



Service & Parts Manual



MODEL No. ST-17
MODEL No. ST-17-1
MODEL No. ST-19-AIR
MODEL No. ST-26



ATTENTION

USERS – ASSEMBLYMEN – RIGGERS – EMPLOYERS – OWNERS AND OTHERS WHOM IT MAY CONCERN

THIS EQUIPMENT IS USED OFF THE GROUND IN HIGH OR DANGEROUS PLACES. THEREFORE, ANYONE USING THIS EQUIPMENT IS EXPOSED TO A HAZARDOUS WORKING ENVIRONMENT.

NEITHER THE MANUFACTURER NOR ITS DISTRIBUTORS CAN KNOW OF, ANTICIPATE OR WARN AGAINST ALL DANGERS THAT EXIST OR CAN EVER ARISE. BE ALERT TO RECOGNIZE ALL DANGERS, KNOWN AND UNKNOWN.

THIS EQUIPMENT CAN BE SERIOUSLY WEAKENED BY A VARIETY OF THINGS, INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:

IMPROPER, INADEQUATE OR INCOMPLETE ASSEMBLY / FIRE / ACID AND OTHER CHEMICALS / CONTACT WITH ELECTRICAL CIRCUITS / CORROSION / ELECTROLYSIS / WEATHER / CARELESS HANDLING OR MAINTENANCE / MISSING PARTS / IMPROPER USAGE OR RIGGING / IMPROPER, INADEQUATE OR INCOMPLETE REPAIRS OR REPLACEMENTS / DAMAGE IN ANYWAY.

THE EQUIPMENT MUST BE USED AND RIGGED IN COMPLIANCE WITH ALL APPLICABLE CODES AND SAFETY RULES AND REGULATIONS. DO NOT REPAIR WITHOUT MANUFACTURER'S WRITTEN AUTHORIZATION.

INSPECTION

- INSPECT COMPLETELY AND THOROUGHLY ALL PARTS AND FASTENERS AS OFTEN AS POSSIBLE.
- INSPECT FOR DAMAGE, CORROSION, LOOSE OR MISSING PARTS, PROPER ASSEMBLY, WEAR.

DO NOT USE THIS EQUIPMENT IF IT IS BENT, BROKE, DAMAGED OR WEAKENED IN ANY WAY. DO NOT USE EQUIPMENT IF IN DOUBT. SHOULD YOUR INSPECTION FIND A CONDITION YOU ARE DOUBTFUL OF OR DO NOT UNDERSTAND, CONSULT YOUR EMPLOYER OR THE MANUFACTURER OR HIS AUTHORIZED REPAIR AND MAINTENANCE REPRESENTATIVE. REMOVE WEAKENED EQUIPMENT FROM SERVICE IMMEDIATELY.

WARNING

IMPROPER USE, TREATMENT OR MAINTENANCE OF THIS EQUIPMENT CAN RESULT IN INJURY TO OR DEATH OF THE USER OR OTHERS IN THE VICINITY OF USE.

Spider POWER DRIVEN *Staging*

MODEL No. ST-17

AIR DRIVEN

MANUFACTURED BY

SPIDER STAGING, Inc.

RENTON, WASHINGTON

ORDER ALL PARTS
FROM YOUR NEAREST
AUTHORIZED
DISTRIBUTOR . . .



BE SURE TO SPECIFY
BOTH MODEL NO. AND
SERIAL NO. WHEN
ORDERING PARTS . . .

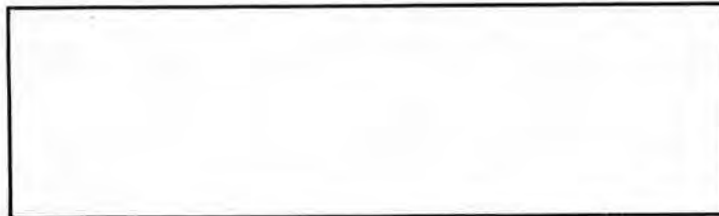


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SPIDER STAGING

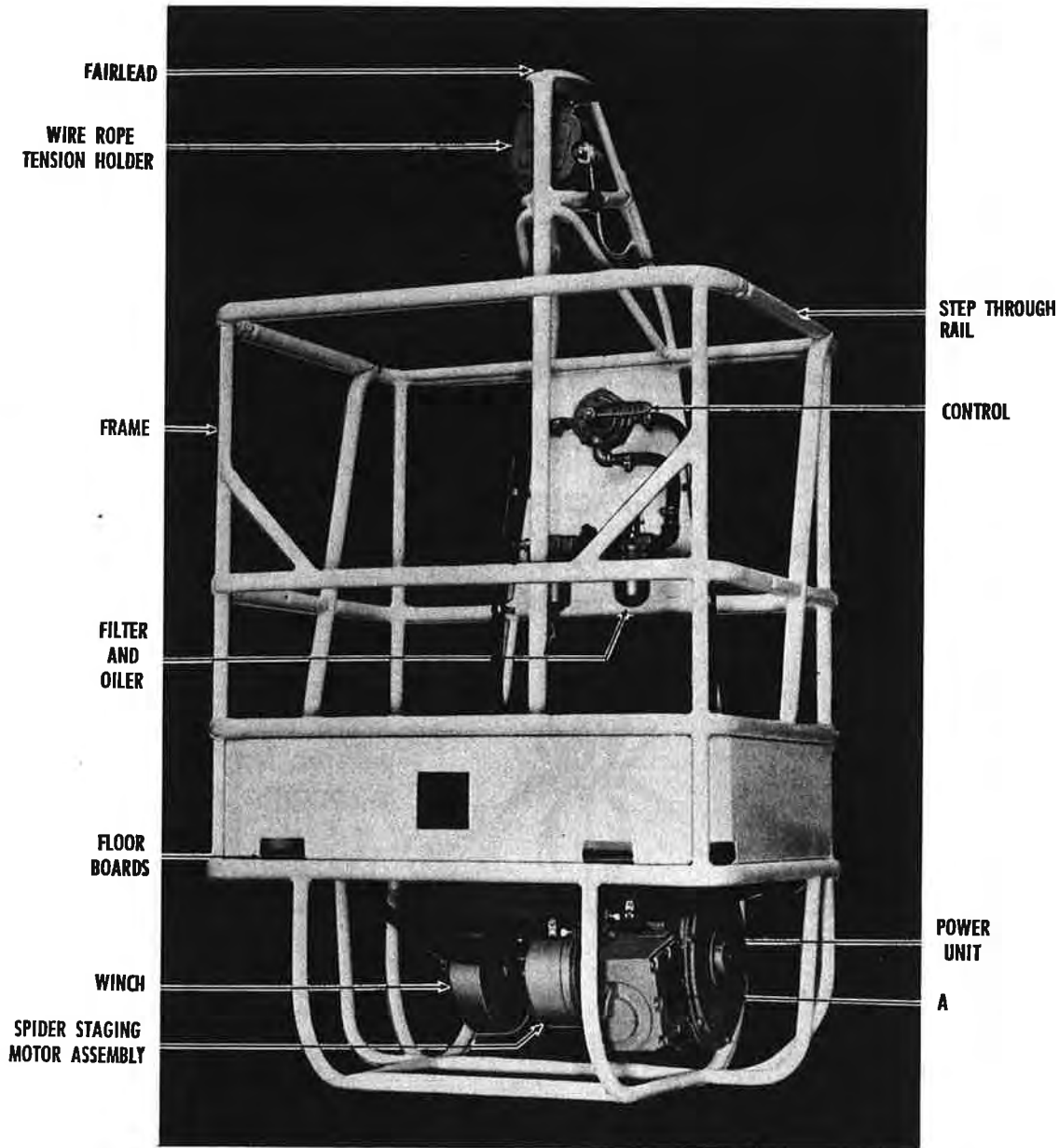


FIGURE 1 — Standard Model ST-17 Spider Staging

SPECIFICATIONS

Physical Dimensions.....	28" x 36" x 69" High
Power.....	Vane Type Air Motor
Lifting Capacity....@ 100 P.S.I. and 60 Cu. Ft. at the motor, 1000 Lbs. Gross	
Drum Capacity.....	350 Ft. 5/16" Wire Rope
Vertical Speed.....	0 to 30 Ft. per minute
Net Weight.....	184 Lbs.
Minimum air required to operate motor for wire rope replacement.....	20 Cu. Ft. per Min. @ 40 Lbs.
Shipping Dimensions.....	30" x 38" x 72" High (crated)
Performance will increase as air pressure and volume is increased. 60 cu. ft. per min. @ 100 P.S.I. at the motor will give rated performance.	



TO THE OPERATOR:

The operator is totally dependent upon the wire rope. His knowledge of wire rope and his ability to determine its condition can prevent accidents.

The operator is the **only** person who can visually inspect the wire rope each working drop. The operator has the wire rope in his care, custody and control and therefore is the only person who can be responsible for its safe use. The following precautions, if adhered to, will aid the operator in the maintenance and safe use of the wire rope.

1. Inspect the rope yourself! Do not rely on others to inspect it for you.
2. **Do not use the wire rope if in doubt.** Should your wire rope inspection find a condition you are doubtful of or do not understand, consult an expert. Any wire rope manufacturer or his representative will be glad to help and advise.
3. Rig properly to prevent severe "pull-in" when staging is at top of drop. Severe "pull-in" will cause high pressure contact of rope against the fairlead resulting in a flattening and weakening of each individual wire in the rope. This will reduce considerably the useful life of the wire rope. Flattened wires will give the rope a bright shiny appearance.
4. Grease wire rope as often as needed to prevent rust.
5. Keep rope properly wound on drum.
6. Do not kink.
7. Do not bend over sharp edges.
8. Keep clear of **all** power lines.
9. Watch for broken wires.
10. Do not use sharp snap-on tools (vice grips) on wire rope.
11. Learn to recognize wire rope splices. Use only a locked-in splice on your Spider wire rope.

The wire rope specified in the parts list and supplied by the factory has a breaking strength of 8,520 pounds or approximately $4\frac{1}{4}$ tons, giving a safety factor of 8 to 1 when the staging is loaded to its 1,000 pound capacity.

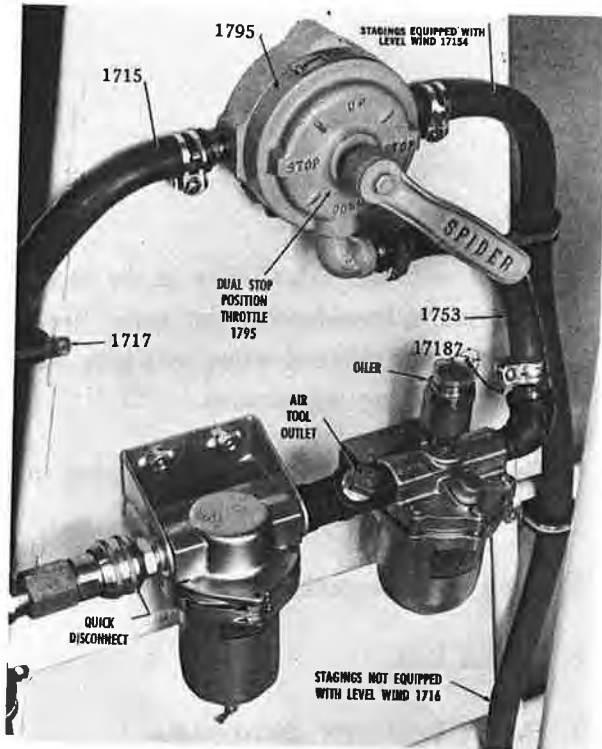


FIGURE 2 — Control Valve, Oiler and Filter

MODEL AND SERIAL NOS.:

The Model Number and Serial Number of each machine will be found stamped in the proper space on the lubrication plate. Be sure to specify both Model No. and Serial No. when ordering parts from your nearest authorized distributor. See Figure 1, Item A.

I. CONTROL VALVE

(Figure 2)

The four way reversing valve (Fig. 2, Part No. 1795) is designed especially for the Model ST-17 Spider Staging. It provides infinitely variable speeds from 0 to 30 feet per minute. Two "stop" positions insures perfect control. No limit to degree control handle can be turned. It receives its lubrication from the oiler.

Lapped surfaces form the seal in this valve. Therefore, grit, sand, etc. can scar the lapped surfaces and cause leakage. Clean the filter as often as necessary to insure against lodging of foreign materials in controls and motor.

II. OILER and FILTER ASSEMBLY

The filter, (Fig. 2), will remove dirt and water from the incoming air. The filter should be drained at least once a day—more frequently if necessary. A well-kept filter will provide clean, dry air at the tee located between the filter and the oiler.

The oiler, (Fig. 2), should be kept filled with Mobil-Almo oil No. 1 or equal. The regulating screw on top of the oiler should be adjusted so that approximately 3 drops of oil enter the air line each minute.

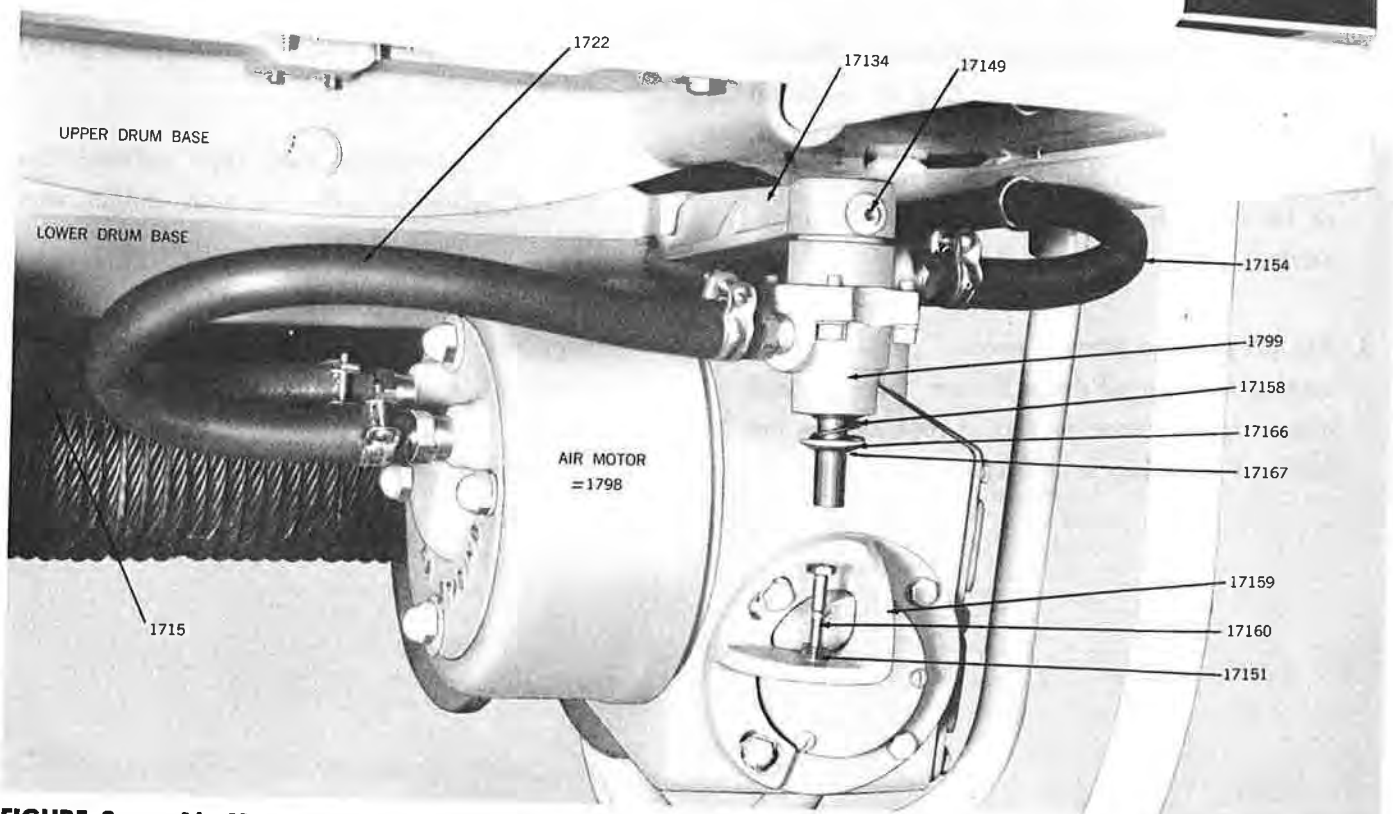


FIGURE 3 — Air Motor, Control Hoses and Overload Mechanism

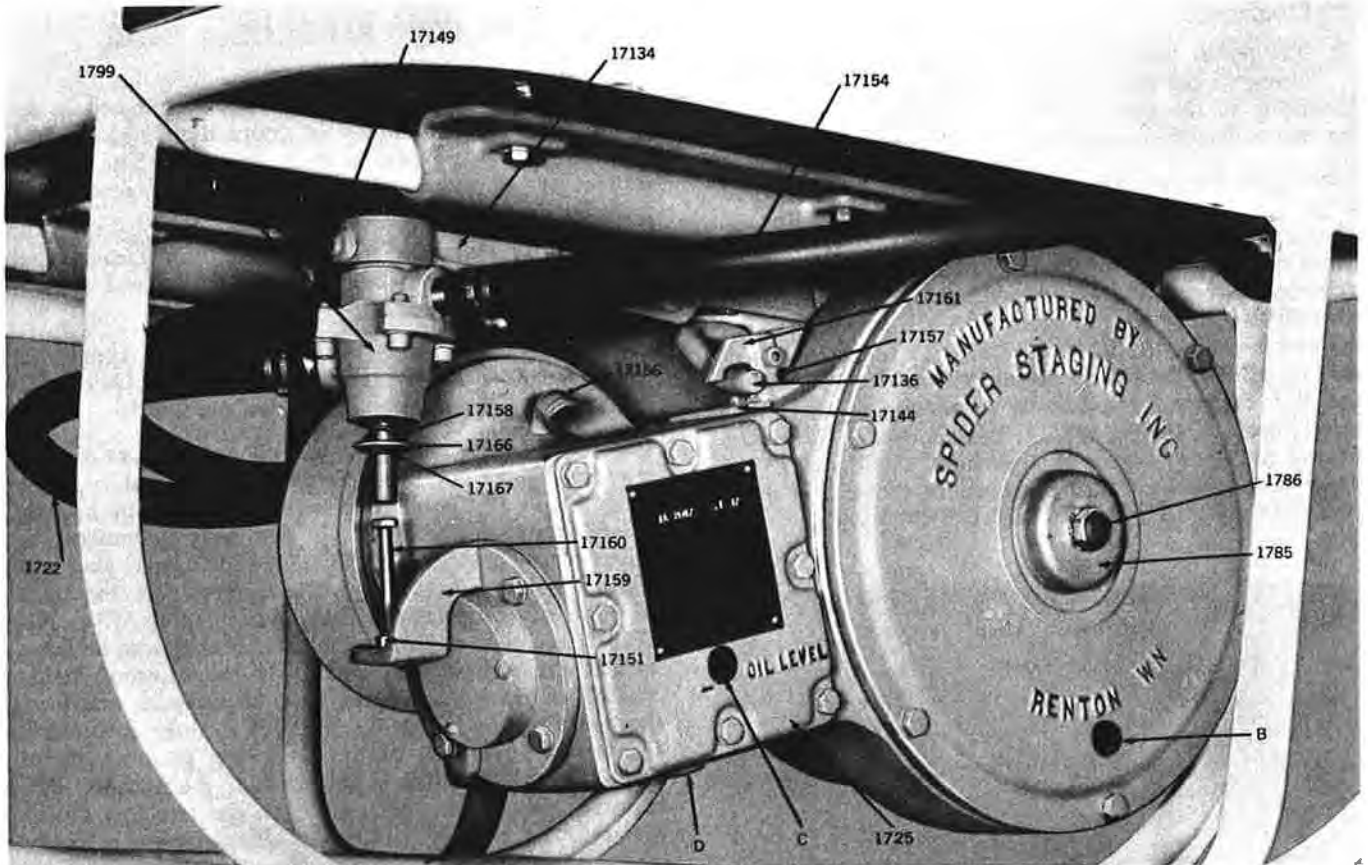


FIGURE 4 — Overload Mechanism

III. AIR CONTROL SYSTEM

(Figures 2, 3, 4)

The vane type reversible air motor which powers the MODEL ST-17 SPIDER STAGING is controlled with a simple 4-way reversing valve connected to the motor by two hoses; one, (Part No. 1715), carries air for upward travel, and the other, (Part No. 17154), for downward travel. The up air line is led through a shut-off valve, (Part No. 1799), which is the overload control for the staging.

The air hose and all connections should be checked at reasonable intervals for any possible leaks. The hose is of neoprene construction and will not be damaged by grease, oil, paint, thinners or weak acid solutions. Abrasion or damage by puncturing will be the most frequent cause of leaky air lines.

IV. OVERLOAD VALVE ASSEMBLY

(Figures 3 and 4. Stagings equipped with level wind.)

The overload valve mechanism is designed to stop the upward travel of the staging at any time the load on the wire rope exceeds approximately 1000 lbs. As the load on the wire rope reaches this figure, the reduction gear housing pivots around the drum shaft and the torsion spring, (Part No. 17136), is compressed and the adjustment bracket, (Part No. 17159), moves the valve stem upward, thereby closing the overload valve and stopping the travel of the staging.

The overload device will need occasional adjusting and resetting. Adjust the overload valve as follows:

1. If the staging is being shut off at too light a load, loosen lock nut on adjustment bolt, (Part No. 17160), Fig. 3, and turn adjustment bolt to the right (clockwise) until staging will lift a load up to approximately 1,000 pounds.
2. To lessen lift capacity turn adjustment bolt to the left (counter clockwise).

A practical field check for proper load capacity and overload setting may be made on the following basis:

The staging with approximately 125 feet 5/16 inch diameter wire rope on the drum, should be set so as to lift five men, the overload should shut off with six men in the unit. Testing should be done with 100 P.S.I. air pressure and volume no less than 60 cubic feet per minute.

V. POWER UNIT

(Figures 3 and 4)

The power unit of the Spider Staging is completely self-contained. It may be removed from staging, set up on a bench, and run. This feature greatly facilitates maintenance and repair. Removal from stagings is accomplished as follows:

1. Take out the cap screw, (Part No. 1786), and remove the hub cap, (Part No. 1785).



SPIDER STAGING

2. Disconnect both air lines at the motor.
3. The power unit will now slide freely off the splined fitting on the end of the drum shaft.

Mounting of the power unit is essentially the reverse of the above described operation.

CAUTION: Be certain to replace spacer, (Part No. 17155) (Fig. 10). Part No. 17155 varies from staging to staging. Should it become necessary to replace a lost spacer, the width of replacement spacer can be determined by taking measurement between Pillow-block bearing and drum shaft end. The length of shaft in excess of 3 inches will represent the spacer width. It will be necessary to force the power unit up against the torsion spring, (Part No. 17136), so that it is compressed sufficiently to allow the power unit hanger hook, (Part No. 17161), to slide over it. When the staging has been completely assembled, check and adjust the overload mechanism as described in the section titled "OVERLOAD VALVE ASSEMBLY."

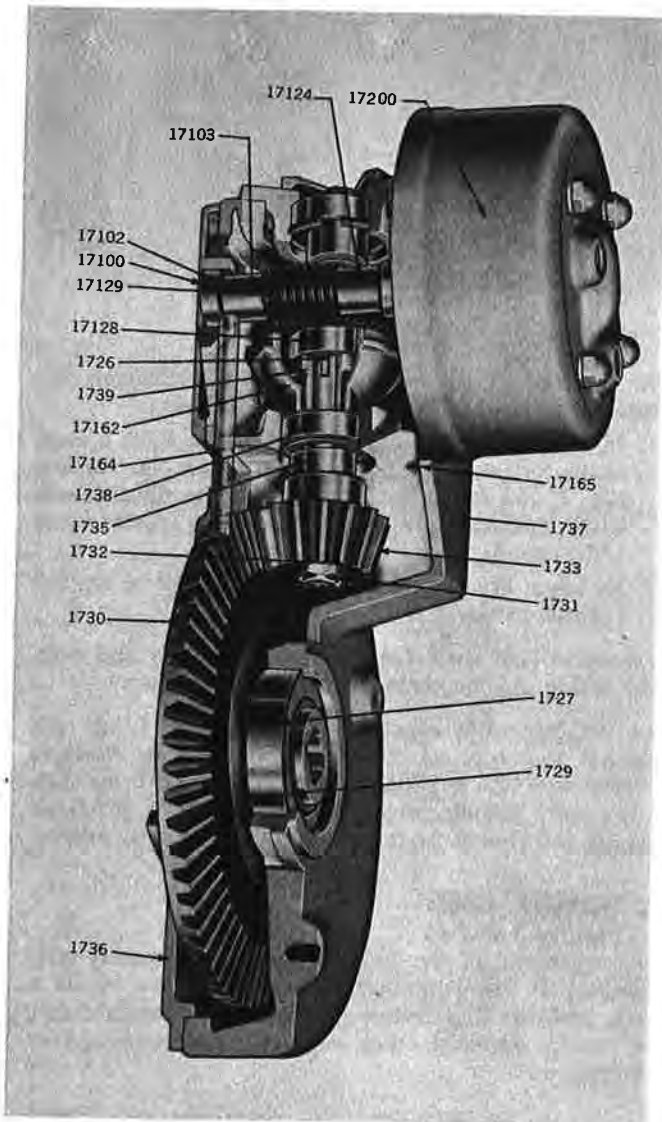


FIGURE 5 — Bevel Gear Mounting

VI. POWER UNIT REDUCTION GEAR

(Figures 5, 6)

The Spider Staging speed reducer has been specially designed to provide the utmost in compactness, light weight, and efficiency for power staging operation. The reducer couples an air motor directly to the winch drum shaft through a double gear reduction.

The primary reduction is a hardened and ground steel worm driving a bronze worm gear, and the final drive is a set of steel bevel gears.

CAUTION: All Model ST-17 Spider Stagings with Serial Numbers under A-502 have 24:1 worm gear pitch. All numbers over A-502 have 48:1 worm gear pitch.

The disassembly of the power unit for replacement of parts is a simple procedure when the parts are removed in proper order. Drain all the oil from both sections of the housing before removing any covers. The first step is to remove the drive housing cover, (Part No. 1736). The bevel ring gear bearing, (Part No. 1727), will usually stay in the cover and slide off the gear hub. The adjusting shims, (Part No. 1729), should be removed next. Special care must be taken to note the quantity and location of the adjusting shims. The shims and grease shield must be replaced exactly as they were removed from the assembly in order to preserve the factory adjustment of the bevel ring gear. The bevel ring gear will now lift directly out of the housing. The adjusting shims and grease shield on the rear hub of the gear must be carefully handled as described above.

NOTE: OIL CIRCULATION TUBES:

(Figures 5, 6)

The two tubes in the housing between the bevel gear section and the worm gear section are for circulating the oil between these two sections. The oil return tube, (Part No. 17164), is placed flush with wall in the bevel gear section and protrudes into the worm gear section $1\frac{1}{8}$ ". The oil scoop tube, (Part No. 17165), has one end riding against the outside edge of the bevel gear with the other end in the worm gear section.

CARE must be taken in removing and reassembling the bevel gear not to damage the oil scoop.

OIL CIRCULATION TUBES INSTALLED ON:

Model ST-17 & ST-17-1 starting with Serial No. TA-2057. All that now remains in the housing is the cross shaft assembly and the drive shaft assembly.

REMOVE AIR MOTOR AS FOLLOWS:

1. Disconnect air lines at motor.
2. Remove the two acorn nuts with flat washers and remove the air motor cover, (Part No. 17200).

(NOTE: For models with Serial No. TA 1909 and under, this step may be disregarded.)

3. Remove the four cap screws, (Part No. 17108). Fig. 15.
4. Pull motor gently, directly away from drive housing until outboard bearing, (Part No. 17102), clears its bore and the worm can be lifted out of mesh with the worm gear.
5. The motor can now be removed completely.

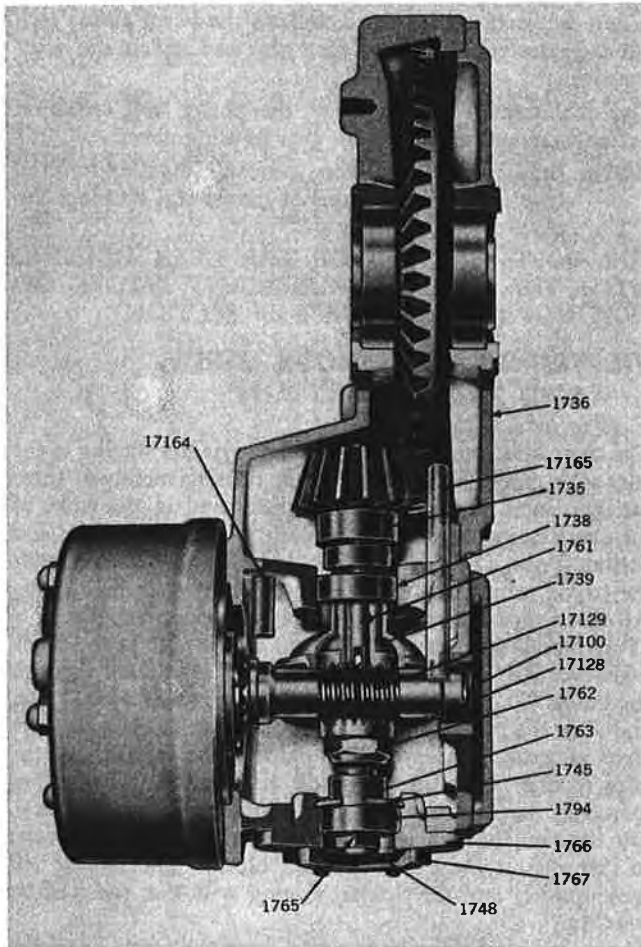


FIGURE 6 — Adjustable Worm Gear Mounting

CAUTION: During these 5 steps particular care must be taken not to damage or force the worm gear set!

The worm, (Part No. 17129), may be removed by removing the snap ring, (Part No. 17100); bearing, (Part No. 17102); and the spacer, (Part No. 17103; Figs. 5 & 6).

With the air motor removed, the cross shaft assembly may be removed as follows:

1. Remove the end cap cover, (Part No. 1767), by removing the three screws that hold it in place.
2. Remove the bearing lock nut, (Part No. 1748), the keyway lock washer, (Part No. 1765), and the carrier lock key, (Part No. 1764).
3. Remove the four cap screws which hold the end cap, (Part No. 1766), in place.
4. With a fibre or lead hammer, tap firmly on the bevel pinion and drive the cross shaft assembly to the rear of the housing until the forward cross shaft bearing, (Part No. 1738), has moved completely out of its bore.
5. Remove the bevel pinion lock nut and the washer which is behind it.
6. Pull the cross shaft out of the rear of the housing. The pulling force will cup the rubber worm lubricator,

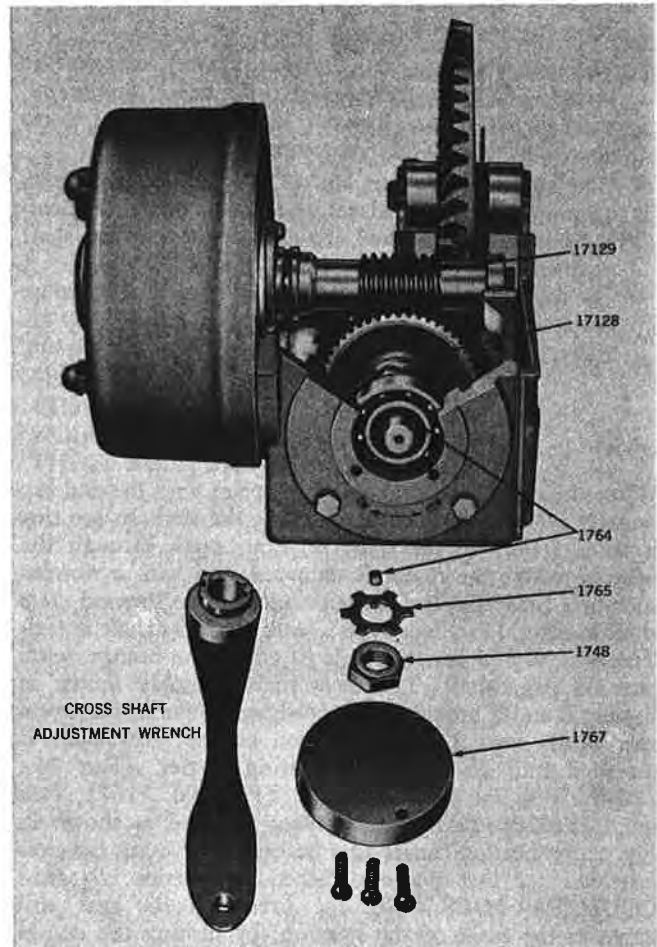


FIGURE 7 — Adjusting Mechanism

(Part No. 17162) Fig. 5 toward the bevel pinion end of shaft. On installation of cross shaft, cup worm lubricator toward pinion end of shaft and then cup it back toward bronze gear after it is in housing and before installation of bevel pinion.

Worm lubricator installed on:

- Model ST-17 Starting with Serial No. TA-2057
- Model ST-17-1 Starting with Serial No. TA-2057
- Model ST-19 Starting with Serial No. TA-553

CAUTION: TAKE PARTICULAR CARE NOT TO NICK OR DAMAGE THE BRONZE WORM GEAR!

The cross shaft assembly may be disassembled in the following way: Reference: Fig. 5 and 6.

1. The end cap, (Part No. 1766), rear bearing, (Part No. 1794), and bearing carrier, (Part No. 1763), may be removed together by screwing them off the shaft. If bearing needs to be replaced, remove the snap ring, (Part No. 1745), and press the bearing from the end cap. Reassemble the new bearing in the reverse order. (**NOTE:** For reassembling the end cap, bearing, and bearing carrier onto the cross shaft, screw on until finger tight, and then back off THREE turns.)



2. Next remove the lock nut, (Part No. 1762).
3. The bronze worm gear, (Part No. 17128), may now be pressed off the shaft, away from the bevel pinion end, with an arbor press. The two keys that hold the worm gear in place may also be removed.
4. The front spacer, (Part No. 1739), and front bearing, (Part No. 1738), need not be removed unless the bearing needs to be replaced. To remove press off the shaft with an arbor press.

For reassembly of the power unit, reverse the procedure outlined above.

CAUTION: IT IS EXTREMELY IMPORTANT THAT ALL KEYS BE PUT BACK IN THE WORM, THE BRONZE WORM GEAR, AND THE BEVEL PINION! ALL LOCK NUTS MUST BE TIGHT!

When the cross shaft assembly is in place with the end cap securely bolted to the housing, check the shaft to see that it spins freely. If the shaft is tight, reach through the opening where the motor is mounted, and with a wooden stick or a brass rod, tap the outer race of the forward cross shaft bearing, (Part No. 1738), until the cross shaft is free. The next step in reassembly is to adjust the bronze worm gear on cross shaft. The cross shaft assembly shown in Figures 6 and 7 provides for adjustment between the worm and worm gear. The rear portion of the cross shaft is threaded into an adjustable bearing carrier, (Part No. 1763). With the end cap cover, (Part No. 1767), lock nut, (Part No. 1748), and washer removed as shown in Fig. 7, the bearing carrier may be turned by using the slots provided for that purpose. When the carrier is turned COUNTER-CLOCKWISE, the bronze worm gear will move to the front of the housing; by turning the carrier CLOCKWISE as well as tapping lightly on the bevel pinion with a fibre or lead hammer, the bronze worm gear will move toward the rear of the housing. The adjustment is made as follows:

1. With the air motor installed, adjustment is close if drive shaft can be turned freely by hand.
2. Final adjustment is made by applying a blueing to the face of one tooth of the bronze gear. Turn the air motor in the down direction allowing the bronze gear to rotate several times. The cross shaft is properly adjusted when wearing of the blueing appears slightly left of center of the bronze gear. Several blueings may be necessary before proper adjustment is obtained.

When the proper adjustment has been made, align the slot nearest the keyway in the cross shaft with that keyway. Place the locking key, (Part No. 1764), in the slot, put the washer in place, and install and tighten the rear lock nut. Crimp keyway washer over lock nut to insure positive lock. The end cap cover may now be put in place.

The next step in reassembly is to adjust the bevel pinion. The pinion may be moved forward or back on the cross shaft by turning the bevel pinion adjusting ring, (Part No. 1735). Proper location of the bevel pinion is checked as follows:

1. The outer edge of the pinion teeth must be flush with the outer edge of the ring gear teeth.
2. There should be approximately .010 of an inch of backlash between the teeth.

When the bevels are adjusted, tighten the bevel pinion lock nut and reassemble the bevel ring gear and replace the housing cover.

The final step in reassembly of the power unit reduction section is mounting the worm gear housing cover.

NOTE: Before installing covers, remove old gasket material from machined surfaces of covers and housing. Replace with Permatex #2.

FILL BOTH SECTIONS OF THE GEAR HOUSING WITH THE SPECIFIED LUBRICANT BEFORE OPERATING! (SEE LUBRICATION SECTION)

VII. TRIPOD, WIRE ROPE GUIDE, AND TRANSFER CHAIN

(Figure 8)

The most important part of this section of the staging is the wire rope guide. Actually, the guide consists merely of three case-hardened pins located at the sides and in the front of the eye. The two castings, top block, (Part No. 1706), and bottom block, (Part No. 1707), hold the pins and support the tripod tubing.

All three pins are removed for easy replacement. The pin, (Part No. 1709), must be slid out of the slot in the block whenever it is necessary to pass a wire rope hook through the guide. To do so, loosen the set screw, (Part No. 1710), and slide the pin clear. As these pins begin to show definite signs of wear they should be replaced. The long life of the wire rope depends on the guide in which it moves being extremely hard and smooth. Care should be exercised not to lose the pins thus making it necessary to allow the wire rope to rub against the cast aluminum blocks. The blocks will wear quickly and the Spider Staging will lose some of its stability.

The tripod blocks may be removed from the frame by taking out the three cap screws in the bottom block, (Part No. 1707). This is necessary in order to replace the front guide pin, (Part No. 1788), which is buried in the cast aluminum top block, (Part No. 1706).

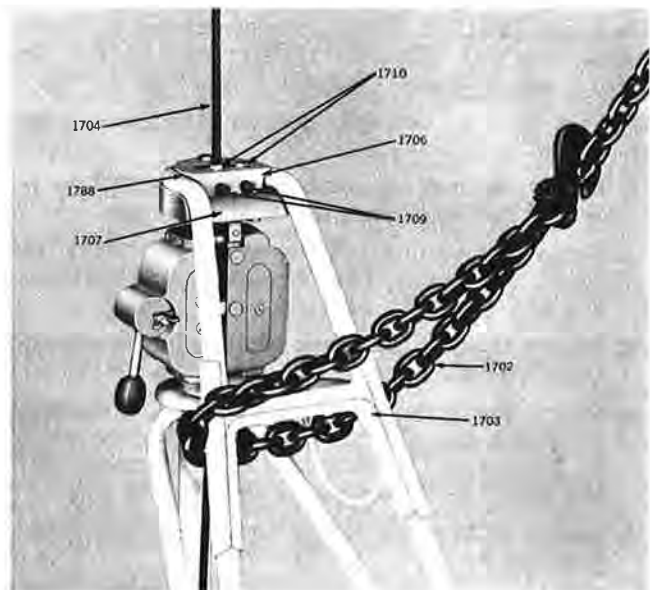


FIGURE 8 — Tripod, Wire Rope Guide and Transfer Chain



VIII. TRANSFER CHAIN

(Figure 8)

The proper method of attaching the transfer chain, (Part No. 1702), to the staging is illustrated in Fig. 8. The transfer chain guard, (Part No. 1703), is expressly designed to provide added support to this section of the tripod and to protect the aluminum tubing from the action of the chain during a transfer. Whenever possible, the transfer chain should pass around both front legs of the tripod as shown.

However, when necessary as a practical matter it is permissible to pass the chain around only one of the legs. When the weight of the staging is moving onto the chain during a transfer watch closely to see that the chain seats itself properly in the guard and does not "hang up" on anything. Take particular care to keep the free hook clear of the loops on the chain guard. These loops are provided only for the purpose of keeping the chain from falling below the guard when not in use. With a little care transfers can be made easily, quickly, and safely.

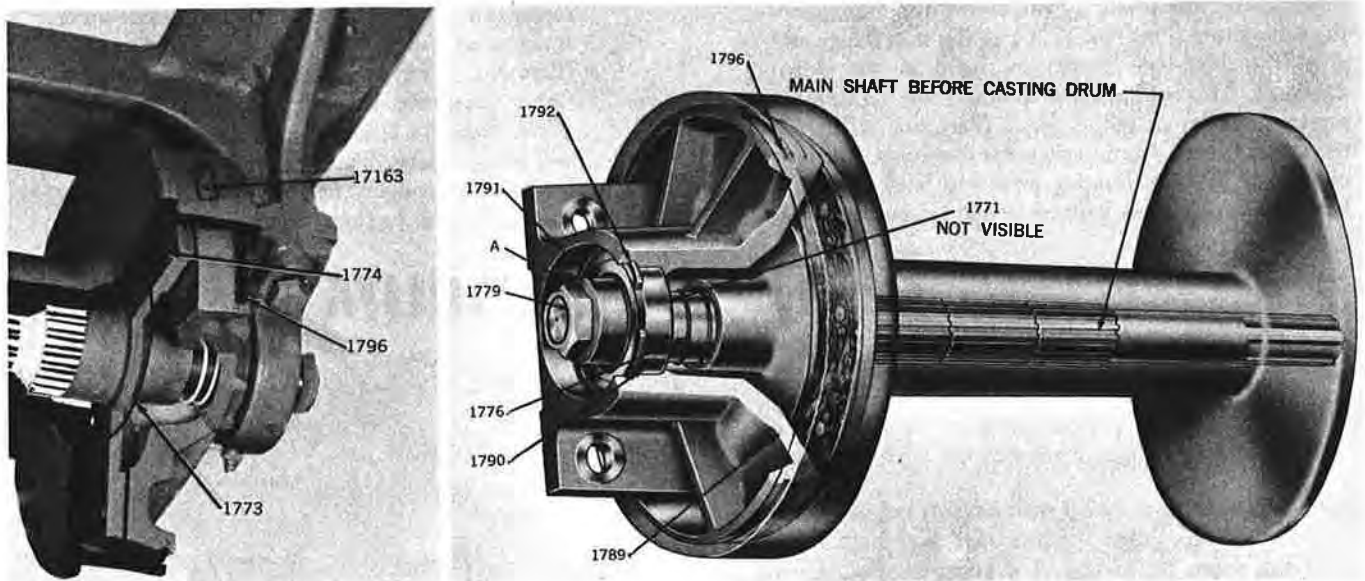


FIGURE 9 — Automatic Emergency Brake

IX. AUTOMATIC BRAKE

(Figures 9, 10)

The back plate casting, (Part No. 1789), has been designed to include the bearing for the end of the shaft. The bearing is held in place by a snap ring, (Part No. 1792), and is a lifetime sealed bearing which requires no lubrication.

Disassembly of the Winch unit is accomplished as follows:

1. Remove the 4 cap screws, (Part No. 1793), Fig. 10, and remove the drum from the base.
2. The pillow-block bearing, (Part No. 1772), is removed by loosening two set screws and sliding the bearing off the splined end of the drum shaft.
3. The bearing and back plate slide off the brake end of the shaft when the lock nut, (Part No. 1779), has been removed.
4. Next remove the compression spring, (Part No. 1776).
5. Now slide the floating plate, (Part No. 1774), off the shaft being careful not to bend or deform the reset spring, (Part No. 1773).

6. Note the location and method of fastening the reset spring so that it can be reassembled properly, then unhook it from the floating plate and the automatic brake is completely disassembled.

Assembly of the winch unit is essentially the reverse of the above. Check all parts, particularly the cam surfaces, for any dirt or other foreign materials. When the floating plate has been put in place, turn it in a clockwise direction then release it and check to see that it moves freely and that the reset spring returns it properly to the base of the cam. CHECK LUBRICATION INSTRUCTIONS PAGE 13 BEFORE ASSEMBLY.

X. AUTOMATIC BRAKE ADJUSTMENT

(Figures 9 and 10)

When the winch unit has been completely disassembled, it is necessary to readjust the automatic brake upon reassembly. Use the same procedure any time the brake needs adjustment.

1. Check all set screws in bearing collars (Part No. 1772) to ensure that they are loose.



2. With inspection plate (Part No. 17163) removed so that the clearance between the floating plate (Part No. 1774) and back plate and bearing housing (Part No. 1789) is visible, set clearance between the two parts to 1/16 inch by turning lock nut (Part No. 1779). Turn clockwise to close gap, counter clockwise to open gap. The edge of the inspection plate can be used as a feeler gauge.
3. Turn drum slowly by hand in the down direction. If the brake goes on, back off the lock nut (Part No. 1779) 1/4 turn at a time until drum turns without actuating the brake. Do not back off lock nut over 1/2 turn after setting the 1/16-inch clearance. If more clearance than this is required, disassemble and inspect all parts for damage or wear.
4. After setting the brake by the above directions, grab the cable drum (Part No. 1770) by the thin flange and give it a high-inertia spin by hand in the down direction. This will set the brake. Now tighten set screws in collar of pillow block (Part No. 1772). To reset brake, turn drum in opposite direction. Recheck clearances between floating plate and back plate and bearing housing. This is necessary to take up accumu-

lated slack in the assembly. If the clearance has remained the same, it is not necessary to test the brake any further. If clearance has increased, loosen set screws in pillow block (Part No. 1772), reset to the original 1/16-inch setting, retighten set screws, and actuate the brake again. Clearance now should remain the same, and brake is ready for service.

The adjustment described above is very important. The brake is an emergency brake only, and during the course of normal operation is never used. It must, however, be kept in good working order, and it is recommended that it be checked as described in (4) above at least once every six months.

NOTE: To check brake on a monthly basis, remove inspection plate (Part No. 17163) and check freeness of the brake by rotating floating plate (Part No. 1774) with the tip of a screw driver. Check clearance between parts No. 1774 and 1789. If brake is not free, then servicing of it will be necessary. The brake should be disassembled and thoroughly inspected. If floating plate is free, then no further attention is necessary.

LEVEL WIND DRUM

HOW IT WORKS

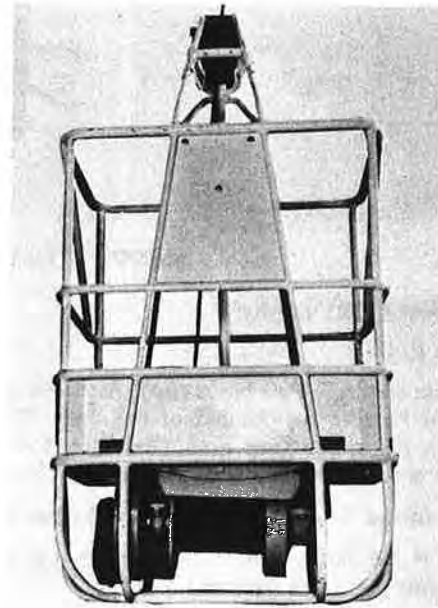
All level wind devices work on the principle of keeping the angle of the line 90° with the drum.

Nearly all level wind mechanisms require power to forcibly, guide the line back and forth across the drum by means of a powered double lead screw, similar to the type commonly found on fishing reels.

It is a well known fact that nearly any line, including wire rope, will gradually decrease in diameter as it is used under load. Therefore, the line footage on the drum also changes. With the speed of the powered level wind remaining constant, it is easy to understand why this particular approach to the problem has not been entirely successful.

Spider Staging approached the problem differently. Knowing that desired results were not obtainable by forcibly bending the line into a 90° position with the drum, we developed a drum mounting device that tilts the drum (without power) into a 90° position with the line.

The drum is mounted on a rocker type base. As the line, under tension, is spooled on the drum, the drum gradually tilts, thus keeping a 0° fleet angle at all times. In the absence of opposing forces the line will guide itself perfectly across the drum.



- NO POWER REQUIRED
- WILL LEVEL WIND ANY DIAMETER WIRE ROPE
- DOES NOT FORCIBLY BEND WIRE ROPE
- HAS NO TURNING SHAFTS
- NO EXPOSED MOVING PARTS
- NO GUIDES — NO WEAR
- SIMPLICITY
- INEXPENSIVE

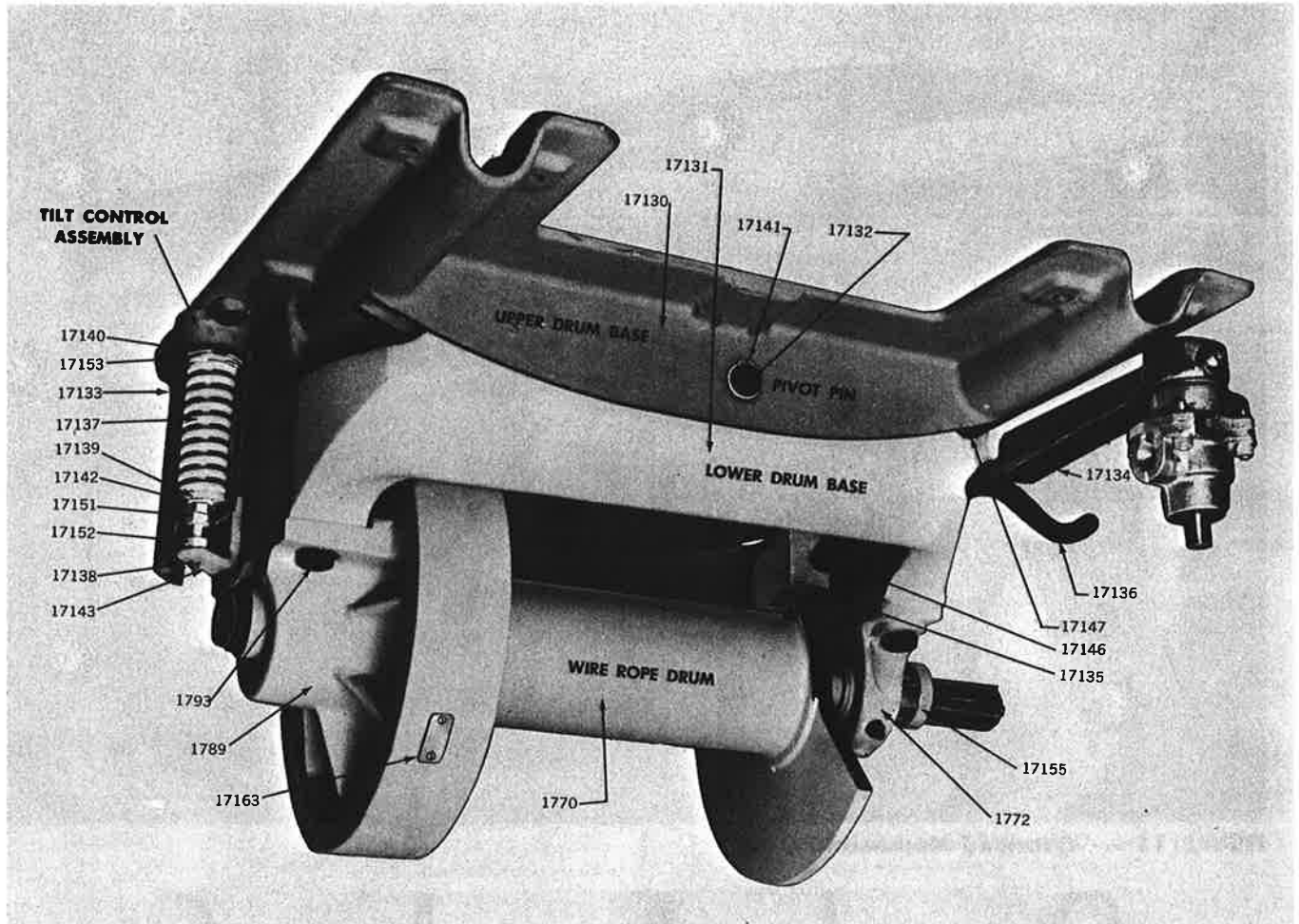


FIGURE 10 — Level Wind Drum and Drum Base Assembly

XI. LEVEL WIND DRUM ASSEMBLY

(Figure 10)

The drum assembly is made up of the upper drum base, (Part No. 17130), and lower drum base, (Part No. 17131). The two bases are connected with two pivot pins that are secured with snap rings, (Part No. 17141). In this assembly, the upper drum base is the backbone of the staging. The component parts of the machine all are mounted on this strong rigid casting. The winch drum, (Part No. 1770), rotates in ball bearings securely fastened to the lower drum base. The bearing on the splined end of the shaft is a standard pillow block, (Part No. 1772). The opposite end of the shaft is held in a back plate and bearing housing, (Part No. 1789).

XII. TILT CONTROL ASSEMBLY

(Figure 10)

Controls the tilt speed of the lower drum base. As the wire rope passes the center of drum, tilt of the lower drum base will gradually increase as wire rope moves across drum toward drum flange. Degree of tilt will gradually decrease as wire rope moves away from flange toward center of drum. Should the tilt control assembly fail to operate, a gap will form in the wire rope spooling at center of drum.

XIII. TILT CONTROL ADJUSTMENT

(Figure 10)

The tilt control assembly is set at the factory and should function properly without further adjustment. However, should further adjustment be necessary, adjust as follows. Should the wire rope tend to lead away from the automatic brake flange, loosen lock nut, (Part No. 17152), and turn spring shaft, (Part No. 17138), with screw drive 1/2 turn to the left. Caution: Do not loosen double hex nuts holding spring. Should the wire rope tend to lead away from the opposite flange turn the spring shaft 1/2 turn to the right. (Clockwise). When checking level wind make certain the wire rope is under approximately 200 pound tension, or load equal to weight of Spider Staging.

XIV. TORSION SPRING

(Figures 10 and 11)

Part No. 17136 is held in position with torsion spring anchor, (Part No. 17135). Torsion spring regulates overload on stagings equipped with level wind. Torsion spring in conjunction with power unit hanger. (Part No. 17161), Figure 11 serves as power unit support when load is off wire rope.

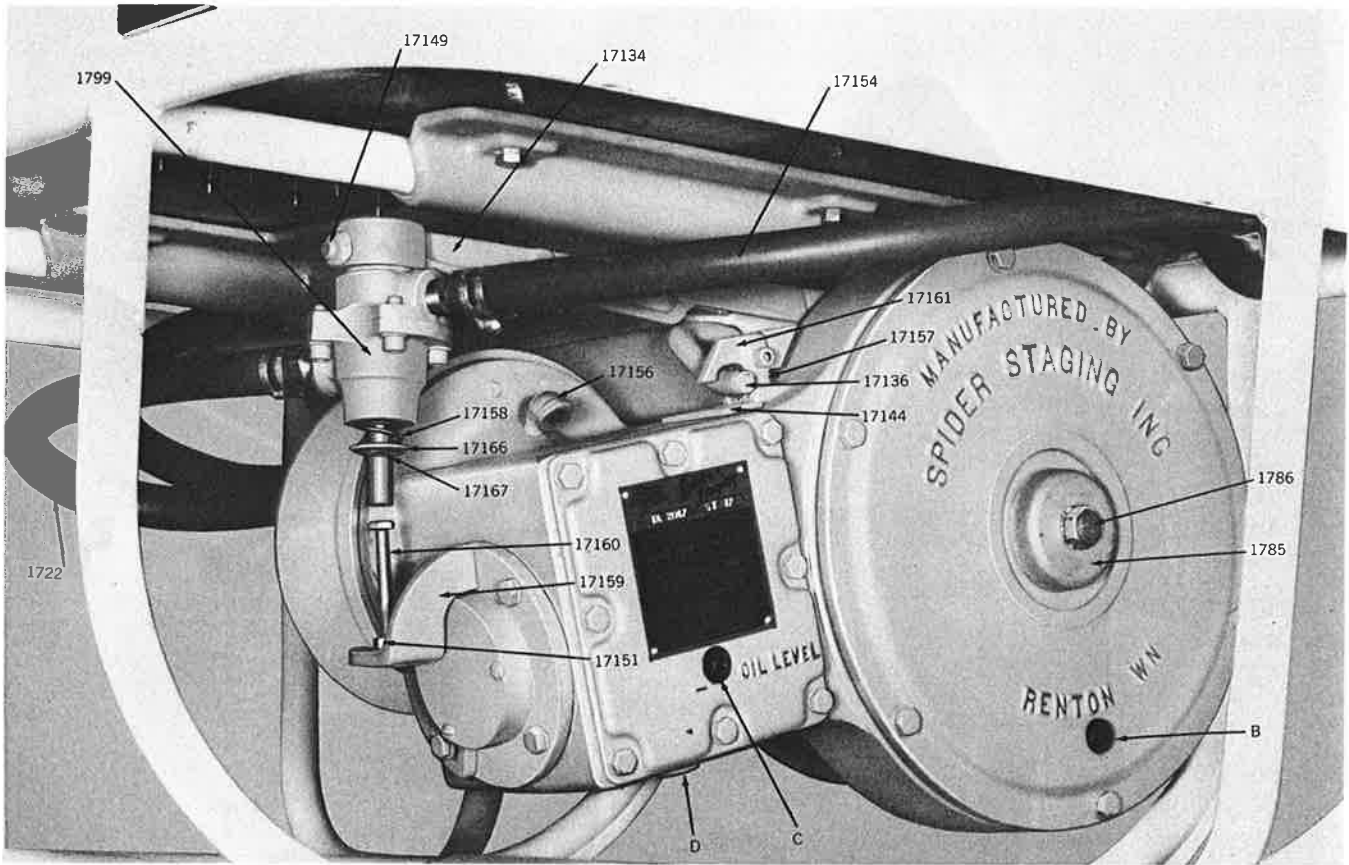


FIGURE 11 — Overload Mechanism

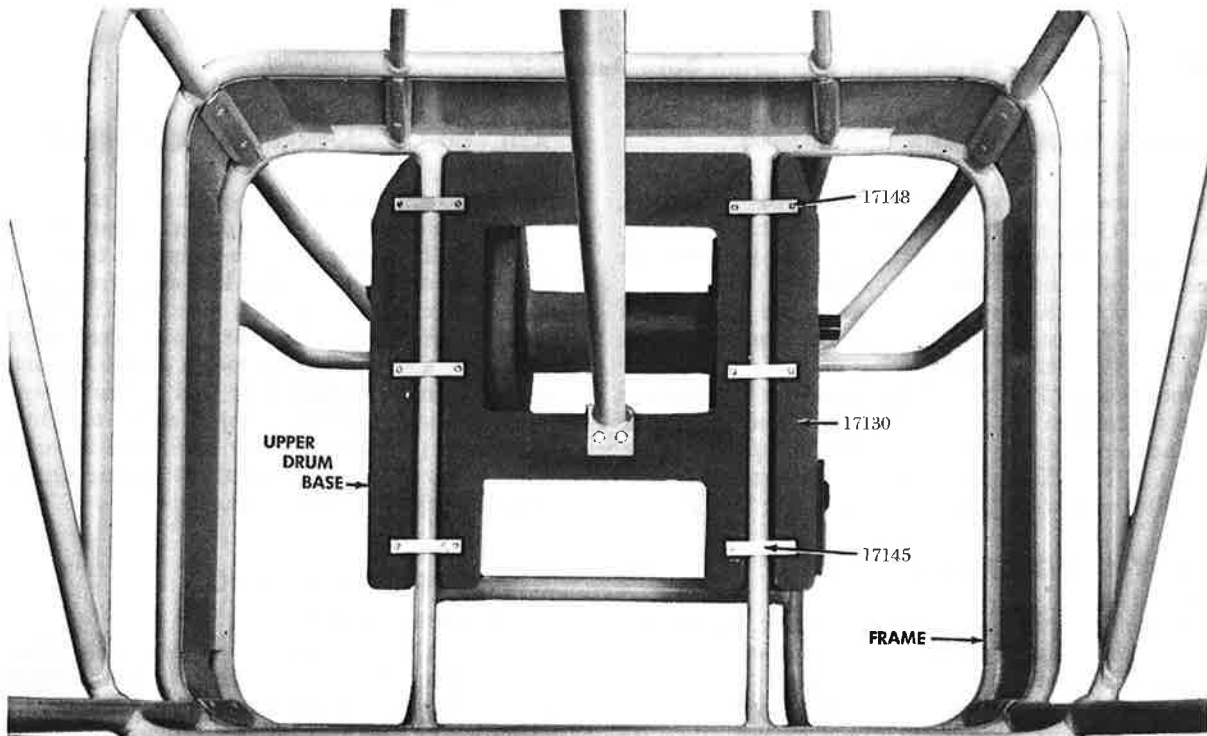


FIGURE 12 — View of Upper Drum Base and Winch Drum



LUBRICATION INSTRUCTIONS

1. WORM GEAR SECTION

The fill hole in this section is shown at "C" in Figure 4. This section is properly filled when the grease will just run out of hole "C" with the power unit in a level position. The drain hole for the worm gear section is shown at "D" in Figure 4 & 11.

CAUTION: It is extremely important that the gears in this section are never allowed to run dry of lubricant. Grease specifications: MOBIL 600W CYLINDER OIL.

2. BEVEL GEAR SECTION

The fill hole and drain hole for this section are located at "B" in Figure 11. The grease is at proper level when it will just run from hole "B" when the power unit is in a level position.

Grease specifications: MOBIL 600W CYLINDER OIL.

3. AUTOMATIC BRAKE

Lubricate only when the brake has been dismantled and the factory applied lubricant removed! The inside of the hub and the cam surface of the floating plate, (Part No. 1774), should be well coated with a grease that

will not run at elevated temperatures.

Grease specifications: MOBIL SORAREX NO. 1.

4. CABLE DRUM BEARINGS

Cable drum bearings, (Part No. 1772 Figure 10 and Part No. 1790 Figure 9). Sealed and lubricated for life.

5. OIL CAN LUBE POINTS

Pivot Pins, (Part No. 17132), Tilt Control Assembly Figure 10. P/B Pivot Pin, (Part No. 17178M), Model ST-17-1 only.

6. OILER and FILTER ASSEMBLY

The filter, (Figure 2), will remove dirt and water from the incoming air. The filter should be drained at least once a day—more frequently if necessary. A well-kept filter will provide clean, dry air at the tee located between the filter and the oiler.

The oiler, (Figure 2), should be kept filled with Mobil-Almo oil No. 1 or equal. The regulating screw on top of the oiler should be adjusted so that approximately 3 drops of oil enter the air line each minute.



Spider Staging

SERIAL

MODEL

LUBRICATION INSTRUCTIONS

WORM GEAR CASE

MOBIL 600 W CYLINDER OIL

CHECK OIL LEVEL WEEKLY. DRAIN AND REFILL GEAR CASE ONCE EVERY 6 MONTHS.

AIR POWERED MODEL ST-17 SPIDER STAGING

AIR LINE OILER: KEEP FILLED TO PROPER LEVEL WITH MOBIL - ALMO NO. 1.

MANUFACTURED BY
SPIDER STAGING, INC.
RENTON, WASHINGTON

U.S. PAT. NO. 2112837 & 2998094, CAN. PAT. NO. 383622, NEW ZEALAND PAT. NO. 124509, GREAT BRITAIN PAT. NO. 882874, FRANCE PAT. NO. 1236286 AND PAT. PENDING. N.Y. CITY B.S.A. NO. 5-17-55SA, N.Y. STATE B.S.A. NO. 4118 & 4119.
STATE OF PENNA. APPROVAL NUMBER 2578

LUBRICATION PLATE:

This plate is permanently riveted to the worm gear case at point "A" (Fig. 1). The lubrication plate is a very important part of the machine and all Spider Staging owners and maintenance men should thoroughly familiarize themselves with its text.

The worm gear case is the most important lubrication point on the machine. The worm gears must NEVER be allowed to run dry. The SAFETY AND EFFICIENCY of your Spider Staging requires that these gears be properly lubricated at all times.



MODEL ST-17-1

CABLE DRUM CAPACITY 1000 FT.

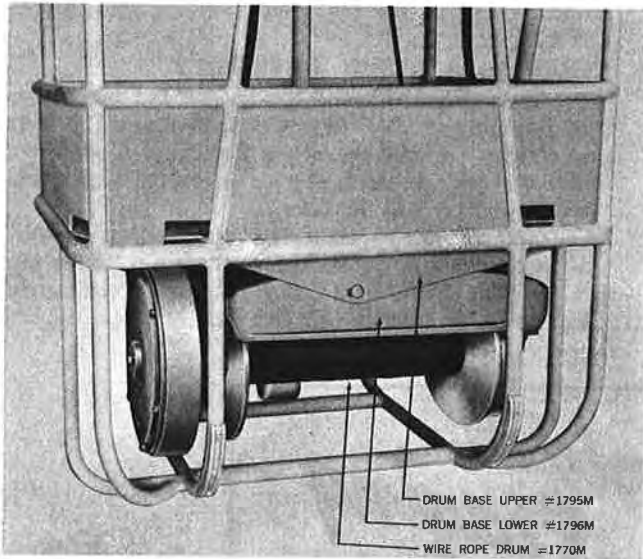


FIGURE 13

The Model ST-17-1 Spider Staging has a drum capacity of 1000 feet of 5/16" wire rope. Specifications differ from the Model ST-17 as indicated below and in specifications on Page Two.

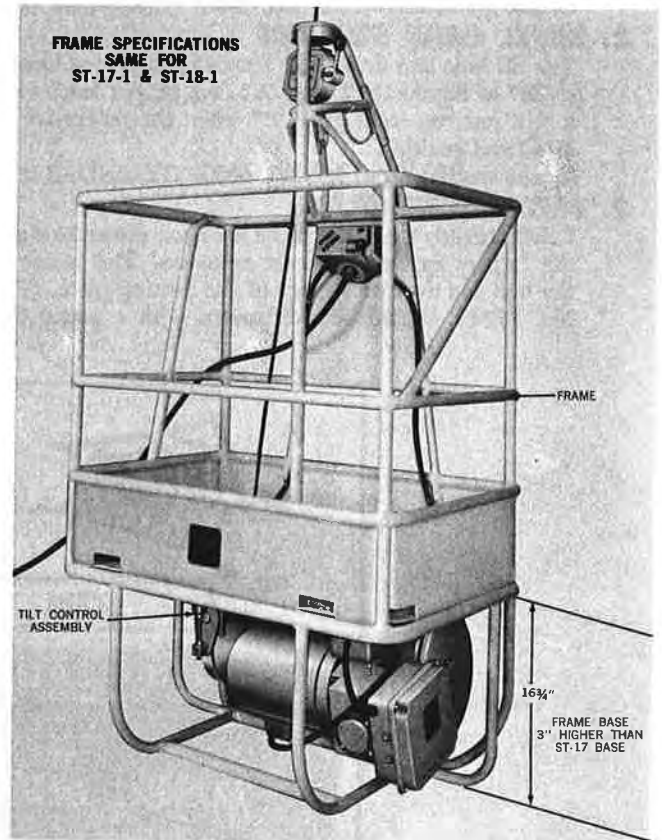
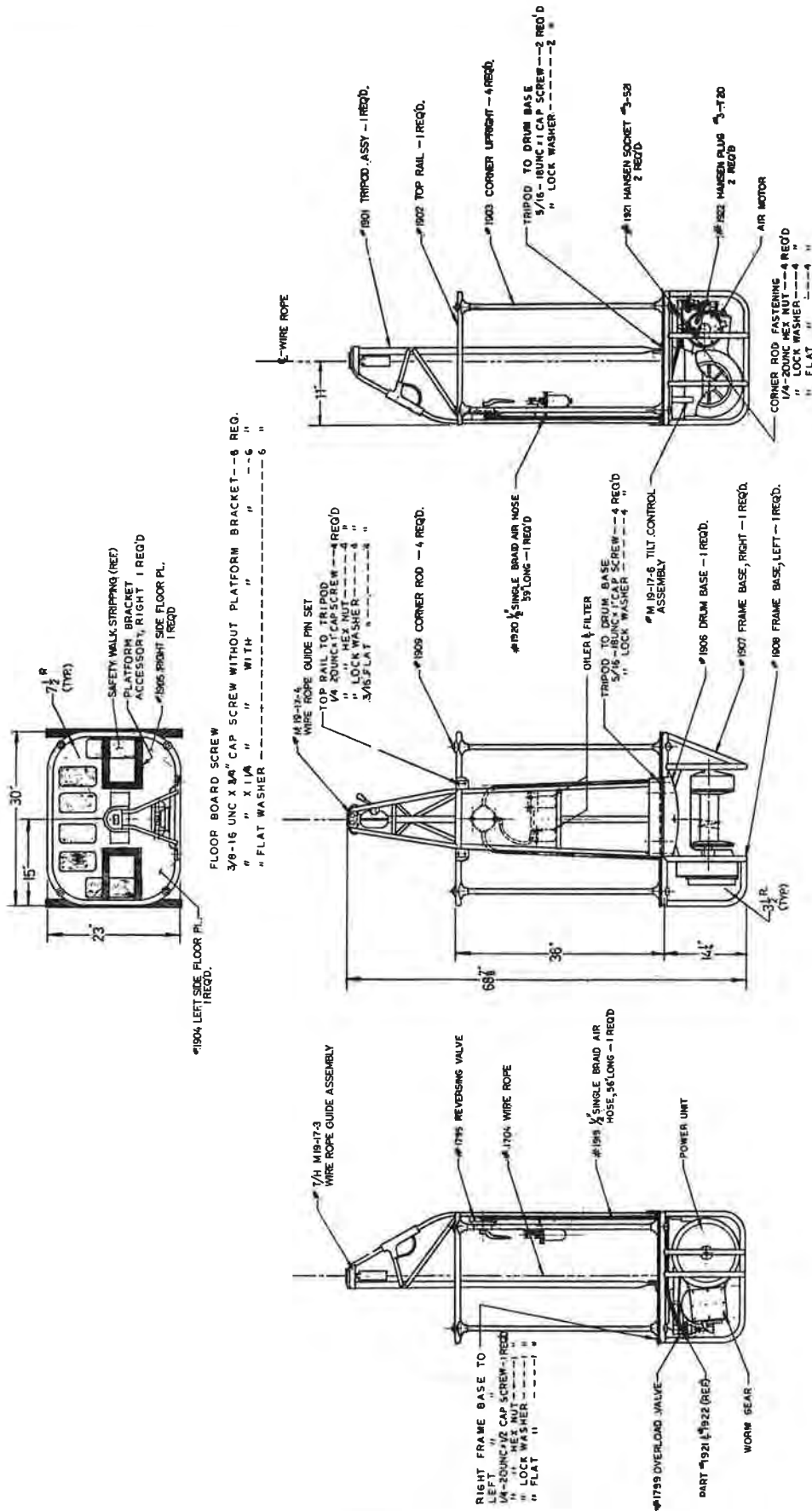


FIGURE 14

SPECIFICATIONS

Physical Dimensions.....	28" x 36" x 71" High
Power.....	Vane Type Air Motor
Lifting Capacity..@ 100 P.S.I. and 60 cu. ft. at Motor, 1000 lbs. Gross	
Drum Capacity.....	1000 ft. 5/16" Wire Rope
Vertical Speed.....	0 to 30 ft. per min.
Net Weight.....	222 lbs.
Shipping Weight.....	252 lbs.



MODEL ST-19 AIR (DEMOUNTABLE)

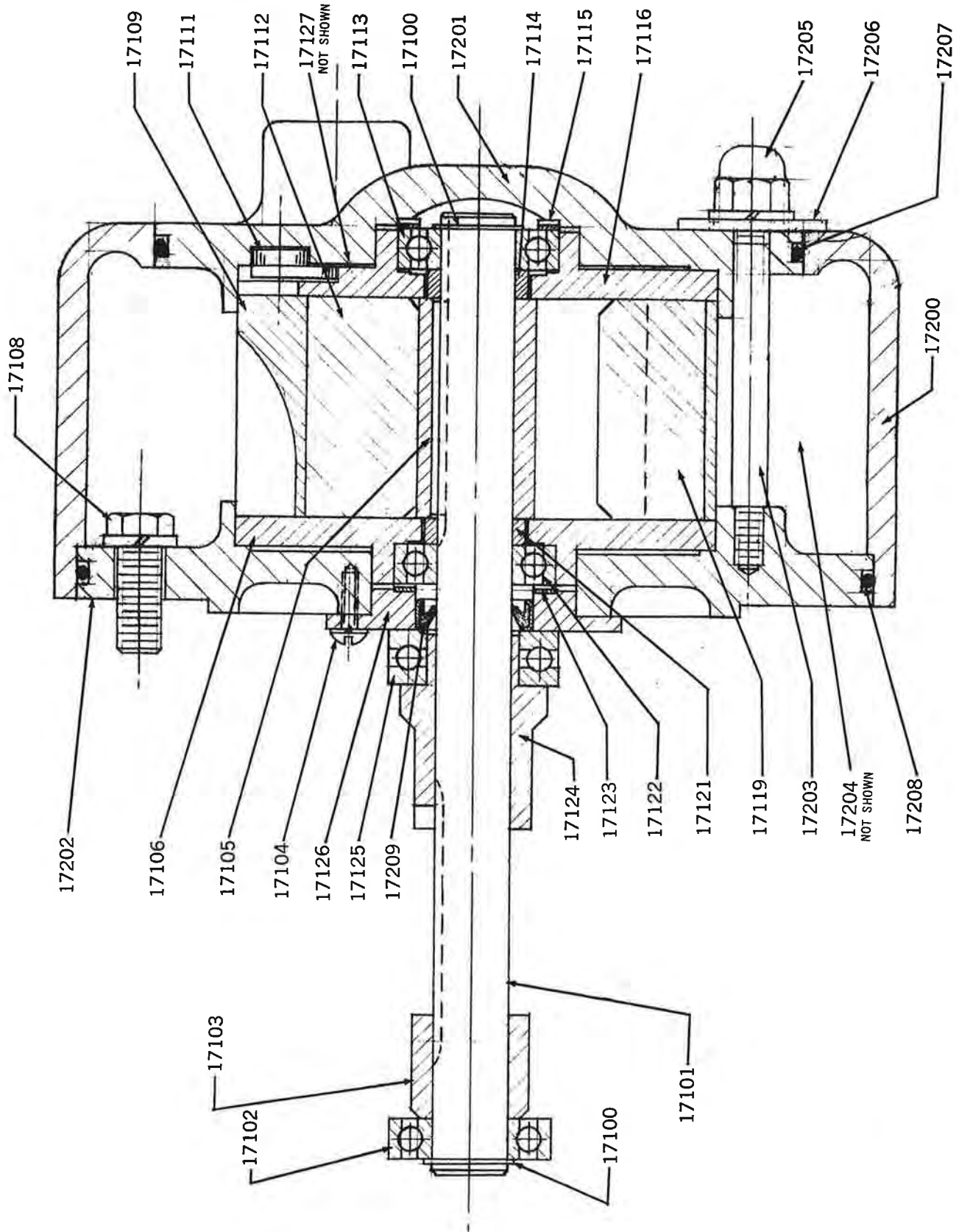


FIGURE 15



XV. AIR MOTOR ASSEMBLY

GENERAL DESCRIPTION:

This air power unit is a piece of precision machinery and must be treated as such in order that it will perform properly throughout its life. Three basic requirements for proper performance are as follows:

1. Air entering the motor *must* be clean and free of dirt at all times.
2. Air entering the motor must carry with it a *continuous* supply of oil to insure proper lubrication of the moving parts.
3. *No* water must be allowed to collect and remain in the motor at any time.

The above requirements are easily met by following these steps:

1. Blow out all air lines before coupling to motor. Check air line filter at frequent intervals and keep it cleaned out. A good procedure is to keep the drain valve on the filter cracked slightly open at all times—the air loss will be negligible.
2. Keep the air line lubricator properly filled and adjusted at all times and check frequently to see that it is in proper operating condition. Refill at least once a day.
3. Use General Petroleum's Almo Oil No. 1 in the air line lubricator. It mixes with water and disposes of it through the exhaust. Run a heavy shot of oil to the motor prior to shutting down for any length of time overnight or longer.

Other than the above items the only precautions to be observed are in disassembly or assembly of the motor during overhaul.

DISASSEMBLE INSTRUCTIONS:

The motor parts are precision made to fine tolerances. Disassemble in a clean place only and protect each part from any possible damage such as nicking, scratching, etc. To disassemble, first remove motor from Drive Housing (Part No. 1737), as follows:

1. Disconnect air lines at motor.
2. Remove the two acorn nuts with flat washers and remove the air motor cover, (Part No. 17200).
(NOTE: For models with Serial No. TA 1909 and under, this step may be disregarded.)
3. Remove the four cap screws, (Part No. 17108).
4. Pull motor gently, directly away from drive housing until outboard bearing, (Part No. 17102), clears its bore and the worm can be lifted out of mesh with the worm gear.
5. The motor can now be removed completely.

NOTE: During these 5 steps particular care must be taken not to damage or force the worm gear set in any fashion!

The motor assembly at this stage may be coupled to an air supply and test run on the bench.

To disassemble the motor proceed as follows:

1. Remove Snap Ring, (Part No. 17100), and slide the Outboard Brg., (Part No. 17102), Outboard Spacer, (Part No. 17103), Steel Worm, (Part No. 1741), Thrust Bearing Carrier, (Part No. 17124), and Thrust Bearing, (Part No. 17125), from the shaft.
2. Remove the two remaining acorn nuts and the Back Head, (Part No. 17201), can be easily lifted off. The Locating Plug, (Part No. 17111), can now be removed.

The Rear Bearing Retaining Spring, (Part No. 17115), will either remain with the back head or will be resting on the bearing. Note the position of this spring so that it can be properly placed in reassembly. Remove the Rear Snap Ring, (Part No. 17100), and Rear End Plate.

3. All remaining parts can now be readily removed from the Housing by hand. The last two parts to be removed will be the Cylinder, (Part No. 17109), and the Front End Plate, (Part No. 17106). To eliminate possible binding remove these two parts together by pushing on the Front End Plate through the opening at the forward end of the Housing and sliding them out together.
4. Remove the Thrust Plate, (Part No. 17126).

At this point, clean all parts thoroughly with a good solvent and blow-off or wipe clean with a lint-free cloth. Examine each part for damage or excessive wear and replace if necessary. With one exception, the wear may be readily evaluated visually. The exception is wear in the Front Rotor Bearing, (Part No. 17122). This bearing, if badly worn, will destroy the running clearance between the end of the Rotor and the Front End Plate. Such a condition will be evidenced by circular scoring or pulling of metal on the front of the Rotor. If the above condition is found, the scored end of the Rotor must be lightly sanded to remove any protruding metal and the Front Rotor Bearing and Front Rotor Spacer must be replaced by a new *matched* set.

ASSEMBLY INSTRUCTIONS:

1. Attach Thrust Plate, (Part No. 17126), to the Front Head.
2. Place a little grease on the Bearing Retaining Spring, (Part No. 17123), and put it in position in the recess provided in the Thrust Plate (the grease helps to hold it in position during assembly). NOTE: The six prongs on the Spring rest against the outer race of the Front Rotor Bearing, (Part No. 17122), when it is in place. IMPORTANT: The Front Rotor Bearing, (Part No. 17122), and the Front Rotor Spacer, (Part No. 17121) are in matched sets. Each are marked with one, two, or three small straight marks. Example—a bearing with two marks *must* be used with a spacer which has two marks. These marks also identify the *Front* bearing and spacer because the *Rear* bearing and spacer carry no marks. The bearing is marked on the side of the inner race on the unshielded or open side of the bearing. The spacer is marked on its outer circumferential surface.
3. Pack the Front Rotor Bearing with a good grade of grease and slide it into the Front End Plate, (Part No. 17106), with the shielded side *down*. Be sure the bearing bore in the End Plate is absolutely clean so that the bearing can seat properly!
4. Place the Front End Plate on the Cylinder, (Part No. 17109).

NOTE: The open end of the large curved slot on the side of the cylinder goes toward the front end plate—(check drawing).

- Check to be certain that the locating dowel in the Cylinder is in place in the proper hole in the End Plate!
5. Slide the Front End Plate and the Cylinder into the Housing together. Be careful not to dislodge the Front Rotor Bearing Retaining Spring while doing this.
 6. Place the Front Rotor Spacer, (Part No. 17121), — identified by the proper marks (which match the marks on the Front Rotor Brg.)—into position in the End Plate.



7. Slide the Rotor, (Part No. 17112), and the Rotor Key, (Part No. 17105), onto the Shaft, (Part No. 17101). The Rotor goes on that end of the Shaft where the keyway extends to the very end of the shaft.
 8. Slide the Shaft with the Rotor in place through the Front Rotor Spacer and Front Rotor Bearing.
 9. Insert the eight Vanes, (Part No. 17119), with the beveled corners toward center.
 10. Pack the Rear Rotor Bearing, (Part No. 17113), with a good grade of grease and slide it into the Rear End Plate, (Part No. 17116), with the shielded side *down*.
 11. Slide the Rear Rotor Spacer, (Part No. 17114), onto the Shaft.
 12. Slide the Rear End Plate and Bearing onto the Shaft. The locating dowel in the Cylinder, (Part No. 17109), must slide into the proper hole in the Rear End Plate.
 13. Install the Snap Ring in its groove in the Shaft.
 14. Place the Locating Plug, (Part No. 17111), in its recess in the Rear End Plate.
 15. Place the Rear Rotor Bearing Retaining Spring, (Part No. 17115), in its recess in the Back Head, (Part No. 17201), with a little grease to hold it in place during assembly.
- NOTE:** The six prongs on the Spring rest against the outer race of the bearing when assembled.
16. Place the two small Port Gaskets, (Part No. 17127), into their recesses in the Rear End Plate. Use a little grease to hold these in place. Part No. 17204 should be in its proper place (mounted in shoulder stud (Part No. 17203)) before back head is installed.
 17. Slide the Back Head in place on the motor—be certain to line up the Locating Plug, (Part No. 17111), with its hole in the Back Head. Take care that the Spring, (Part No. 17115), and the Port Gaskets, (Part No. 17127), remain properly in position while the Back Head is being installed!
 18. It is necessary at this point to check the air motor assembly. First secure the four acorn nuts.
- Pour a small amount of No. 10 oil into one of the ports. Hold the motor by the shaft with the motor *down*. Spin the motor, by hand, so that it rotates on the shaft. The motor should turn *very* freely, with practically no resistance, and should coast to a smooth stop. No dragging, jerking, or roughness should be felt or heard. There will be a slight noise caused by the movement of the vanes and it is possible to feel them moving in relation to the cylinder and rotor. This, however, will be a smooth action. After checking as above, place the Thrust Bearing, (Part No. 17125), on the Thrust Bearing Carrier, (Part No. 17124), and slide them on the Shaft. **NOTE:** The bores of the two bearing races differ in size. The race with the *larger* bore *must* bear against the Thrust Plate, (Part No. 17126). The worm (Part No. 1741), and Worm Key, (Part No. 1743), now are placed in the shaft. *Check to be certain the Worm Key has been installed.* Now place the Outboard Spacer, (Part No. 17103), and the Outboard Bearing, (Part No. 17102), on the Shaft and secure with the Snap Ring, (Part No. 17100).

NOTE: In order to install the snap ring the shaft must be *pulled* as far as it will go toward the *front* of the motor and the worm gear pushed as far on the shaft as possible.

Some end play will be noted in this Worm assembly. This is normal and is no cause for concern as the thrust is *always* in the direction of the motor.

The motor can now be assembled on the reduction gear housing. Slide it into place being very careful not to force

or damage the worm gear set. Insert the Cap Screws, (Part No. 17108), complete with lock washers, and tighten securely—making certain that the Air Motor is properly seated in its locating register.

The two acorn nuts with the flat washers must now be removed and the air motor cover be put in place with the exhaust hole in the cover placed at a 7:00 o'clock position. Secure the two acorn nuts being certain that the flat washers overlap onto the cover.

If the cross shaft assembly which carries the bronze gear has not been tampered with, it will not be necessary to re-adjust the worm gear set.

Now connect the control hoses to the motor, check the filter and lubricator, and the Staging is ready to operate.

TROUBLE SHOOTING

1. Motor running slowly, loosing power . . .

Possible Causes:

- a. low air volume
- b. lack of oil or too much
- c. swollen vanes
- d. badly worn vanes
- e. worn front rotor bearing

Remedies:

- a. Check air supply at Spider.

A gage may be used in the line and a pressure of 90 psi should be maintained with the motor running and the control valve wide open.

A lower reading indicates a need for a larger compressor or larger hose and fittings.

- b. Check lubricator—see that it is clean, full of oil, and properly adjusted (3 - 4 drops per minute.)
- c. Remove vanes and *lightly* sand the *ends*. Moisture causes the vanes to swell and the increased *length* causes binding between the end plates. If vanes can be measured, proper length is 1.870 inches. An increase of .004 inches will cause binding.
- d. Remove and replace.

- e. Remove and replace with new Front Rotor Bearing and properly matched Front Rotor Spacer. Check Paragraph 5 for disassembly instructions.

2. Motor running sluggishly in *downward* direction

Possible Cause:

- a. over-supply of oil

Remedy:

- a. Check lubricator for proper adjustment (3 - 4 drops per minute). Then run motor in downward direction until it has discharged excess oil and is running normally.

3. *Light* rubbing or binding of motor upon assembly, apparent when checking by spinning motor by hand.

Possible Cause:

- a. Some part or parts improperly seated

Remedy:

- a. Connect motor to air line and while running tap the side of the shaft lightly with a soft mallet. This will quite often help to seat all parts properly and eliminate trouble. Be sure motor has oil in it when this is being done!

4. Motor bound tightly—won't move in either direction.

Upon disassembly no visible wear or indication of rubbing or scoring on any parts.

Possible Cause:

- a. swollen vanes

Remedy:

- a. same as item 1, remedy c above.



MODEL ST-17-1 PARTS LISTED BELOW ARE NOT
INTERCHANGEABLE WITH MODEL ST-17

Figures 13 & 14

PARTS LIST

FIGURE	PART NUMBER	PART NAME	QUAN. PER UNIT	MANUFACTURER	MFR. CATALOG NUMBER
13-14	1701M	Frame.....	1	Spider Staging.....	.....
13-14	17130M	Drum Base Upper.....	1	Spider Staging.....	.....
13-14	17131M	Drum Base Lower.....	1	Spider Staging.....	.....
13-14	1770M	Wire Rope Drum.....	1	Spider Staging.....	.....

TILT CONTROL ASSEMBLY

13-14	17210M	Housing	1	Spider Staging .....	.....
13-14	17211M	Spring Shaft	1	Spider Staging .....	.....
13-14	17212M	Spring	1	Spider Staging .....	.....
13-14	17213M	Spring Shaft Bracket	2	Spider Staging .....	.....
13-14	17214M	Adjusting Nut	2	Std. Stock Item	3/8" x 16
13-14	17215M	Washer	2	Std. Stock Item	5/8 SAE
13-14	17216M	Washer	1	Std. Stock Item	3/8 SAE
13-14	17217M	Bolt and Lockwasher	4	Std. Stock Item	1/4-20 UNC
13-14	17218M	Snap Ring	2	Truarl	5000-137
13-14	17186M	Tilt Stop Adj. Bolt with Nut	1	Std. Stock Item	5/16"-18x1-1/4"
13-14	17187M	Tilt Stop Adj. Bolt with Nut	1	Spider Staging	5/16"-18x2"
13-14	17188M	Floor Boards	1 set	Spider Staging .....	.....

PARTS LIST

FIGURE	PART NUMBER	PART NAME	QUAN. PER UNIT	MANUFACTURER	MFR. CATALOG NUMBER
1	1701 †	Frame.....	1	Spider Staging.....	
9	1702 †	Transfer Chain.....	1	Spider Staging.....	
9-11	1703 †	Transfer Chain Guard.....	1	Spider Staging.....	
9-11	1704 †	Wire Rope, 5/16" 6 x 19 Flexset.		Length as Required.....	
1	1705 †	Floor Boards.....	1	Spider Staging.....	
8	1706 †	Top Block.....	1	Spider Staging.....	
8	1707 †	Bottom Block.....	1	Spider Staging.....	
8	1709 †	Guide Pin, Long.....	2	Spider Staging.....	
8	1710 †	Set Screw.....	2	Std. Stock Item.....	
2	1713	Barbed Fitting.....	7	Std. Stock Item.....	3/8"
2	1714	Hose Clamp.....	8	Std. Stock Item.....	
2	1715	Air Hose (Up) 1/2" Single Braid.	1	Std. Stock Item.....	
2	1716	Air Hose.....	1	Std. Stock Item.....	
2	1717	Hose Clip.....	9	Spider Staging.....	
2	1718	Quick Coupling.....	1	Hansen Mfg. Co.....	44 4400
4	1722	Air Hose (Motor) 1/2" Single Braid	1	Std. Stock Item.....	
4	1725	Worm Case Cover.....	1	Spider Staging.....	
5	1726 †	Worm Gear Key.....	2		
5	1727 †	Ring Gear Bearing.....	2	SKF.....	6210 2RS
	1728 †	Adjusting Shims.....		Spider Staging.....	
5	1729 †	Grease Shield.....	2	Spider Staging.....	
5	1730 †	Bevel Ring Gear.....	1	Spider Staging.....	
5	1731 †	Bevel Pinion Lock Nut.....	1	Flex Locknut.....	5/8-18
5	1732 †	Washer.....	1	Spider Staging.....	
5	1733 †	Bevel Pinion.....	1	Spider Staging.....	
	1734 †	Pinion Key.....	1		
5-6	1735 †	Pinion Adjusting Ring.....	1	Spider Staging.....	
5-6	1736 †	Drive Housing Cover.....	1	Spider Staging.....	
5	1737	Drive Housing.....	1	Spider Staging.....	
5	1738 †	Cross Shaft Bearing, Forward.....	1	SKF.....	6205 RS
5	1739 †	Front Spacer.....	1	Spider Staging.....	
(not shown)	1743	Worm Key.....	1		
6	1745 †	Snap Ring.....	1	Waldes-Kohinoor.....	5000-206
6-7	1748 †	Bearing Lock Nut.....	1	Flex Locknut.....	5/8-18
2-3	1753	Air Hose (Filter Inst.).....	1	Std. Stock Item.....	
2	1754	Norgren Oiler.....	1	Norgren Mfg. Co.....	10-002-003
2	1755	Norgren Filter.....	1	Norgren Mfg. Co.....	12-002-033
2	1756	Pipe Tee.....	1	Std. Stock Item.....	
2	1757	Close Nipple.....	2	Std. Stock Item.....	
2	1758	Pipe Plug.....	1	Std. Stock Item.....	
6	1761 †	Cross Shaft.....	1	Spider Staging.....	
6	1762 †	Worm Gear Lock Nut.....	1	Flex Locknut.....	7/8-14
6	1763 †	Rear Bearing Carrier.....	1	Spider Staging.....	
7	1764 †	Carrier Lock Key.....	1		
6-7	1765 †	Keyway Lock Washer.....	1		
6	1766 †	End Cap.....	1	Spider Staging.....	
6-7	1767 †	End Cap Cover.....	1	Spider Staging.....	
9	1770 †	Main Shaft & Drum.....	1	Spider Staging.....	

† Interchange on Air and Electric Models.

PARTS LIST

FIGURE	PART NUMBER	PART NAME	QUAN. PER UNIT	MANUFACTURER	MFR. CATALOG NUMBER
8	1771	Spacer.....	1	Spider Staging.....	
10	1772 †	Pillow Block Bearing (Stock).....	1	Std. Stock Item.....	1 3/16"
9	1773 †	Reset Spring.....	1	Spider Staging.....	
9	1774 †	Floating Plate & Lining.....	1	Spider Staging.....	
9	1776 †	Compression Spring.....	1	Spider Staging.....	
9	1779 †	Lock Nut.....	1	Elastic Stop Nut Corp.....	7/8-14
8	1785 †	Hub Cap.....	1	Spider Staging.....	
8	1786 †	Cap Screw.....	1	Std. Stock Item.....	1/2-13 x 1 1/4"
8	1788 †	Front Guide Pin.....	1	Spider Staging.....	
9	1789 †	Back Plate & Bearing Housing.....	1	Spider Staging.....	
9	1790 †	Automatic Brake Bearing.....	1	SKF.....	6207 2RS
9	1791 †	Bearing Sleeve.....	1	Spider Staging.....	
9	1792 †	Snap Ring.....	1	Waldes-Kohinoor.....	5000-287
10	1793 †	Cap Screw.....	4	Std. Stock Item.....	1/2-13 x 2
6	1794 †	Cross Shaft Bearing, Rear.....	1	SKF.....	6205
2	1795	Reversing Valve.....	1	Spider Staging.....	
9	1796 †	Seal Automatic Brake.....	1	Spider Staging.....	
9	1797 †	Spring Spacer/Automatic Brake... ..	1	Spider Staging.....	
3	1798	Air Motor.....	1	Spider Staging.....	
4	1799	Overload Valve w/ Spring Reset.. ..	1	Spider Staging.....	
15	17100	Snap Ring.....	2	Waldes-Kohinoor.....	
15	17101	Air Motor Shaft.....	1	Spider Staging.....	
15	17102	Outboard Bearing.....	1	Spider Staging.....	
15	17103	Outboard Bearing Spacer.....	1	Spider Staging.....	
15	17104	Mach. Screw.....	3	Std. Stock Item.....	
15	17105	Rotor Key.....	1	Spider Staging.....	
15	17106	Fwd. End Plate.....	1	Spider Staging.....	
15	17108	Cap Screw.....	4	Std. Stock Item.....	
15	17109	Cylinder.....	1	Spider Staging.....	
15	17111	Locating Plug.....	1	Spider Staging.....	
15	17112	Rotor.....	1	Spider Staging.....	
15	17113	Rear Rotor Bearing.....	1	Spider Staging.....	
15	17114	Rear Rotor Spacer.....	1	Spider Staging.....	
15	17115	Rear Bearing Retaining Spring.....	1	Spider Staging.....	
15	17116	Rear End Plate.....	1	Spider Staging.....	
15	17119	Vane.....	8	Spider Staging.....	
15	17121	Front Rotor Spacer.....	1	Spider Staging.....	
15	17122	Front Rotor Bearing.....	1	Spider Staging.....	
15	17123	Front Bearing Retaining Spring... ..	1	Spider Staging.....	
15	17124	Thrust Bearing Carrier.....	1	Spider Staging.....	
15	17125	Thrust Bearing.....	1	Spider Staging.....	
15	17126	Thrust Plate.....	1	Spider Staging.....	
15	17127	Port Gaskets.....	2	Spider Staging.....	
5-6	17128 †	Worm Gear (On Stagings over No. A-502)...	1	Spider Staging.....	
5-6	17129 †	Worm (On Stagings over No. A-502)...	1	Spider Staging.....	
10	17130 †	Drum Base Upper.....	1	Spider Staging.....	
10	17131 †	Drum Base Lower.....	1	Spider Staging.....	

† Interchange on Air and Electric Models.

PARTS LIST

FIGURE	PART NUMBER	PART NAME	QUAN. PER UNIT	MANUFACTURER	MFR. CATALOG NUMBER
10	17132 †	Pivot Pin.....	2	Spider Staging.....	.....
10	17133 †	Tilt Control Spring Housing.....	1	Spider Staging.....	.....
4-10	17134	Overload Valve Brkt.....	1	Spider Staging.....	.....
10	17135 †	Torsion Spring Anchor.....	1	Spider Staging.....	.....
4-10	17136 †	Torsion Spring.....	1	Spider Staging.....	.....
10	17137 †	Tilt Control Spring.....	1	Spider Staging.....	.....
10	17138 †	Tilt Control Spring Shaft.....	1	Spider Staging.....	.....
10	17139 †	Washers.....	1	Spider Staging.....	.....
10	17140 †	Snap Ring.....	1	TRUARC.....	5000-137
10	17141 †	Snap Ring.....	4	TRUARC.....	5100-75
10	17142 †	Washer.....	2	.....	.....
10	17143 †	Tilt Control Spring Brkt.....	1	Spider Staging.....	.....
4	17144	Wear Guard.....	1	Spider Staging.....	.....
12	17145 †	Winch Mounting Strap.....	6	Spider Staging.....	.....
10	17146 †	Hex Hd. Cap Screws & Washers..	2	Spider Staging.....	.....
10	17155 †	Power Unit Spacer.....	1	Spider Staging.....	.....
10	17147 †	Flat Hd. Allen Screws.....	2	Spider Staging.....	.....
12	17148 †	Hex Hd. Cap Screws.....	12	Spider Staging.....	.....
4	17149	Allen Set Screws.....	1	Spider Staging.....	.....
4	17150 †	Flat Head Mach. Screw.....	2	Wear Guard Attach. Spider Staging.....	.....
4-11	17151 †	Hex Nuts.....	2	Tilt Spring Shaft & Limit Lock.....	.....
10	17152 †	Lock Nut.....	1	Tilt Shaft Spider Staging.....	.....
10	17153 †	Flat Washer.....	1	Spider Staging.....	.....
2-4	17154	Air Hose (down).....	1	Spider Staging.....	.....
4	17156	Housing Vent (Worm Gear).....	1	Spider Staging.....	.....
4	17157 †	Housing Vent (Bevel Gear).....	1	Spider Staging.....	.....
4	17158	Overload Valve Reset Spring.....	1	Spider Staging.....	.....
4	17159	Overload Adjustment Brkt.....	1	Spider Staging.....	.....
4	17160	Overload Adjustment (Bolt & Lock Nut).....	1	M.....	.....
4	17161 †	Power Unit Hanger Hook.....	1	Spider Staging.....	.....
5	17162 †	Continuous Worm Lubrication....	1	Spider Staging.....	.....
10	17163	Automatic Brake Inspection Plate.	1	Spider Staging.....	.....
5-6	17164 †	Oil Return Tube.....	1	Spider Staging.....	.....
5-6	17165 †	Oil Scoop.....	1	Spider Staging.....	.....
3-4	17166	Reset Spring Retainer.....	1	Spider Staging.....	.....
3-4	17167	Snap Ring.....	1	TRUARC.....	5100-50
2	17189	Barb Fitting.....	1	Std. Stock Item.....	1/2"
15	17200	Air Motor Cover.....	1	Spider Staging.....	.....
15	17201	Back Head.....	1	Spider Staging.....	.....
15	17202	Front Head.....	1	Spider Staging.....	.....
15	17203	Shoulder Stud.....	4	Spider Staging.....	.....
15	17204	Exhaust Baffel.....	1	Spider Staging.....	.....
15	17205	Acorn Nut.....	4	Std. Stock Item.....	.....
15	17206	Flat Washer.....	2	Std. Stock Item.....	.....
15	17207	O-Ring.....	1	Std. Stock Item.....	.....
15	17208	O-Ring.....	1	Std. Stock Item.....	.....
15	17209	Air Seal.....	1	Std. Stock Item.....	.....

† Interchange on Air and Electric Models.



GENERAL INFORMATION

This manual is published for the purpose of aiding Spider Staging owners, operators, and servicemen to properly use and maintain their Spider Power Driven Staging equipment. The Spider Staging is a machine, and it is essential that it be treated as such so that it will perform safely and efficiently at all times. Proper maintenance is a necessity if you expect your machine to serve a long, useful life.

THE MODEL ST-17 SPIDER STAGING will provide rated performance when the vane type air motor is receiving 60 cubic feet of air per min. at 100 lbs. per sq. in. line pressure. To insure such a supply two things are necessary. First, the compressor used must be large enough to pump the quantity of air required, and the air line leading to the staging must be large enough to deliver that air to the unit at the proper pressure. Due to the extreme variation in jobs and conditions prevailing on jobs it is impossible to list complete standardized compressor and hose requirements. The minimum recommendation for any job is a 75 cubic foot compressor and 5/8 to 3/4-inch air hose. A good point to remember is that the farther the air has to be carried, the larger the hose must be in order to maintain the pressure at the staging. Your Distributor or the Manufacturer is always available for information concerning hook-ups on specific jobs.

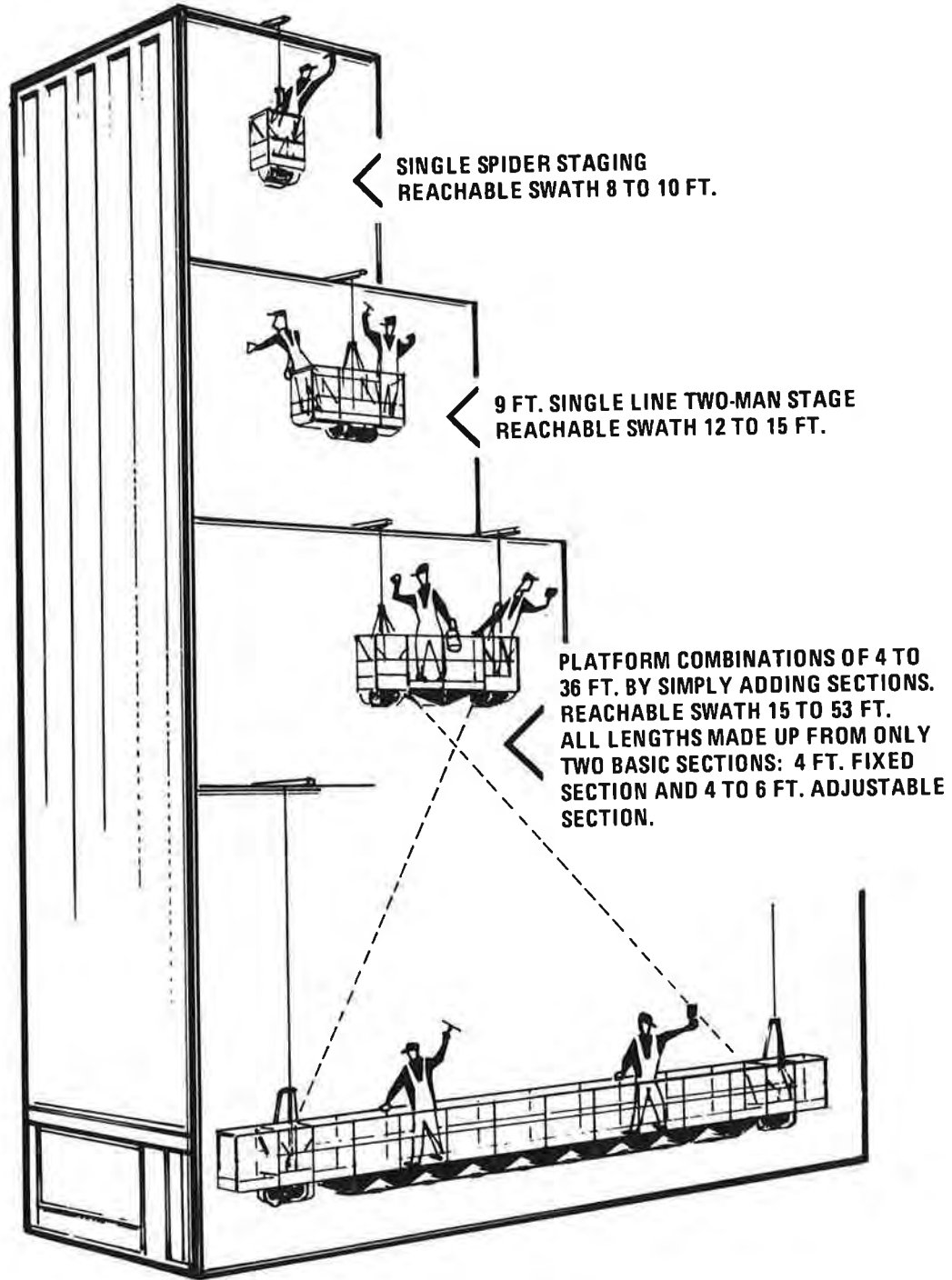
WARRANTY

Spider Staging equipment is warranted to be free from defects in material or workmanship, under normal and proper use in accordance with instructions of the manufacturer for a period of one year from date of delivery to the buyer, but the liability on such warranty shall be limited to the repair or replacement by the manufacturer (f.o.b. Renton, Washington) of any of its equipment which may be returned by the buyer to Renton, Washington, transportation charges and handling fees prepaid, within said one year period and which is found by the manufacturer to have been thus defective in material or workmanship. The foregoing is the full extent of the responsibility of the manufacturer, Spider Staging, Incorporated. No other warranties, express or implied, and in no event shall the manufacturer be liable for delay caused by defects, for consequential damages, or for any charges or expenses of any nature incurred without its written consent.

||| **USE PREVENTIVE MAINTENANCE** |||
IT ALWAYS PAYS DIVIDENDS |||

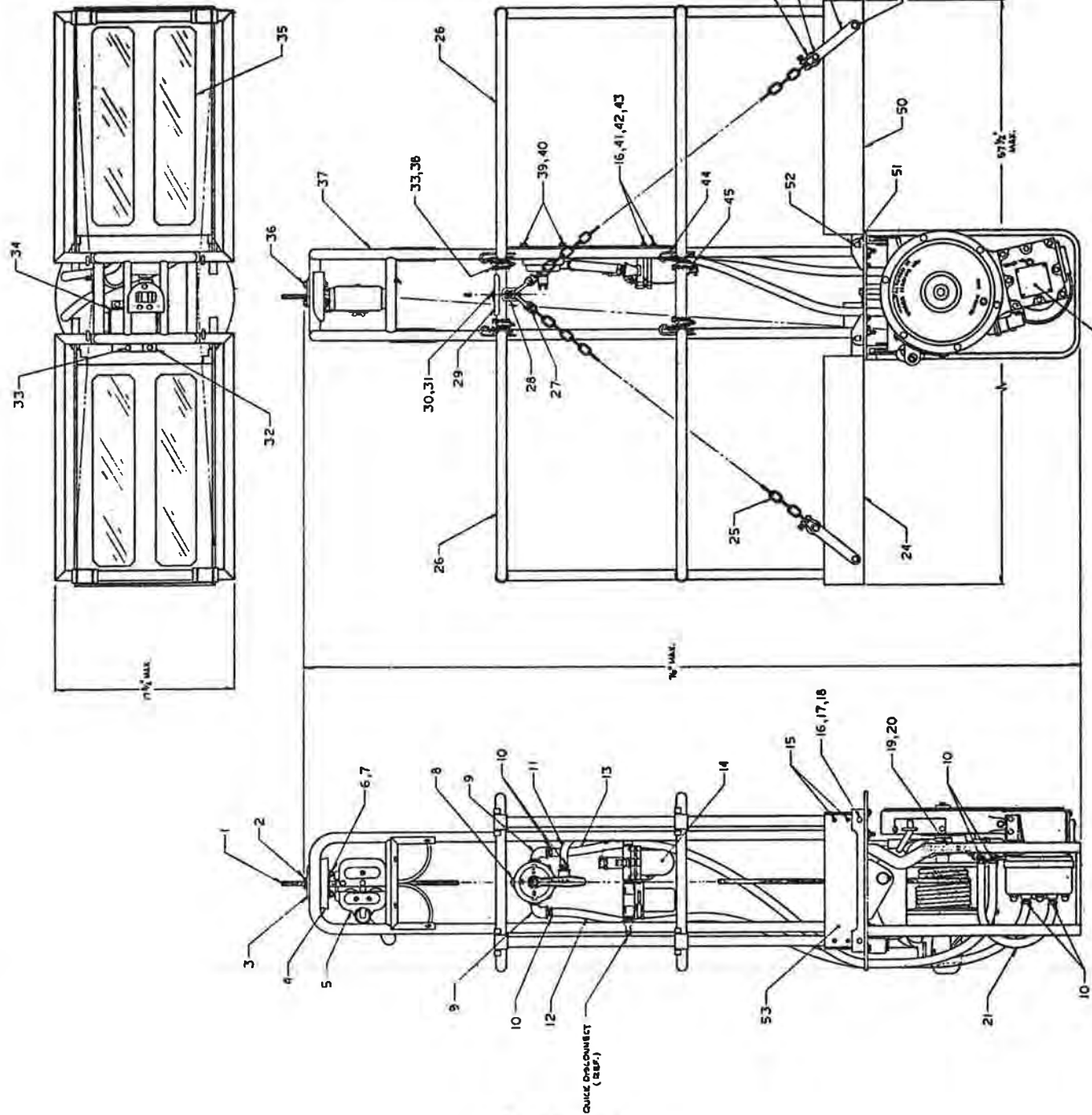


SPIDER STAGING





PART NO/REV	DESCRIPTION
1	WIRE ROPE SWAY
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51	WIRE ROPE SWAY
52	WIRE ROPE SWAY
53	WIRE ROPE SWAY



MODEL ST-26 MINI UNIT

