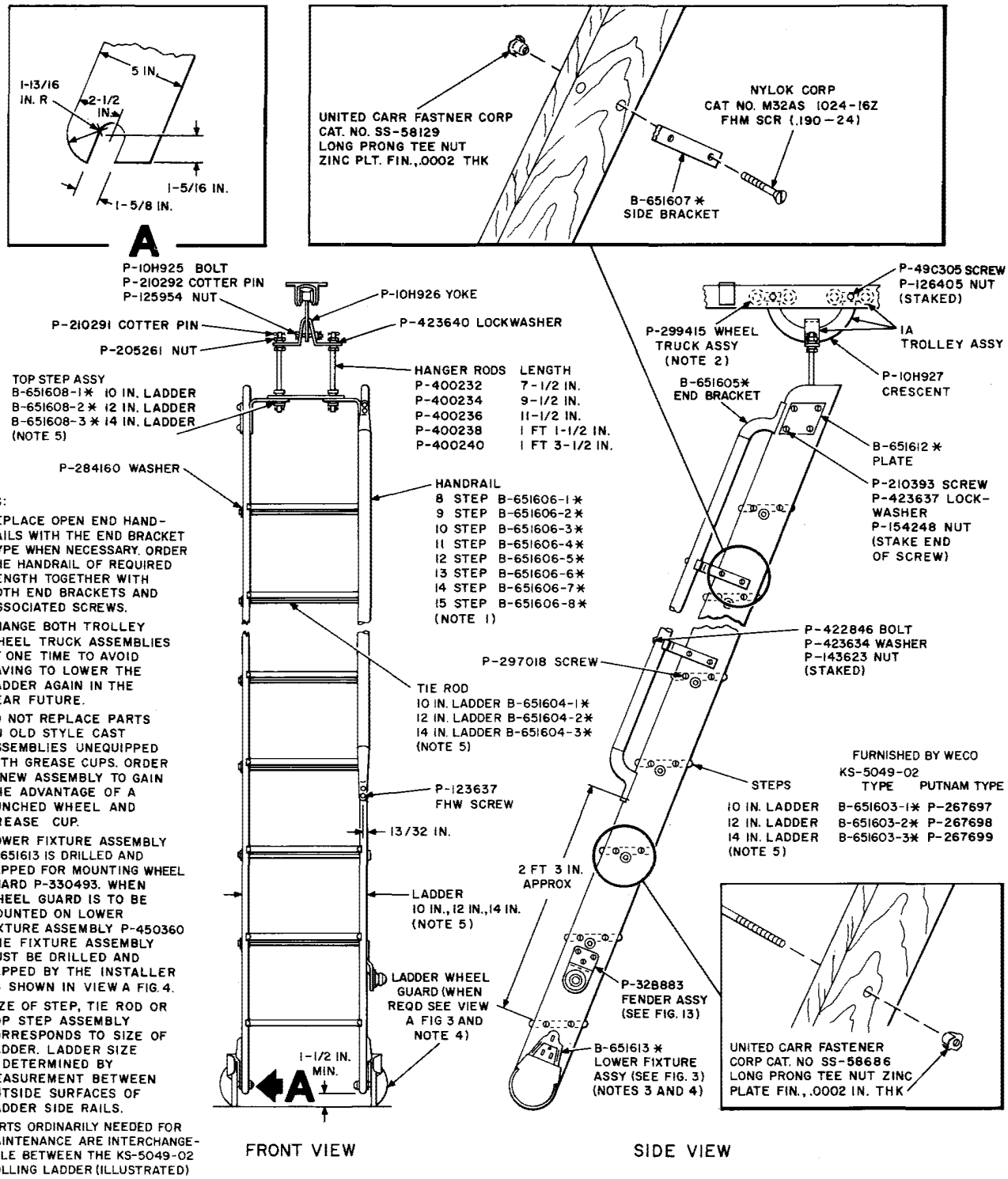
3.01 The figures included in this part (Fig. 2 through 14) show the various piece parts of the items and their associated assemblies. The names of parts are also included as far as practical to facilitate identification.

3.02 The ladders covered in this section have been supplied by the Western Electric Company or by an outside supplier. Parts which are to be furnished by the Western Electric Company are listed by their P numbers while parts furnished by outside suppliers are listed by EP or B numbers. A few parts, peculiar to the older outside suppliers' ladders, are listed by their KS specification detail numbers.

3.03 All ladders manufactured by the Western Electric Company are steel stamped with the characters, Western Electric Company, Made in U.S.A., and the ED drawing number. This stamping is located either on the central portion of a side rail or on the bottom of a centrally located step. Old KS ladders usually have the outside supplier's nameplate with a stamped KS number located on an inner side rail on the upper portion of the ladder. The newer outside suppliers' ladders have the KS number and list number on the outside, the same as the Western Electric Company ladders. If no identifying mark can be found on an older-type ladder, it can be assumed that the ladder is a KS specification ladder.

3.04 When ordering parts for replacement purposes, it will be necessary to determine if the part is a product of the Western Electric Company indicated by P numbers, of outside suppliers' manufacture indicated by EP or B numbers, or in some cases by KS specification detail numbers, and to order accordingly. The P number, the EP number, the B number, or the KS specification detail number should be given as well as the name of the part; for example: From Fig. 4, "Floor Wheel Bearing Det. 20 of KS-5049-01 Ladder" or "P-450354 Wheel Bearing"; also from Fig. 6, "Hinge Assembly EP-30A111." Do not refer to BSP numbers or to any information shown in parentheses following the piece-part numbers.

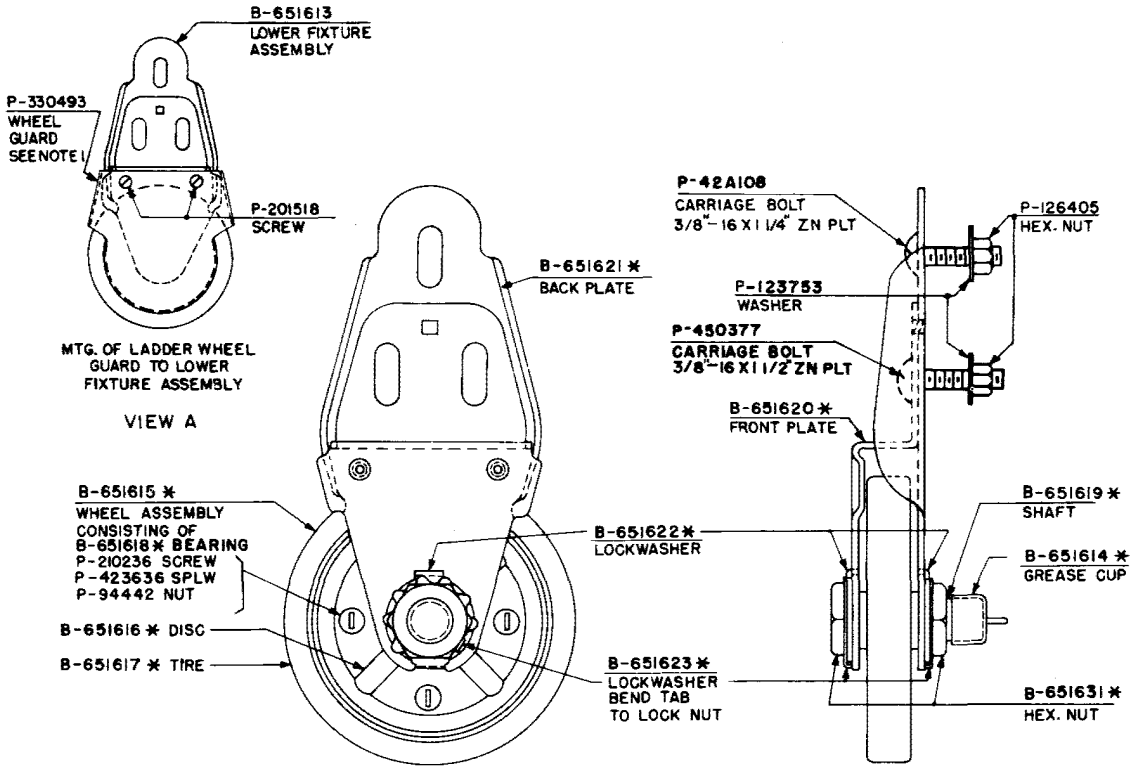
3.05 In the ordering of replacement parts, determine if cotter pins, tab lockwashers, mounting screws, or tie rods and bolts are likely to be damaged in the removal of the old part. If there is a possibility that they may not be reused, order the required quantity together with the replacement part.



NOTES:

1. REPLACE OPEN END HANDRAILS WITH THE END BRACKET TYPE WHEN NECESSARY. ORDER THE HANDRAIL OF REQUIRED LENGTH TOGETHER WITH BOTH END BRACKETS AND ASSOCIATED SCREWS.
2. CHANGE BOTH TROLLEY WHEEL TRUCK ASSEMBLIES AT ONE TIME TO AVOID HAVING TO LOWER THE LADDER AGAIN IN THE NEAR FUTURE.
3. DO NOT REPLACE PARTS ON OLD STYLE CAST ASSEMBLIES UNEQUIPPED WITH GREASE CUPS. ORDER A NEW ASSEMBLY TO GAIN THE ADVANTAGE OF A PUNCHED WHEEL AND GREASE CUP.
4. LOWER FIXTURE ASSEMBLY B-651613 IS DRILLED AND TAPPED FOR MOUNTING WHEEL GUARD P-330493. WHEN WHEEL GUARD IS TO BE MOUNTED ON LOWER FIXTURE ASSEMBLY P-450360 THE FIXTURE ASSEMBLY MUST BE DRILLED AND TAPPED BY THE INSTALLER AS SHOWN IN VIEW A FIG. 4.
5. SIZE OF STEP, TIE ROD OR TOP STEP ASSEMBLY CORRESPONDS TO SIZE OF LADDER. LADDER SIZE IS DETERMINED BY MEASUREMENT BETWEEN OUTSIDE SURFACES OF LADDER SIDE RAILS.
6. PARTS ORDINARILY NEEDED FOR MAINTENANCE ARE INTERCHANGEABLE BETWEEN THE KS-5049-02 ROLLING LADDER (ILLUSTRATED) AND LADDERS FORMERLY FURNISHED UNDER ED-91562-70, ED-91563-70 AND ED-91564-70. THESE PARTS ARE MARKED WITH AN ASTERISK (*).

Fig. 2—Straight-Type Rolling Ladder, KS-5049-02



NOTES:

1. WHEEL GUARDS P-330493 SHALL BE FURNISHED ON ALL LADDERS IN NO. 5 CROSSBAR OFFICES, ON LADDERS FOR NEW-TYPE CABLE DUCT FRAMES HAVING REMOVABLE GUARD RAILS AND ON THE FRAME SIDE OF LADDERS AT DISTRIBUTING FRAMES IN ALL OFFICES

2. PARTS ORDINARILY NEEDED FOR MAINTENANCE ARE INTERCHANGEABLE BETWEEN THE B-651613 LOWER FIXTURE ASSEMBLY (ILLUSTRATED) AND THE P-33A398 LOWER FIXTURE ASSEMBLY. THESE PARTS ARE MARKED WITH AN ASTERISK (*).

Fig. 3—Lower Fixture Assembly, B-651536

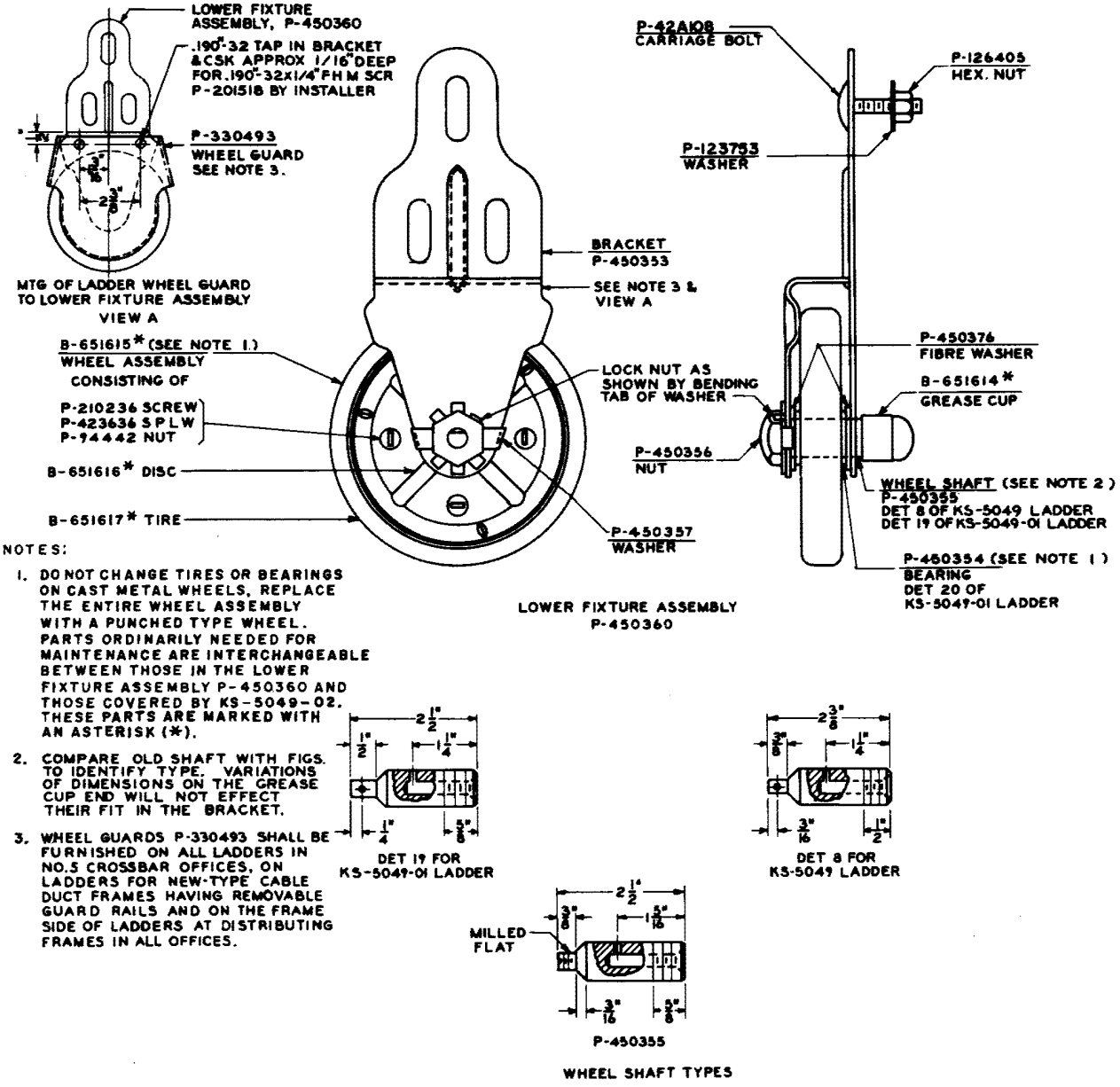


Fig. 4—Lower Fixture Assembly, P-450360 and Wheel Shaft Type

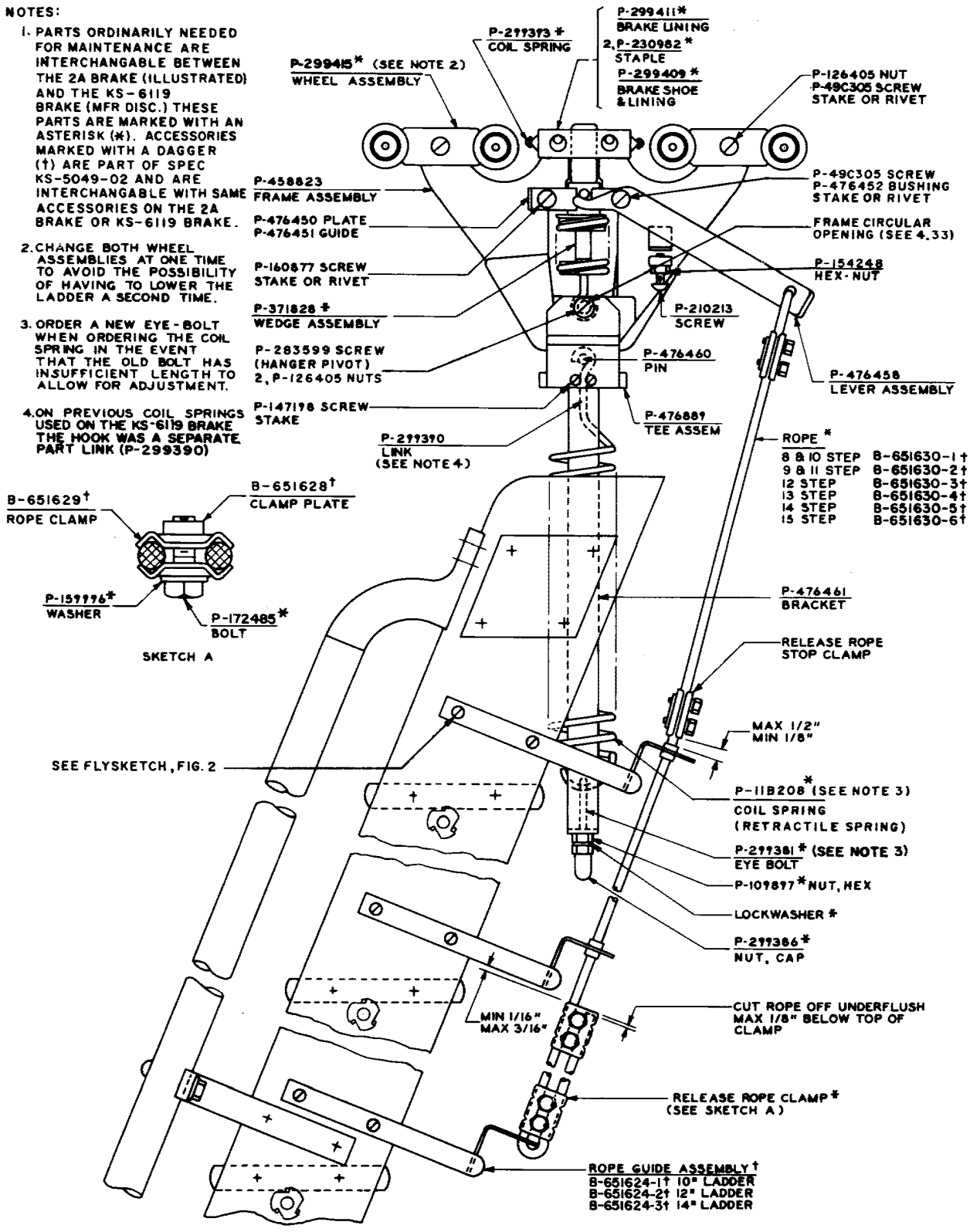


Fig. 5—2A Rolling Ladder Brake and Accessories (See Note 1.)

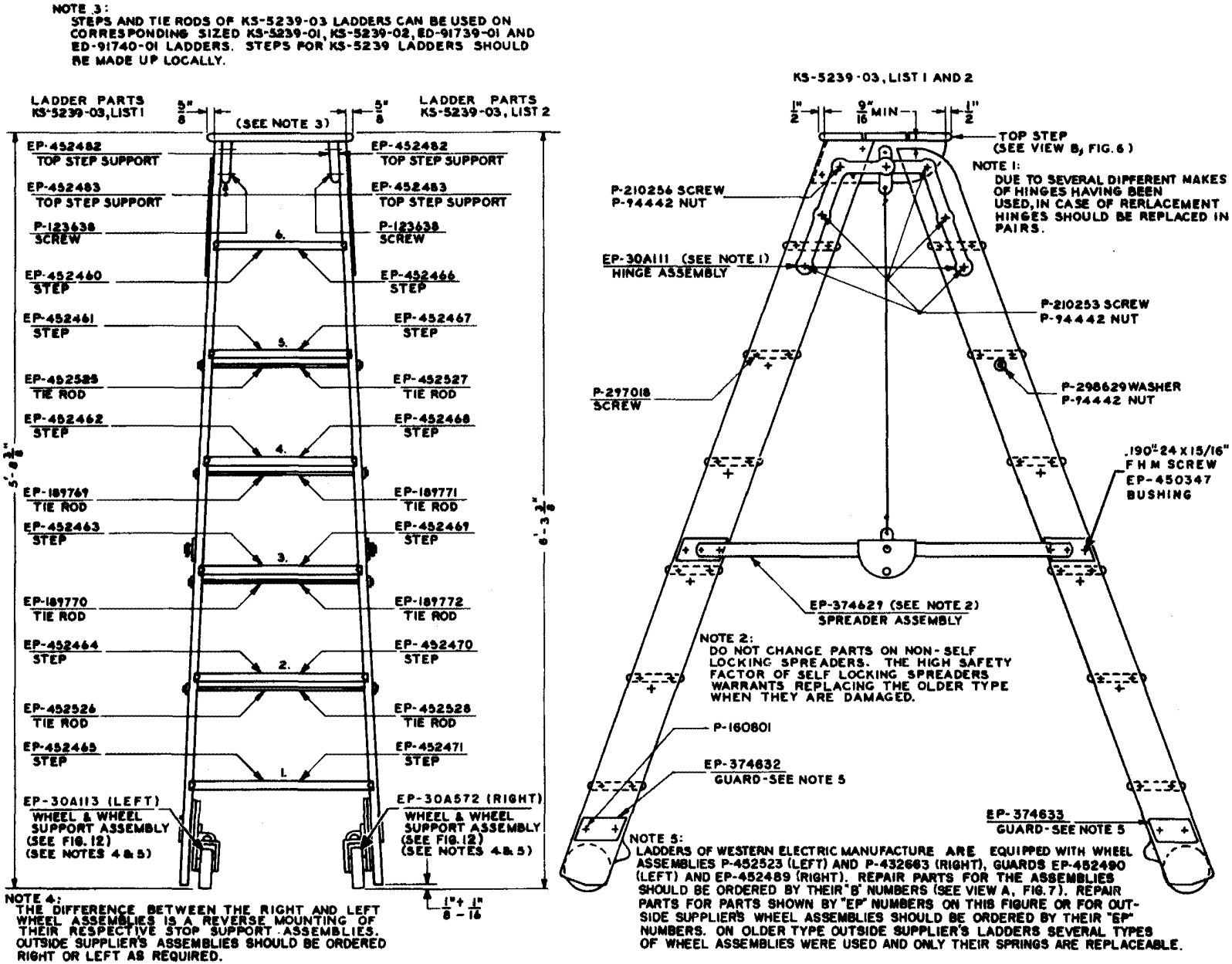


Fig. 6—Portable-Type Rolling Ladder

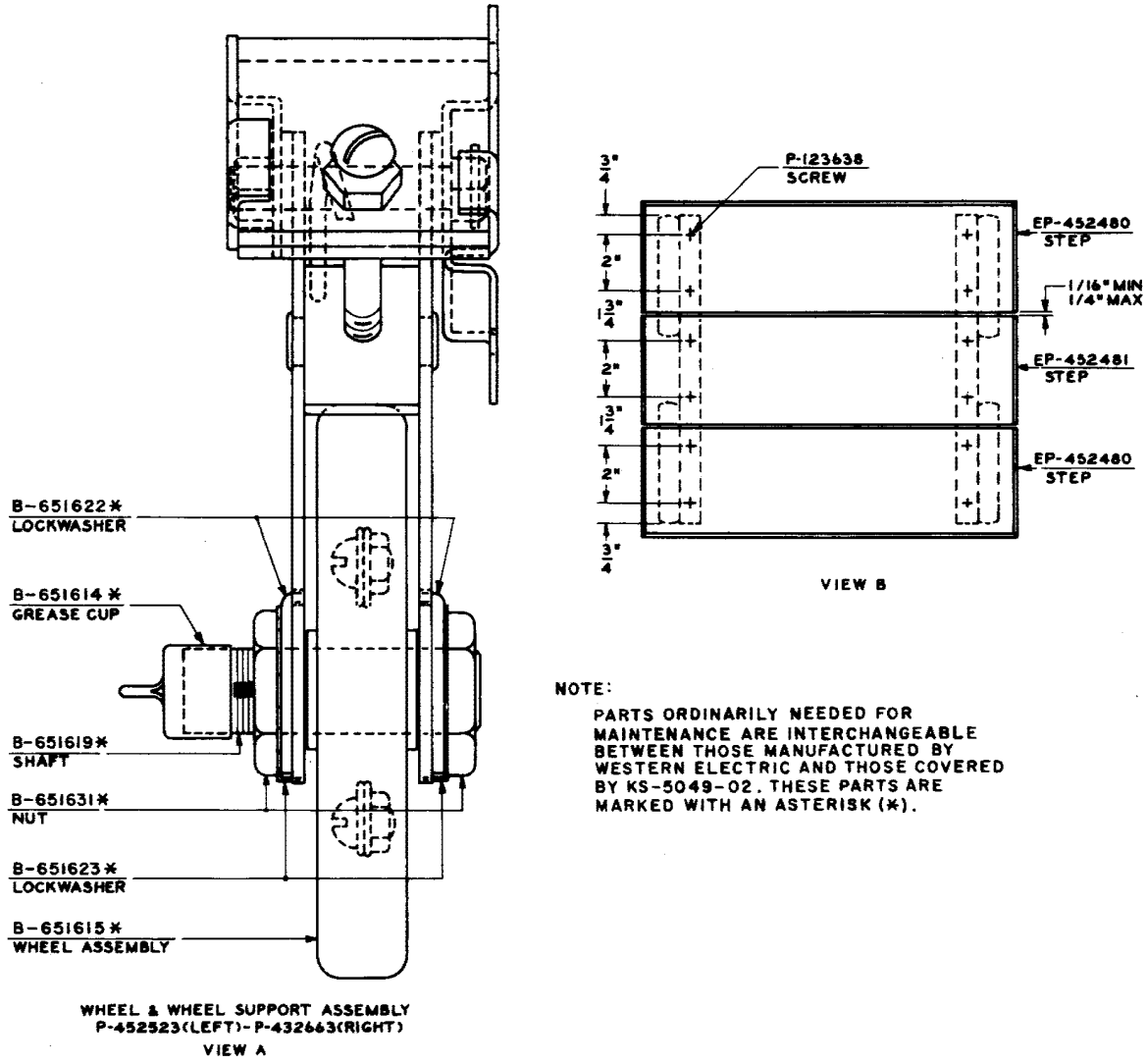


Fig. 7—Views of Portable-Type Rolling Ladder

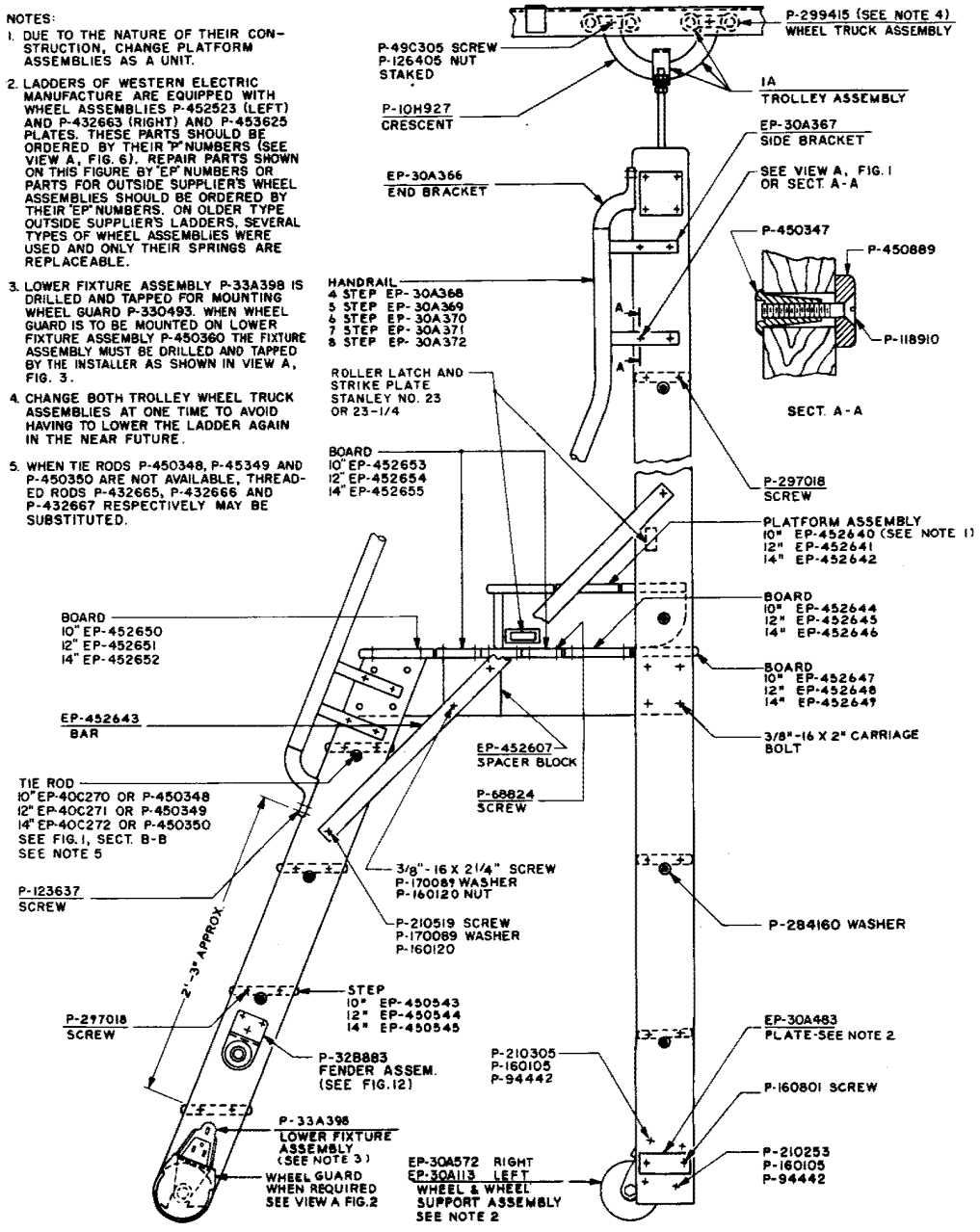


Fig. 8—Platform-Type Rolling Ladder

LADDER	DIMENSION					ACCESSORIES	
LIST NO.	A	B	C	D	E	QUANT	DETAIL
KS-21054, L1	5'-0"	4'-6"	1'-10"	10"	4'-5-1/4"		
KS-21054, L2	6'-0"	4'-11"	1'-11"	10-9/32"	5'-5-1/4"		
KS-21054, L3						25	L-148819
KS-21054, L4						2	L-148815
						2	L-148817
						4	L-148818
						4	1/4-20 X 2-1/8 RHMS
						4	1/4 STL WASHER
						4	1/4-20 HEX NUT
						4	1/4-SPRG LOCK WASHER

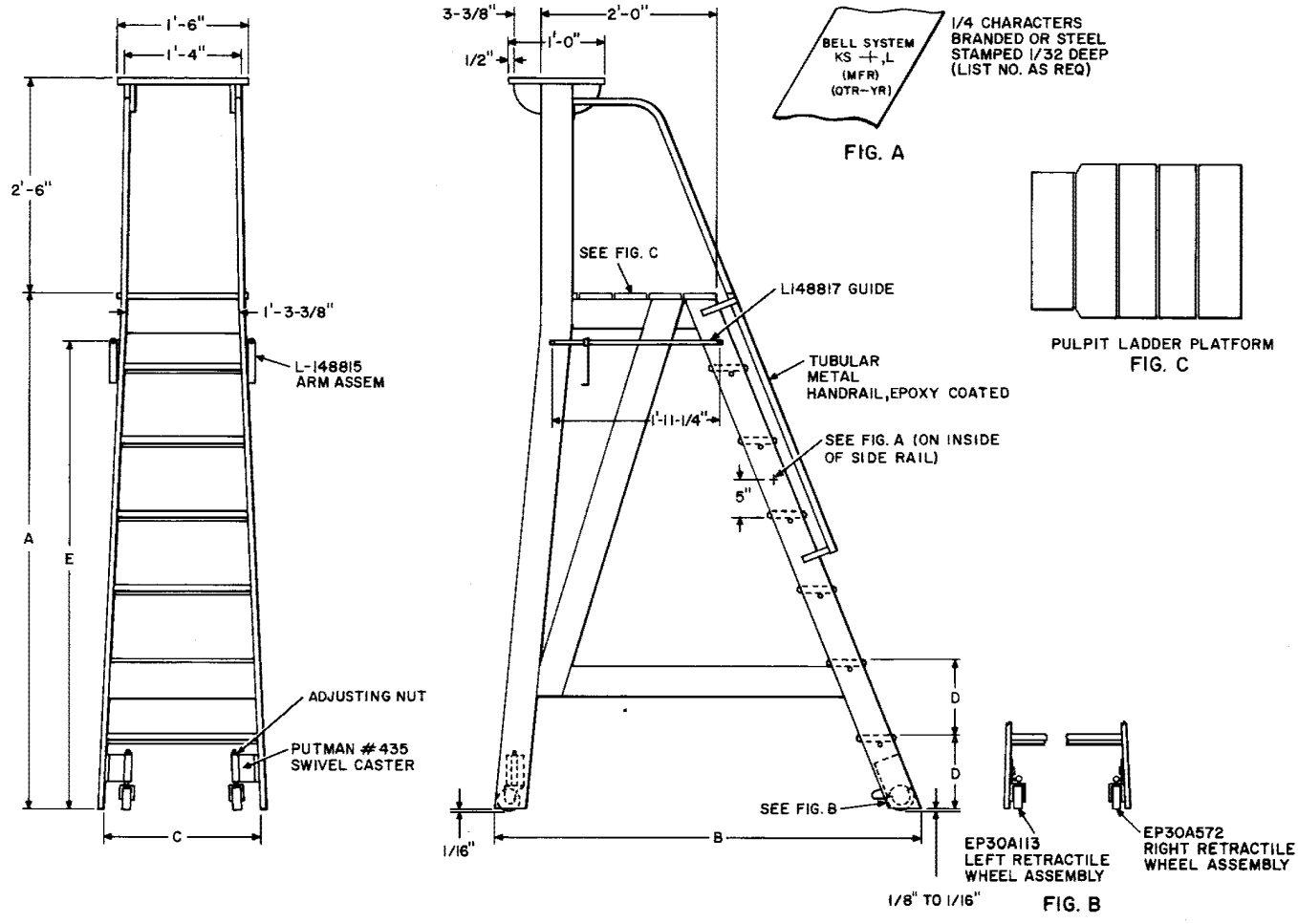


Fig. 9—KS-21054 Pulpit Ladder

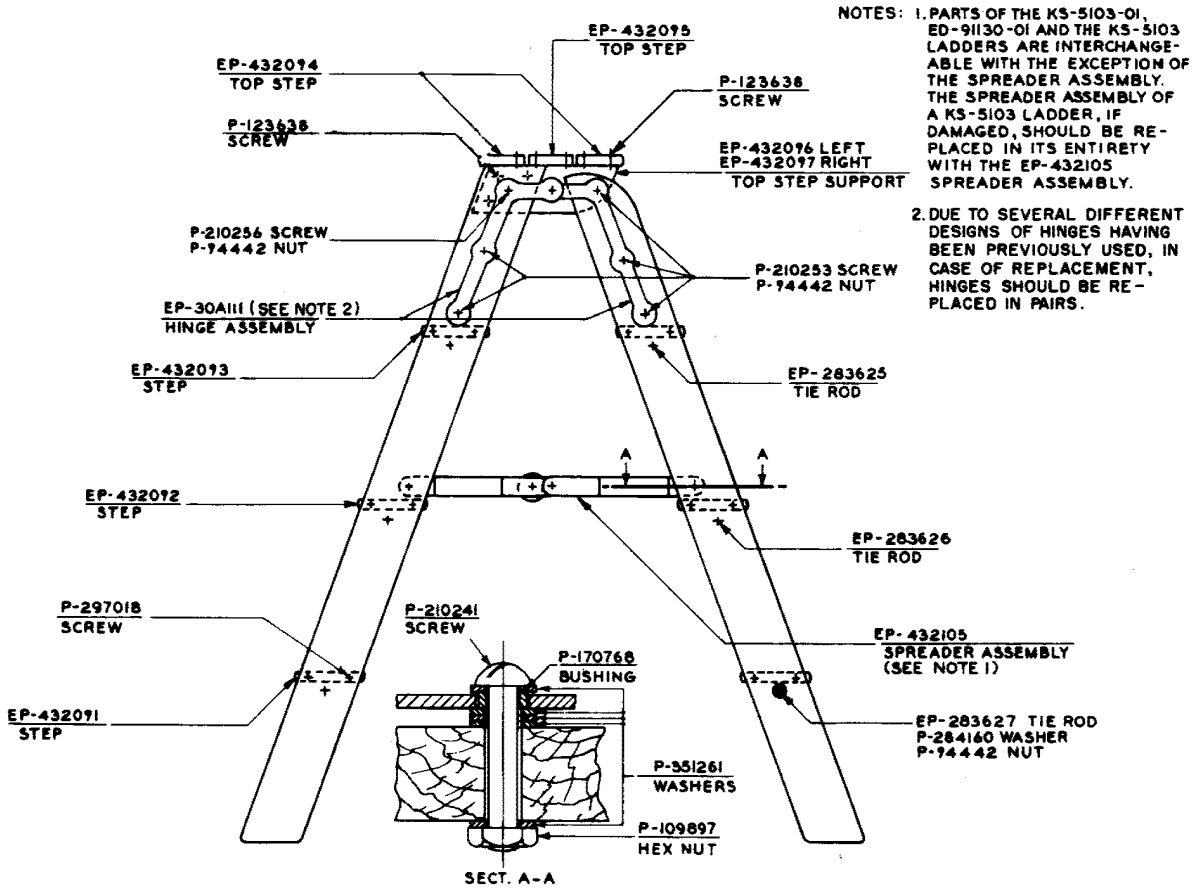


Fig. 10—4-Foot Portable Stepladder (See Note 1.)

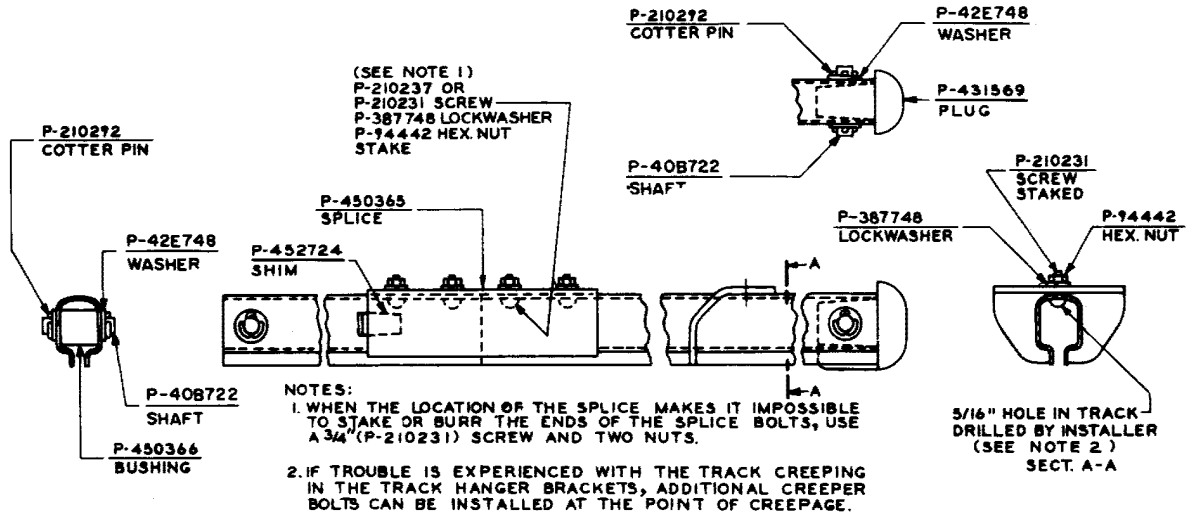


Fig. 11—Ladder Stop—Ladder Track Splice—Ladder Track Plug—Creeper Bolt

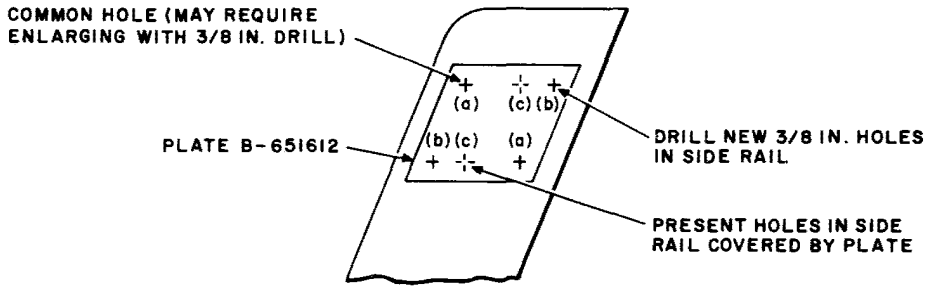


Fig. 12—Modification of Side Rails of KS-5049-01 Rolling Ladder for Top-Step Replacement

NOTES:
1. WHEN ORDERING COMPLETE WHEEL ASSEMBLIES, EP-30A572 SHALL BE ORDERED FOR RIGHT SIDE AND EP-30A113 FOR THE LEFT SIDE.

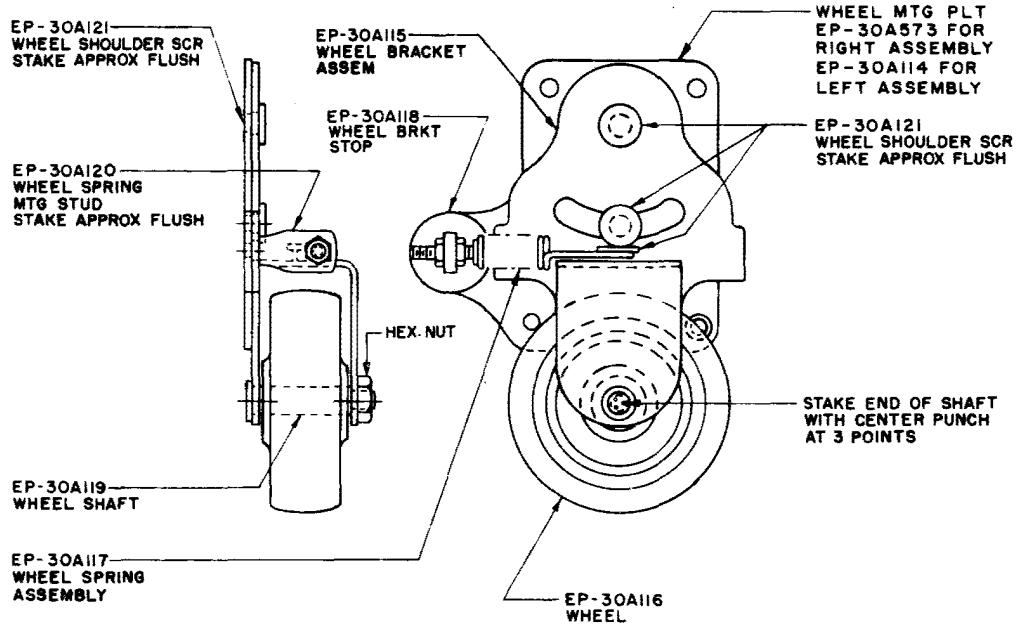
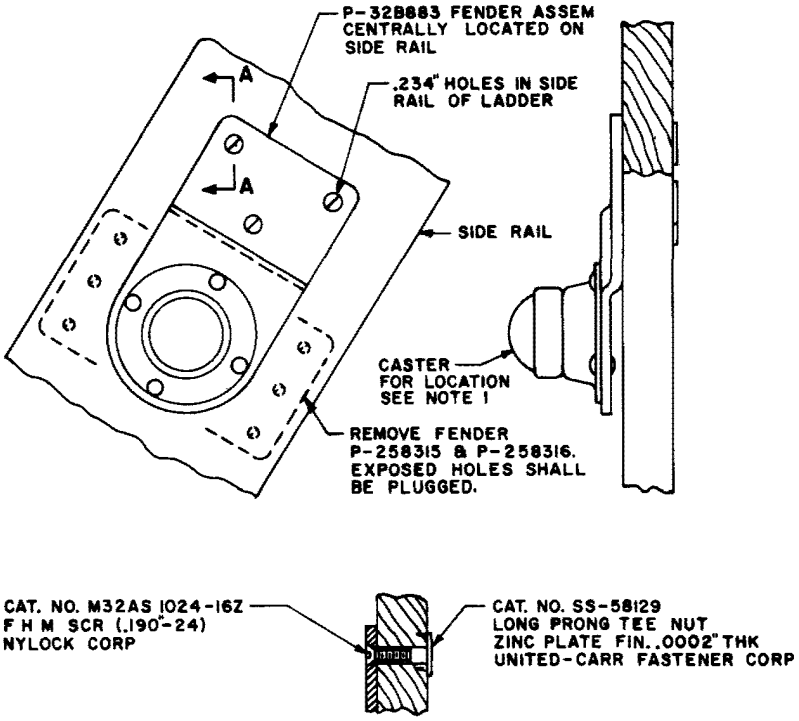


Fig. 13—Platform and Portable-Type Rolling Ladder Wheel Assemblies



NOTES:
1. FENDER ASSEMBLY SHALL BE LOCATED ON THE SIDE RAIL ADJACENT TO THE GUARD RAIL WITH THE CASTER CONTACTING THE CENTER OF THE GUARD RAIL.

Fig. 14—Replacing Fender Assembly

4. REPLACEMENT PROCEDURES

4.01 *List of Tools, Gauges, Materials, and Apparatus*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
247	1-1/4 inch flat open single-end wrench
353C	Grease gun
KS-2993	Brush
KS-5174	Foot stool
KS-14208	Brush
R-1051	Pillar file
R-1060	Putty knife
R-1298	Oil can
R-1455	6-inch C clamp
R-1482	H-type combination file
R-1640	Center punch
R-2192	Rubber mallet
R-2512	8-inch adjustable open-end wrench
R-2919	3/16-inch round brush
R-3370	Wire rope shears
—	4-inch wood sanding block
—	1/2-inch cold chisel
—	Hand drill
—	No. 3 twist drill
—	No. 10 twist drill
—	No. 28 twist drill
—	7/32-inch twist drill
—	15/32-inch twist drill
—	5/16-inch twist drill
—	3/8-inch twist drill
—	Hack saw
—	Portable stepladder
—	Small cellulose sponge
—	Small sharp knife
—	1-pound ball-peen hammer
—	Combination pliers
—	3-inch C screwdriver (or the replaced 3-inch cabinet screwdriver)
—	4-inch E screwdriver (or the replaced 4-inch regular screwdriver)
—	5-inch E screwdriver (or the replaced 5-inch regular screwdriver)
—	◗Goggles, American Optical 710B or Bausch & Lomb W-74 Super Balguard II◖
—	15/16- and 1-inch open double-end flat wrench, J.H. Williams Company Engineers Wrench Cat. No. 33C (or equivalent)
GAUGES	
91C	0.060-inch thickness gauge
173A	0.191-inch thickness gauge
R-2481	Spring balance (or equivalent)
MATERIALS	
KS-7471	Grease
KS-7860	Petroleum spirits

CODE OR SPEC NO.	DESCRIPTION
MATERIALS	
KS-8662	Gray enamel
KS-16326	Oil
KS-16832 L2	Lubricant
R-2998	Tan chromate enamel
—	3/4-inch gray friction tape
—	Assorted grits of abrasive paper
—	Plastic wood
—	Clean rags
—	3-foot length of 1/4-inch rope (2 required)
—	25 feet of 1/2-inch manila rope
—	Finish, wood, clear, penetrating, DuPont VC5357 or Pittsburgh Plate Glass Co VD4971 in quart cans for touching up ladders having the 118BB finish
—	Clear spar varnish
—	White shellac
—	Household scouring powder
APPARATUS	
P-432514	Wire washers

4.02 Care should be exercised when using petroleum spirits in power rooms where there are dc machines, since commutation may be adversely affected by the softening of the commutator film by the fumes. To avoid the need for burnishing the commutators of the dc machines after doing any cleaning operations called for in this section, provide adequate ventilation, use the absolute minimum amount of petroleum spirits required for the cleaning operation, and keep the container closed when not in use.

4.03 Replacement procedures for the parts listed in this section are given in the following order:

Caution: Care shall be exercised when handling ladders that propel power trolleys.

Straight-Type Rolling Ladders—4.06 Through 4.28

4.06 Steps

4.11 Handrails

4.13 End Brackets and Side Brackets

4.14 Tie Rods

4.15 Fender Assembly

4.16 Removing and Replacing Rolling Ladders

4.21 Trolley Wheel Truck Assembly

4.23 Replacement of Cast-Type Lower Fixture Assembly

4.24 Tires

4.27 Bearings

4.28 Shafts

Rolling Ladder Brakes—4.29 Through 4.37

4.30 Wheel Truck Assembly

4.31 Brake Shoes and Linings

4.33 Final Brake Adjustment

4.34 Brake Release Rope

4.37 Lubrication

Portable-Type Rolling Ladders—4.38 Through 4.44

4.38 Spreader Assembly

4.39 Top Step and Top-Step Support

4.40 Steps

4.41 Tie Rods

4.42 Wheel and Wheel Support Assemblies

Platform-Type Rolling Ladders—4.45 Through 4.49

4.45 Platform Assemblies

4.46 Trolley Assemblies and Lower Fixture Assemblies

4.47 Wheel and Wheel Support Assemblies

4.48 Tie Rods and Step

4.49 Fender Assemblies

◗4.50 KS-21054 Pulpit Ladders◖

Portable Stepladder—4.51

Ladder Track—4.52 and 4.53

4.52 Creeper Bolts

4.53 Track Splice

4.04 All wood parts furnished for replacement purposes will be finished with clear, penetrating wood coating.

4.05 No replacement procedures are specified for screws or other parts when the procedure consists of a simple operation.

STRAIGHT-TYPE ROLLING LADDERS

4.06 ***Steps:*** To replace a step, remove the two screws from each side rail and loosen the adjacent tie rod sufficiently to release the step. Using the R-2192 rubber mallet, tap alternately at the end and the center of the step until it is driven free. Insert the new step evenly and with the rubber mallet drive it into place.

4.07 If the new step should prove to be too thick for the side rail grooves, the ends of the step may be tapered slightly with the sanding block. Taper the step primarily on the top edge of the ends so the load-bearing side remains squared. Exercise care that the edges are not rounded in the sanding process.

4.08 Should the screw lead holes of the new step fail to center with those in the side rail, fill the lead holes with plastic wood and allow to dry thoroughly before new holes are drilled. Insert the new step and drill the new holes 1-3/4 inches deep with the 7/32-inch twist drill. Tighten the four screws firmly and remove burrs and sharp edges with the R-1051 file.

4.09 Retighten all tie rods that may have been loosened. On tie rods tightened with nuts, rivet the ends so they will be free from burrs. Tie rods with Teenuts are self-locking and should not be riveted or staked.

4.10 When replacing a malleable iron top step of a KS-5049-01 rolling ladder, redrill the side rails, as shown in Fig. 12, and mount the step assembly and plate, as shown in Fig. 2.

4.11 ***Handrails:*** Remove the old handrail by taking out the carriage bolts at each side bracket and removing the lower end bracket. Force the new handrail firmly into the upper end bracket and mark the drill points at each side bracket. Shop-drilled holes that do not match the side brackets shall be filled with plastic wood and allowed to dry thoroughly before new holes are drilled. If new holes are necessary, clamp the handrail to a bench and drill all holes vertically with a No. 3 twist drill. Position the lower end bracket so the handrail is a tight fit; then bolt the handrail in place. If the old end bracket screw holes do not match, fill them with plastic wood and drill new holes with the No. 19 twist drill. This is a screw body hole to prevent splitting the side rail and should be drilled no deeper than 1/2 inch to ensure secure fastening of the screw. Stake the side bracket carriage bolts with the center punch and check all bolts and screws for roughness. Remove burrs and sharp edges with R-1051 file.

4.12 When open-end type handrails are being replaced with the end bracket type, mount the lower end bracket first, as shown in Fig. 2. Force the new handrail into the lower end bracket; then mount the handrail and upper end bracket. The end brackets may be tipped slightly toward the outside, if necessary, in order to align the handrail and the old-style side brackets.

4.13 ***End Brackets and Side Brackets:*** In replacing end brackets, make sure that the handrail is a tight fit. If necessary, proceed as covered in 4.11 to position the new bracket. After

placing a new side bracket, hammer the Teenut in place and tighten the Nylok screws, as shown in Fig. 2. The screw and bushing formerly used for mounting side brackets should have the end of the screw staked in three places after tightening. Draw the handrail carriage bolt up tight and stake. Check metal fittings involved for burrs and sharp edges and remove with the R-1051 file.

4.14 ***Tie Rods:*** After the Teenut is in place, insert the new tie rod in the ladder making certain there is a washer under the head. Turn the tie rod to a firm tightness in the Teenut, as shown in Fig. 2. On ladders which had staked or riveted nuts on one end of the tie rods, if the tie rod and nut are reused, rivet the end of the rod so it will be free from burrs.

4.15 ***Fender Assembly:*** The P-32B883 ball-bearing caster fender assembly, attached as shown in Fig. 14, shall be used to replace worn or broken fender assemblies or, on older ladders, to replace the P-258315 and P-258316 fenders attached to the side rail of the ladder with six screws and nuts.

(a) When replacing a ball-bearing caster fender assembly with a similar one, new screws shall be used; but the existing Teenut may be reused if threads and prongs are not damaged or deformed.

(b) When replacing fenders on the older ladders, the combination of parts shall be disassembled and discarded. The exposed holes shall be filled with plastic wood which shall be permitted to dry, sanded flush, and refinished before attaching the new fender assembly, as shown in Fig. 14.

4.16 ***Removing and Replacing Rolling Ladders:*** Roll the ladder to the end of the track toward which it is inclined. Loop a 1/2-inch manila rope over the ladder track behind a track support or brace in such a manner that it cannot slide off the end. Tie it securely to that step in the upper portion of the ladder which will allow the rope to be as near vertical as possible when the trolley is disengaged from the track. Badly worn manila rope should not be used for this purpose because of the possibility of contaminating the area with manila fibers.

Caution: Where rolling ladders propel power trolleys, the power trolley must be removed from its trolley duct before the ladder is prepared for removal.

4.17 With one workman supporting the ladder from the floor by means of the rope, a second workman ascends a portable ladder, removes the ladder stop, descends to the floor, and pushes the rolling ladder out of the track, guiding it down as the rope is payed out by the first workman. If the ladder is brake equipped, allow it to rest on the KS-5174 footstool to protect the lower portion of the brake assembly. When there are other ladders in the same track section, place the R-1455 C clamp in front of the last support as a temporary ladder stop.

4.18 Replace the ladder in an inverse procedure to its removal. As one workman supports the weight of the ladder with the rope, a second workman raises it to the proper level, then ascends a portable stepladder, and guides the trolley into the track. Check that the cotter pins and rubber bushing of the ladder stop are in good condition and replace the stop in the track immediately.

Caution: Power trolley shall not be inserted in power trolley duct until the ladder is completely restored to operation.

4.19 In locations where the ladder track extends to the wall, the end section of track will have to be removed in order to release the ladder. Working from a portable stepladder, tie the splice end of the track section to be removed securely to the track support with a short piece of rope. Remove the splice screws and with the ball-peen hammer drive the splice onto the section being removed. The splice may be moved easily if the lips of the ladder track are compressed slightly with the combination pliers while tapping with the hammer. Place another tie at the wall end of the track section and proceed to remove the creeper bolts and hanger bracket bolts from each support. When the last support has been removed, swing the loose track section out of the way and lower the ladder, as covered in 4.17 and 4.18.

Note: If the end track section is of sufficient length, it may be possible to loosen it at the splice end only. Care should be taken that enough of the length of the section is free so it will not be distorted when it is swung out of position.

4.20 When the ladder has been restored to the track, swing the loose track section into line and drive the splice back into place. Check that the track ends are no more than a maximum of

1/8 inch apart. Replace the splice screws and where a single nut is used stake the screw. Replace the track hanger bracket bolts and their cotter pins. Replace and stake all creeper bolts.

4.21 ***Trolley Wheel Truck Assembly:*** If, after examination, it is found that the fault with the wheel trucks cannot be corrected by cleaning and repacking the bearings, remove the trucks from an ED ladder by turning off the nut and from a KS ladder by removing the cotter pins. Examine the new trucks to see that all the bearings turn freely and that they are adequately packed with grease. Rotate the wheels and remove any grease that has a tendency to work out of the bearings. Fasten the new trucks to the trolley crescent of ED ladders with screws and nuts and stake. On the KS ladders, insert the cotter pins in the trolley pin and bend them back fully around the trolley pin.

4.22 If the crescent or the trolley yoke has been changed, make certain before rehanging the ladder that all cotter pins are in place on the ends of the hanger rods and at the end of the crescent bolt.

4.23 ***Replacement of Cast-Type Lower Fixture Assembly:*** Remove the old assembly and modify the ends of the ladder in accordance with View A of Fig. 2. Position the new assemblies, as shown in Fig. 2, mark the bolt holes, and drill with the 15/32-inch twist drill. Mount the assemblies and position them so the ladder side rails are a minimum of 1-1/2 inches from the floor; then the ladder will roll in a straight line.

4.24 ***Tires:*** Replace tires on punched wheels by dismounting the wheel and disassembling the wheel discs. On shafts secured by a nut and washer, use the cold chisel and ball-peen hammer to straighten the locking tab of the washer and turn off the nut.

Caution 1: The head of the cold chisel shall not be mushroomed.

Caution 2: No hammer other than a ball-peen hammer shall be used for striking the cold chisel.

Caution 3: Safety goggles shall be used when striking the head of the cold chisel with the ball-peen hammer to prevent the possibility of flying chips causing personal injury.

On shafts of the cotter pin type, straighten the cotter pin and remove. Remove the shaft and check for wear and scoring. Disassemble the wheel by removing the disc screws and check the condition of the bearing before mounting the new tire.

4.25 Reassemble and remount the wheel with the new tire. Replace the cotter pin and spread fully to the edges of the slot. On the screw-type shaft, do not turn the nut up too tightly as the bent tab of the washer will lock it securely in place. At some later date, after the new tire has assumed its permanent set, it may be necessary to retighten the wheel disc screws.

4.26 When necessary to replace a cast metal wheel which is to be used with cast brackets having narrow forks, the hubs of the new wheels must be filed sufficiently to allow space for the fiber washers. With the R-1482 H-type combination file, dress down the hubs of the new wheel evenly until it turns freely in its supporting details and is centered as closely as possible.

4.27 ***Bearings*** are changed in punched-type wheels by disassembling the wheel discs and in cast metal wheels by replacement of the wheel itself, as covered in 4.24 through 4.26.

4.28 ***Shafts:*** When a shaft is being replaced and the old grease cup is being reused, clean out the old grease and repack with new KS-7471 grease. Screw the grease cup onto the new shaft until the shaft is fully packed with grease and mount within the wheel assembly. After the wheel assembly is mounted, continue to turn the grease cup until the grease appears at the end of the bearing. Then remove the grease cup, refill, and replace it on the shaft.

ROLLING LADDER BRAKES

4.29 When making repairs, cleaning, or replacing parts on rolling ladder brakes, lower the ladder from the track, as covered in 4.16, 4.17, and 4.19, and allow it to rest on the KS-5174 footstool.

4.30 ***Wheel Truck Assembly:*** Check the new trucks for freedom of movement and tightness of assembly, and see that the bearings are adequately

packed with grease. Rotate the wheels freely and remove any grease that has a tendency to work out of the bearings. Remove the old trucks and replace with the new. On the 2A brake, stake the bolt with the R-1640 center punch, and on KS brakes spread the cotter pins fully and bend them back around the pin.

4.31 ***Brake Shoes and Linings:*** After the brake shoes and linings have been replaced, check that the coil springs are in good condition. When coil springs are installed, they should hold the new shoes firmly against the wedge when the stop surface of the release lever is brought into contact with the stop.

4.32 Replace the ladder and restore the track, as covered in 4.18 and 4.20.

4.33 ***Final Brake Adjustment:*** Adjust the tension of the retractile spring so with an unloaded ladder the hanger pivot bolt will touch the top of the circular opening in the frame lightly but firmly. Increasing the tension beyond this amount will decrease the braking power with a man on the lower steps of the ladder. Secure this adjustment by tightening the cap nut. If the eye bolt is too long to permit locking the hexagonal nut, cut off the end of the eye bolt with the hack saw so it will extend approximately 1/2-inch below the hexagonal nut. (See Fig. 5.)

4.34 ***Brake Release Rope:*** To replace a broken or defective release rope, remove the four rope clamp assemblies and remove the old rope.

4.35 Thread the new rope up through the eyes of each rope guide bracket 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 inches above the top guide bracket. Place a clamp so the upper end of the rope will be underflush (maximum 1/8 inch) with the bottom of the clamp. With the release lever held lightly against its stop (brake release), adjust the rope loop so the lower of the two clamps is maximum 1/2 inch, minimum 1/8 inch from the top of the top bracket, as shown in Fig. 5. Tighten the clamp. The second clamp is then assembled on the rope at a point just above the lower clamp with the screws engaged so the clamp may slide along the rope to a point approximately 1 inch below the release lever. Tighten the screws of the second clamp.

4.36 At lowest rope guide bracket, turn up the lower end of the rope and adjust it so there will be about 1 inch of slack when the brake is fully operated by the weight of a man on the ladder (release lever up). Secure this adjustment with a clamp placed 1 inch above the lowest guide bracket. Place the second clamp so with the rope held tightly between the two lowest guide brackets the top of the clamp will be maximum 1/16 inch and minimum 1/16 inch below the bottom of the second lowest guide bracket, as shown in Fig. 5. With wire rope shears, cut off the excess rope so the end will be underflush with the top of the clamp, as shown in Fig. 5.

4.37 ***Lubrication:*** The following points shall be lubricated with one dip of KS-16832 L2 lubricant:

(a) Both wheel assemblies, center pivots, and both surfaces of frame (front and rear)

(b) Wedge assembly lower loop and both surfaces of frame (front and rear)

(c) Coil spring upper pivot and lower loop and eye bolt.

One dip of KS-16832 L2 lubricant is the amount of lubricant retained on a KS-14208 brush after being dipped into the lubricant to a depth of 1/2 inch and the tip lightly touched against the edge of the container to remove any surplus.

PORTABLE-TYPE ROLLING LADDERS

4.38 ***Spreader Assembly:*** To replace the older-type spreader with the self-locking type, open the ladder with the older spreader in place. Position the new mounting plates, as shown in Fig. 6, mark the drill holes, and drill with the 5/16-inch twist drill. Remove the old spreader and mount the new, filling the old screw holes with plastic wood if desired.

4.39 ***Top Step and Top-Step Support:*** The mounting screw holes of top-step supports should match on all ladders. However, there may be some variation in locations of the top-step screw holes. Fill holes that cannot be used with plastic wood and allow to dry thoroughly before new holes are drilled. Locate the top step in accordance with Fig. 6. Mark the new hole positions on the support and drill 11/16 inch deep with the No. 28 twist

drill. Place all screws firmly, taking care not to force them to the extent of damaging the threads.

4.40 ***Steps:*** Replace steps as covered in 4.06 through 4.08.

4.41 ***Tie Rods:*** Insert new tie rod in the ladder, making certain that a washer is in place at each end. Tighten the nut and then cut off the end of the rod with a hack saw to slightly overflush. Rivet the end of the rod so it will be free from burrs.

4.42 ***Wheel and Wheel Support Assemblies:*** When either a P-452523 or a P-432663 wheel assembly has to be replaced, all four wheel assemblies are to be replaced by wheel assemblies EP-30A113 and EP-30A572. In order for the newer type wheel assemblies to be mounted, the side rails will have to be modified in accordance with Fig. 15. When wheel support assemblies have been replaced, stake the screws flush with the nuts. (See Fig. 6, 7, 13, and 15.)

4.43 With the new wheel support assemblies in place and the floor wheel brackets lubricated so there is no undue friction between the two parts of the floor wheel brackets, the ladder shall meet the following tests, first on one side and then on the other side.

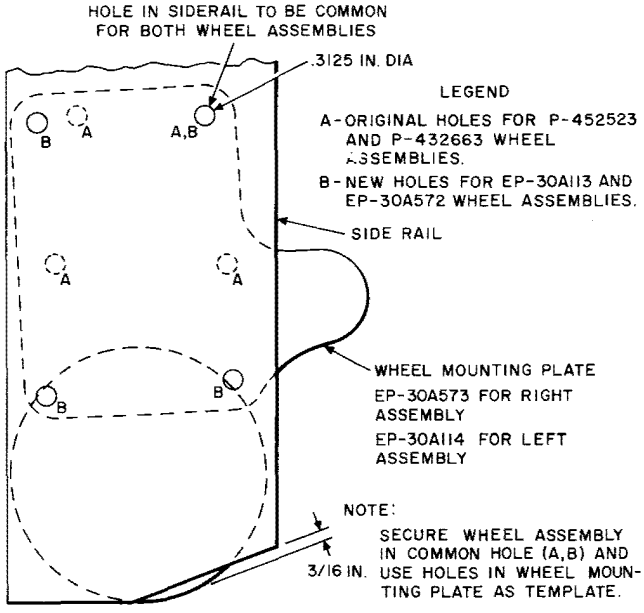


Fig. 15—Modification of Side Rails of Portable-Type Rolling Ladder Four-Wheel Assembly Replacement

(a) With a load of 10 pounds placed in the center of the bottom step and the two side rails brought into contact with the floor by pressing down on the bottom step by hand, the springs which cause the retractile wheel brackets to operate shall be tensioned sufficiently to lift the two side rails off the floor when the hand pressure is removed. This adjustment should make it possible for a sheet of letter paper to be passed freely back and forth under both of the side rails.

(b) With a load of 30 pounds placed in the center of the bottom step and the two side rails lifted off the floor by hand and then released, the 30-pound weight shall cause the two side rails to rest on the floor so it is impossible to pass a sheet of letter paper under either side rail.

(c) With 200 pounds on the fourth step on either side of the ladder, all four side rails shall be in contact with the floor so it is impossible to pass a sheet of letter paper under any side rail.

(d) With no load on the ladder, the springs shall hold the movable parts of all four of the floor wheel brackets against the stops, and the stops shall be so adjusted that it is possible to pass a 19C gauge under all four side rails but impossible to pass the 0.191-inch end of a 173A gauge under any of the four side rails.

4.44 To adjust the height of the ladder side rails from the floor, loosen the backstop screw locknuts. Turn the screw in to lower the rails or turn it out to raise them. When the proper position has been attained, retighten the locknuts. To increase the tension on the wheel support, loosen the locknut on the spring adjusting screw and turn the screw in; to release tension, turn the screw out. When the load requirements have been met, retighten the locknut. On outside suppliers' assemblies with adjusting details, the same procedure can be followed for the spring adjustment. The side rail height, however, can only be changed by shifting the mounting of the whole assembly.

PLATFORM-TYPE ROLLING LADDERS

4.45 ***Platform Assemblies:*** Remove the old assembly by taking out the associated tie rod which acts as a hinge for the platform. Position

the new assembly, reinsert the tie rod and washers, and draw the nut up tightly. If necessary, cut off the end of the tie rod so only one or two threads project beyond the nut, and rivet the end so it will be free from burrs. Tie rods with Teenut are self-locking and are not riveted or staked.

4.46 ***Trolley assemblies and lower fixtures assemblies*** are replaced as covered under Straight-Type Rolling Ladder, 4.21 through 4.28.

4.47 ***Wheel and wheel support assemblies*** are replaced as covered under Portable-Type Rolling Ladders, 4.42 through 4.44, except they are mounted as shown in Fig. 8. The adjustments for this assembly when used on platform-type ladders are as follows.

(a) When replacing outside supplier-type retractile wheel assemblies on platform-type rolling ladders, roll the ladder to a point in the run where the clearance between the bottom of the vertical rail and the floor is the greatest. Replace the assembly, being sure to maintain an approximate gap of 1/4 inch between the stop and the movable bracket. The slight rotation of the assembly that might be necessary to do this can be made possible by enlarging the holes for the mounting screws with a file where necessary.

(b) On ladders equipped with Western Electric retractile wheel assemblies, the ladder shall be moved the full length of the ladder run and the backstop screw of the vertical leg wheel so adjusted that at no point in the run shall the backstop gap be less than approximately 1/16 inch. The spring tension shall then be adjusted so the wheel will exert sufficient pressure on the floor at all points of the ladder run to eliminate side sway of the ladder without causing a perceptible lifting effect.

4.48 ***Tie rod and step*** replacement procedures are covered under Straight-Type Rolling Ladders, 4.06, 4.07, and 4.15.

4.49 ***Fender assemblies*** on platform-type rolling ladders shall be replaced, as covered in 4.16 and shown in Fig. 14.

KS-21054 PULPIT LADDERS

4.50 There are no replacement procedures for any of the wood parts or the handrail for the pulpit ladder. The Putnam No. 435 swivel casters and the retractile wheel assemblies may be replaced. Both wheel assemblies are available from the supplier. Replacement of these assemblies is limited to a simple procedure and needs no explanation. Each ladder is provided with 25 shoulder bushings for the locking arrangement. Additional lots of 25 are provided by KS-21054 L3. Latching devices for use on ladders which may be in use without latches are available as KS-21054 L4.

PORTABLE STEPLADDER

4.51 Replacement procedures for the portable ladder are the same as those given in 4.38 through 4.41 for the portable-type rolling ladder.

LADDER TRACK

4.52 ***Creeper Bolts:*** To install additional creeper bolts, drill a hole through the track in line with the center of the hanger bracket, using the 5/16-inch twist drill. Provide adequate protection to prevent metal filings from falling into the equipment. Place the creeper bolt with the head inside the track, draw the nut up tightly, and stake.

4.53 ***Track Splice:*** If the track does not line up within the splice, it may be possible to correct by driving metal shims (P-452724) between the splice and the side of the track. However, if the splice is distorted beyond correction, remove the splice screws and with the ball-peen hammer drive the splice onto the supported section of the track, swing the free section out of the way, and drive the splice off. Place the new splice in a reverse manner and check the track ends for alignment and a maximum separation of 1/8 inch. Replace the screws and stake. If the screws are in such a location that they cannot be staked, use the 3/4-inch screw and install two nuts.

5. MINOR REPAIRS

5.01 This portion of the section covers the minor repairs that may be made to ladders, ladder

track, and ladder seats. It includes cleaning, reconditioning, and restoration of wood and finished metal parts, cleaning and lubricating of moving parts, and repair and maintenance of brakes and brake ropes.

CLEANING WOOD PARTS

5.02 Remove wax and dirt from wood parts by using a cloth moistened with KS-7860 petroleum spirits. This method is applicable to both the varnished and the penetrating finish ladders and ladder seats. If trouble should be encountered in the cleaning of excessively dirty penetrating finish ladders, take household scouring powder to some point outside the switchroom and mix with water to form a thick paste. Dip the cellulose sponge lightly in the paste and rub the soiled part briskly until it becomes clean. Rinse the sponge well in clear water and wipe the cleaned area thoroughly. This method has a bleaching effect on the finish, and it will be necessary, after the part is thoroughly dried, to wipe a thin coat of new penetrating finish over the cleaned portion with a soft cloth.

RECONDITIONING WOOD PARTS

5.03 Wood parts that are damaged to the extent that they may not be refinished should be replaced. If refinishing of the part will not impair its strength, cut out the damaged portion with the sharp knife and sand the area smooth with fine sandpaper. Wipe up all dust with a soft cloth moistened with petroleum spirits, allow to dry, and with the KS-2993 brush apply a thin coat of penetrating finish to the sanded area. Allow the finish to penetrate for approximately 15 minutes; then with a clean cloth wipe off the excess finish before it becomes tacky. When the finish is thoroughly dry after approximately 1 hour, sand the area lightly again; and after wiping with the moistened cloth and allowing the area to dry, apply a second coat of finish. Wipe off the excess finish and allow the area to dry for several hours before using.

5.04 Varnished ladder and ladder seat parts may be refinished, as covered in 5.03. However, if for appearance reasons it is not desirable to mix the two finishes, use two coats of clear spar varnish in place of the penetrating finish. Allow the varnish to dry overnight between coats and before using.

5.05 If the refinishing process is so extensive as to cause an undesirable amount of dust in the equipment room, lower the ladder from the track, as covered in 4.16 and 4.17, and move it to some other portion of the building during the reconditioning operations.

5.06 Steps that have become badly worn or damaged should be replaced with new steps rather than turning them over or reversing the front to the rear.

CLEANING METAL PARTS

5.07 Finished metal surfaces shall be cleaned by wiping lightly with a cloth moistened with petroleum spirits or with household scouring powder if the dirt is stubbornly ingrained.

RECONDITIONING METAL PARTS

5.08 Burrs and sharp edges should be removed with the R-1051 file or by peening with the ball-peen hammer.

5.09 When a nut is tightened on an end-staked bolt or a riveted tie rod, saw one or two threads off the end beyond the nut, if necessary, before restaking or reriveting. Peen staked bolts free of sharp edges and rivet tie rods free from burrs.

RETOUCHING FINISHES ON METAL PARTS

5.10 Details having a No. 395, 525, or 533 gray enamel finish and which have been marred by the use of a file shall be retouched with the KS-8662 gray enamel finish using the R-2919, 3/16-inch round brush. Screws, nuts, washers, and details having the No. 289 passivated zinc finish and which have been marred by the use of a file or another tool shall be retouched with the R-2998 tan chromate enamel finish using the R-2919, 3/16-inch round brush.

CONDITIONING OF FLOOR WHEELS

5.11 If wheels rub against supporting details, determine if the cause is lack of sufficient washers to center the wheel in the bracket, if the wheel bearing or axle is worn, or if the wheel bearing is not gripped tightly by the wheel discs. As the condition requires, add washers, replace

parts, or tighten the bearing in the disc by the addition of two wire washers, P-432514. The wire washers can be placed by removing and disassembling the wheel. Place one washer over each side of the bearing within the collar and reassemble the wheel. If wheel bracket assembly, P-450360, becomes bent, it shall be removed and replaced by wheel bracket assembly, P-33A398, since straightening the bend might tend to further weaken the bracket as well as weaken the welded joint.

LUBRICATION OF FLOOR WHEELS

5.12 If floor wheels do not revolve freely, remove any foreign material that may be twisted around the axle. Check metal wheels for lubrication. If grease cups are provided and a bearing appears dry, turn up its grease cup until a small amount of grease is forced through as indicated by grease appearing at the far end of the bearing. If the cup is screwed up to the limit of its travel, refill it with KS-7471 grease. If grease cannot be forced through the bearing, remove the axle and thoroughly clean all passages. Where grease cups are not provided on ladders equipped with ***metal*** wheels, apply a few drops of KS-16326 oil, exercising care to avoid an excess which might later reach the rubber tires or the floor.

Note: Bearings of rubber composition wheels should not be lubricated unless bronze bushed.

BRAKE ADJUSTMENTS

5.13 After making minor repairs, brakes shall be adjusted, as covered in 4.33.

CONDITIONING OF TRACK AND BRAKE LININGS

5.14 To remove oil or grease from a ladder track, fold a piece of cloth to make a swab which will fit snugly into the ladder track. Moisten slightly with petroleum spirits. Before folding the cloth, tie a piece of heavy twine about the middle. Move all the ladders to one end of the ladder run and remove the ladder stop from the vacated end. Insert the swab in the open end of the track with the twine extending through the track slot and proceed to swab the track thoroughly over half its length. Dry the track with a dry cloth swab in the same manner and replace the ladder stop. Proceed to clean the remainder of the track following the same procedure.

5.15 If the brake linings of the ladders have become saturated with the oil or grease, it will be necessary to lower the ladders and replace the linings.

HANDRAIL INSULATION

5.16 Check that the tape on the metal handrail is in good condition. If signs of wear are apparent or if the tape is torn, remove the old tape and replace it with two layers of new, gray friction tape or grey plastic tape per KS-14090. Apply the tape with at least a half lap, wrapped from the bottom up. Where friction tape is used, it shall be finished with two coats of white shellac.

METAL SEATS

5.17 The seat lock should be lubricated occasionally with a slight amount of KS-16326 oil to assure proper operation.

5.18 Any burrs appearing on the seat should be removed with the R-1051 file.

FENDER ASSEMBLIES

5.19 If the ball-bearing caster contained in the fender assembly should stick or fail to rotate freely, it shall be cleaned with a clean cloth moistened with petroleum spirits. The ball-bearing caster shall be slightly lubricated by wiping with a clean cloth moistened with a few drops of oil to prevent rust.