

# AERIAL LIFT TRUCK

## "TELSTA" T-40B

### DESCRIPTION AND OPERATION

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#### 1. GENERAL

1.01 This section describes and explains the operation of the Telsta Model T-40B aerial lift. It is used to elevate and support personnel with tools and material at above-ground work locations. The T-40B is categorized as a telescoping boom with a work platform. In addition, it has been engineered and designed to place strand and cable while moving.

1.02 The section is reissued to:

- (a) Relate OSHA requirements to aerial lift devices
- (b) Cover prelashing equipment
- (c) Cover reel drives
- (d) Include other technological improvements developed since previous issue
- (e) Provide definitive maintenance information for field forces

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- (f) Provide requirement for "qualified" specialized equipment operator
- (g) Include precautions listed in the Operator's Manual as required information for qualified operator certification.

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

**1.03** The safety precautions outlined in this section as well as those in other Bell System Practices pertaining to aerial lift devices apply to all current Telsta models. T-40B lift operators rated "qualified" must be familiar with these and the precautions listed in the Operator's Manual.

**1.04** The T-Series Telstas are designed to place cable, wire, strand, and self-supporting cable while in motion if load limits in Section 627-700-201 are not exceeded. The aerial lift mechanism is not designed to withstand loads imposed by work operations that normally require the use of material handling devices such as booms, derricks, or cranes.

**1.05** The methods of operation and load limits given in this section apply to the older T-36 and T-40 models when the self-supporting cable conversion kit has been installed according to the manufacturer's specification.

## 2. DESCRIPTION

**2.01** The Telsta Model T-40B (Fig. 1) is a truck-mounted unit with a turret base, a boom constructed of two rectangular metal sections, one of which telescopes into the other, and a metal platform supported on the inner boom section by steel arms. Automatic limit switches prevent excessive elevation and extension of the boom. The unit is equipped with a safety cam to prevent retraction of the boom if the telescopic chain fails and a safety cylinder to prevent the boom from descending if the elevation chain fails. The rotation motor is equipped with a drag brake to prevent overrotation of the rotation shaft. The rotational mechanism is equipped with a key that will shear in case of overload to prevent damage to the equipment.

**2.02** The lift is electrically operated from either of two control positions. The controls located on the turret consist of three toggle switches.

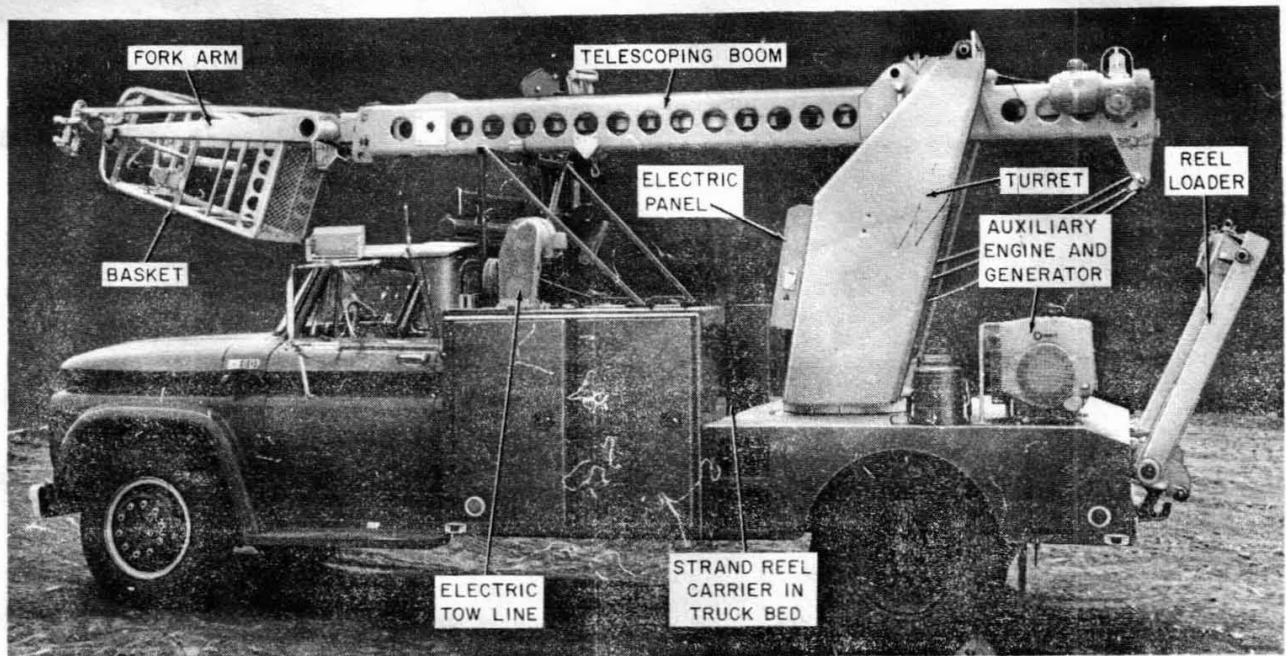
The control in the platform (Fig. 2) is a single-lever joy-stick type designed to move the platform in the same direction the stick is moved. Lifting the control stick will elevate the boom, pushing down will lower the boom, moving it to the right or left rotates the boom right or left, and pushing the control stick forward (away from truck) extends the boom, while pulling the control stick to the rear (toward truck) retracts the boom. A thumb-operated safety switch on the top of the control stick must be held down to activate the control. The control stick can be used to combine movements of the lift. For example, the boom may be elevated and extended while the turret is being rotated. Electric tow line toggle switches (IN-OFF-OUT) are located in the platform and on a plug-in unit which permits control from the ground.

**2.03** On or near the lower (turret) control panel on all lifts is the ground control "override" switch (Fig. 9). It is used to deactivate the basket movement control panel should it be necessary to take control from an injured person aloft. When the override switch is placed in the "on" position, all subsequent lift movements are controlled from the turret (ground) control panel until the "override" switch is allowed to return to the "off" position.

**2.04** Rotation limit switches are standard equipment on all Telsta units. Unlimited turret rotation in one direction would twist and damage electrical conductors which connect truck circuits to the lift device circuits. From zero or center rotation, Telsta T-Series units can make either three clockwise rotations or three counterclockwise rotations. However, when a limit switch stops rotation in one direction, six rotations can then be made in the opposite direction before the other limit switch will stop rotation. It is recommended that lifts be kept at or near zero rotation.

**2.05** The boom can travel from below horizontal to nearly vertical. With the boom fully extended and at maximum elevation, the platform height is approximately 35 feet above the ground. With the boom extended horizontally, the maximum side working distance (from center of truck) is approximately 30 feet.

**2.06** Electric power to operate the lift, power tools, and lights is provided by an ac generator driven by an auxiliary gasoline engine. (See Fig. 3.) The generator provides 120-volt single-phase, 240-volt 3-phase, 60-hertz power. The ignition switch, low



**Fig. 1—Telsta Aerial Lift**

oil pressure reset button, and choke are located on the engine. Emergency stop switches are located on the turret control panel (large red button) and in the platform on the body of the lift control stick housing.

**2.07** To activate the communication system between the lift operator and truck driver, rotate the "on-off" volume control button located on the cab speaker unit. To transmit from the cab, depress the "push-to-talk" switch. For operator safety and convenience, the unit located on the end of the boom near the platform is a hands-free transmit-receive speaker unit. The truck cab speaker unit is shown in Fig. 4.

**2.08** A hydraulically operated reel loader-carrier is mounted on the rear of the truck. The standard size loader-carrier has a capacity of 2500 pounds, and the heavy duty model has a capacity of 3500 pounds. The capacity of each loader-carrier is clearly marked on the arm. The control (Fig. 5) for the loader is usually located in the right rear compartment of the truck.

**2.09** A strand reel carrier (Fig. 6), mounted in the forward portion of the body, is used for transporting and paying out strand.

**2.10** The spindles for the rear reel loader-carrier and the strand reel carrier are equipped with electric brakes for controlling tension. The brake tension controls are located in the truck cab. (See Fig. 7.)

**2.11** Ground fault interrupters (GFIs) provide supplemental protection for 3-wire and double-insulated tools. All 120-volt single-phase convenience receptacles must be equipped with ground fault interrupters. Should a ground fault develop in the tool, current flow to ground causes the circuit to open immediately. This happens at a flow of about 5 ma, which is considerably below the danger threshold. Ground fault interrupters should be tested monthly. To test the interrupters normally used on Telsta lifts, push the yellow "T" (test) button. This should cause the red "R" button to pop out, exposing a white band. This indicates the interrupter is functioning properly and power is off at all outlets on that circuit. If the white band does not appear when tested, do



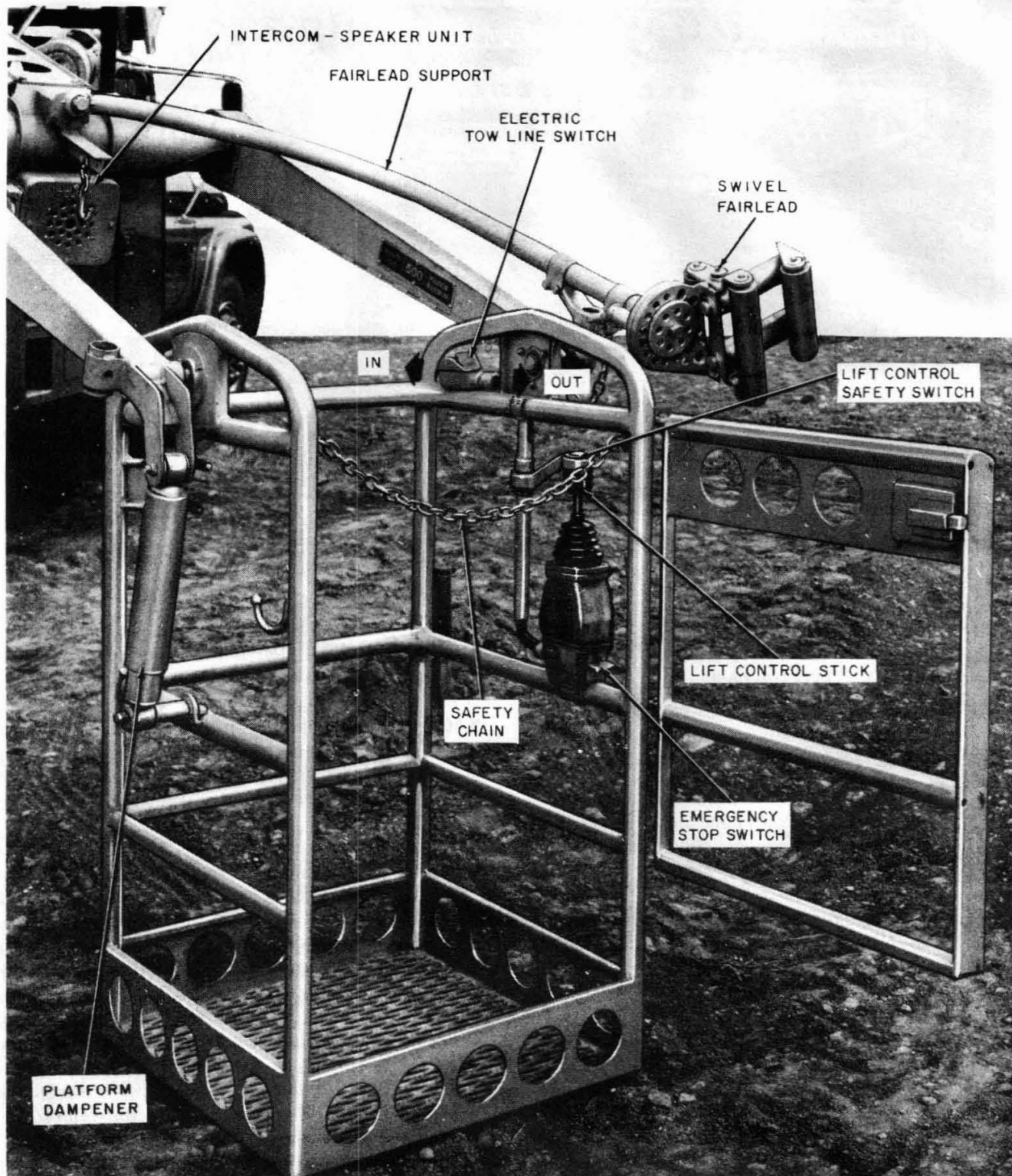


Fig. 2—Platform and Controls

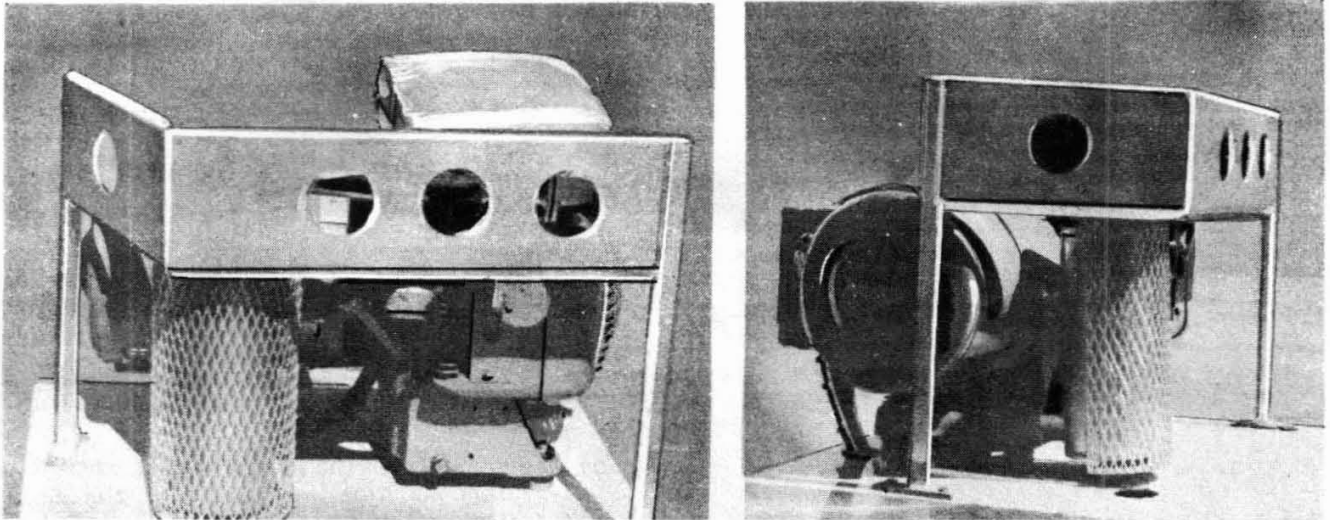


Fig. 3—ONAN Generator

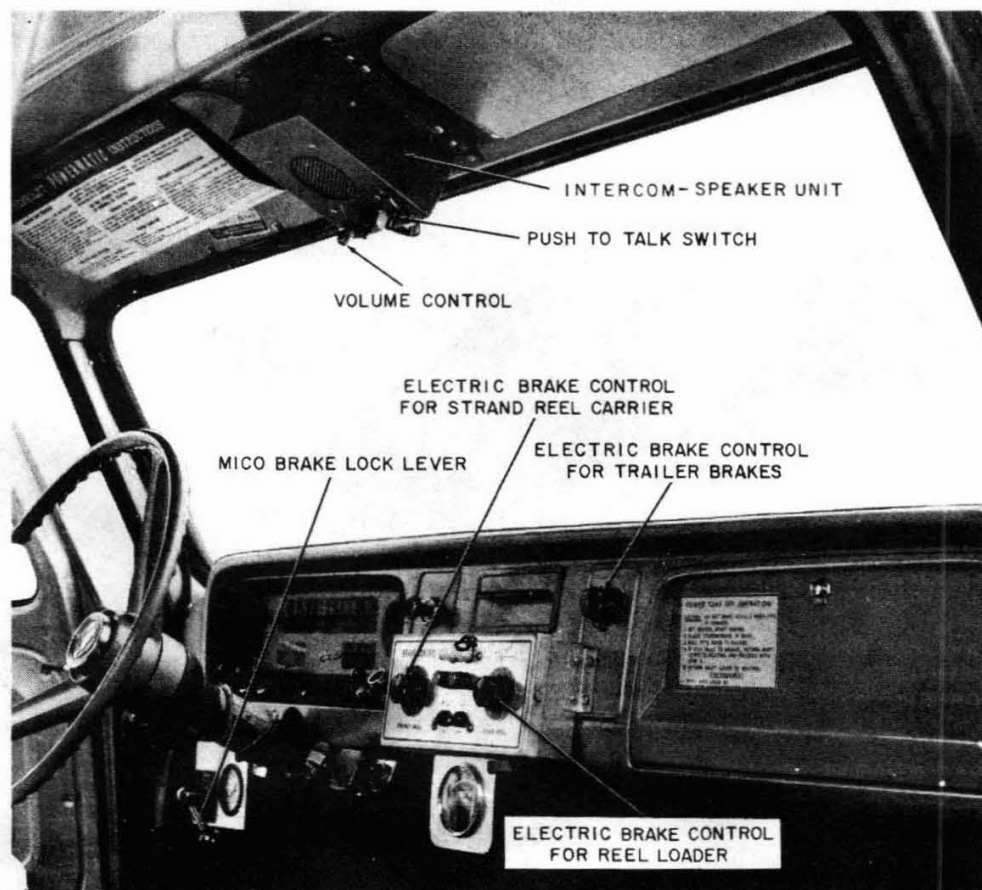


Fig. 4—Controls in Truck Cab

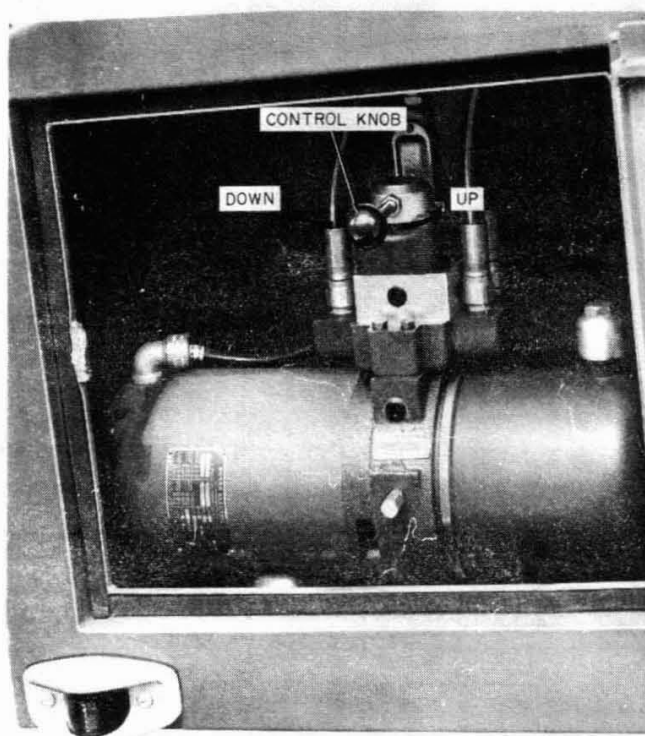


Fig. 5—Reel Loader Control

not use any outlets on the circuit. Push red "R" button back in to restore power availability. Refer the malfunction to the appropriate maintenance group for repair. (See Fig. 8.)

### 3. PRECAUTIONS—OPERATOR AND DRIVER RESPONSIBILITIES

**3.01** Before moving the truck for normal roadway travel, be sure the lift is in the stowed position with the boom fully retracted and resting properly in its support. If the boom is not firmly stowed, road shock can cause damage to the lift.

**3.02** Enter or leave the platform only when it is resting on the ground. Use the boom movement control panel located on the turret to position the platform for entry and to place the boom in the stowed position.

**3.03** The load in the platform shall be limited to one person with authorized tools and material. In no case shall the combined load be allowed to exceed 500 pounds. Combined platform load includes cable and/or strand being placed, tools, material, and operator.

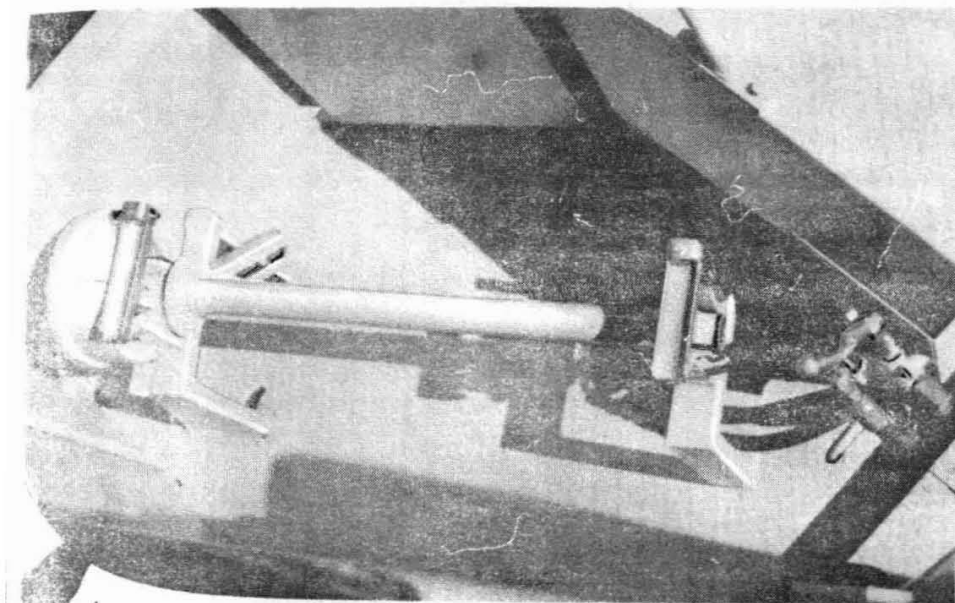
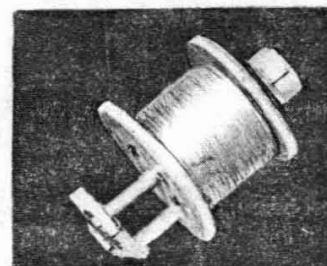


Fig. 6—Strand Reel Carrier Spindle (Viewed From Above)

REEL MOUNTED  
ON SPINDLE



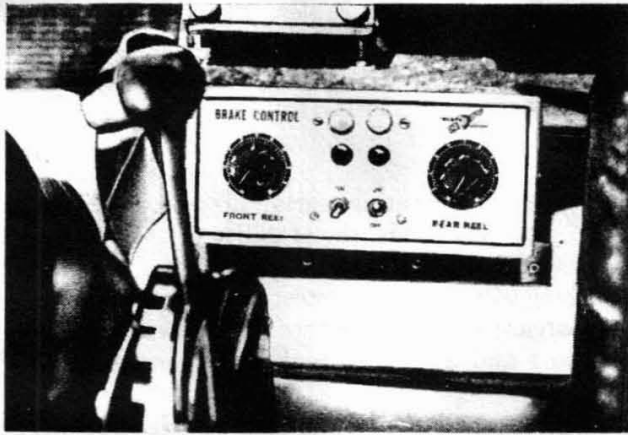


Fig. 7—Brake Control for Reel Carrier



Fig. 8—Electrical Outlet With GFI Protection

- 3.04 Only personnel who have been properly trained shall be permitted to operate aerial lifts.
- 3.05 Lift operators shall wear appropriate standard safety equipment, ie, headgear, body belt with safety strap (lanyard), eye protection, gloves, and insulating gloves as required.
- 3.06 When it is necessary to move the truck with operator aloft, truck movements shall be made as the operator directs. It is the responsibility of the operator to be sure that any signals which might be used will be understood by all concerned.
- 3.07 The truck shall be moved at a slow walking pace, and insofar as possible, the operator should look in the direction of travel to avoid objects that might cause injury, damage to equipment, or interfere with traffic.
- 3.08 The operator must guard against possible contact with primary or secondary power conductors. Throughout the time this possibility exists, rubber gloves of proper class to provide protection shall be carried in the platform.
- 3.09 Under no circumstances shall operators perform work on any plant that does not meet **minimum** clearances as specified in other Bell System Practices.
- 3.10 Operators and drivers of aerial lift vehicles shall have an insulating blanket and rubber gloves of proper class available when contact with electrical conductors or equipment is possible. Before commencing work at locations where this possibility exists, the rubber gloves and insulating blanket shall be placed in the cab of the vehicle. Because insulating equipment is susceptible to damage, selection of a storage compartment location requires careful consideration.
- 3.11 The aerial lift is rated as uninsulated and contact with conductors must be avoided.
- 3.12 If the lift should accidentally contact an energized power conductor, the entire truck, its contents, and anything touching it will become electrically charged. If this happens, no one should attempt to enter the truck, or in any way come in contact with the truck or its contents. ***Anyone in the truck should remain there until the electrical contact has been broken***

unless an emergency arises and the following precautions are taken:

(a) If contact with electric power is made and an emergency makes it necessary to leave the truck, put on the insulating gloves and throw the insulating blanket on the ground. Jump off the truck onto the insulating blanket. Do not come in contact with grounded objects such as tree limbs, shrubbery, personnel standing on the ground, etc, until free and clear of contact with the truck.

(b) If it is necessary to reenter the truck, wear the insulating gloves and step from the insulating blanket to the truck, making sure there is no bodily contact with any grounded object.

**3.13** While operating with a man aloft, the driver shall be certain that no contact exists between the lift and any energized object. If there is any doubt as to whether electrical contact exists, the driver must assume the truck is energized.

**3.14** When the operator is on the platform, the driver of the truck shall not leave the cab unless the engine is stopped, the parking brake is set, the wheels are chocked, and (when truck is equipped with standard transmission) the gear shift lever is in "low" or "reverse" position and the Mico brake lock is set, if so equipped. If the truck is stopped on a grade and the driver must leave the cab, wheel chocks shall be placed on the downhill side and against both rear wheels.

**3.15** While on the platform, the operator must wear a body belt and safety strap (lanyard). At no time should the operator "belt-off" to or around adjacent fixtures, structures, or poles. Keep both feet on the platform floor and avoid sitting or standing on the side rails. Devices used to gain height or reach from the platform shall not be used.

**3.16** Placing operations should be carried out with the truck moving in the direction of traffic, where practical. In order to avoid depressions or holes in the road which could cause a sudden lurch or change of truck inclination, the driver shall walk any part of the proposed truck route not plainly visible from the truck cab. Starts and stops should be made as smoothly as possible and the driver must be on the alert for commands from the operator.

**3.17** Do not attach cables, strand, wire, etc, to the platform or boom except as outlined in sections which cover cable and strand placing methods using an aerial lift truck. Do not alter or modify the lift in any way.

**3.18** When operating aerial lifts on crowned or inclined roads, the stability of the truck will be reduced. Under these conditions, the driver will generally be able to detect impending instability. To increase stability, operate the lift with the boom as short and as nearly centered as practical.

**3.19** Do not attempt to make any switch adjustments, replace any fuses, or open any electrical connections on the lift electrical system unless the generator has been shut down and the platform stowed or on the ground.

**3.20** When making adjustments or performing maintenance on any part of the aerial lift where movement of the machine could cause injury or damage, stop the generator and take any additional precautions necessary to prevent movement of the lift.

**3.21** Keep bystanders away from the aerial lift and clear of all work operations. Work locations must be guarded in accordance with Division 620 of the Bell System Practices.

**3.22** Although the auxiliary engine exhaust system is shielded, it will still scorch or burn polyinsulated conductors, sheath, or nylon ropes when allowed to remain in contact. Should contact occur, check extent of heat damage.

#### **4. OPERATION**

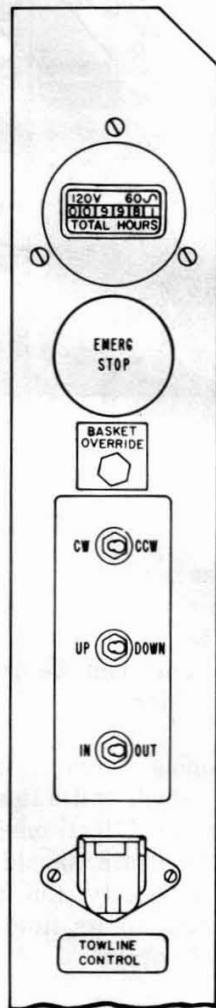
**4.01** Only trained and authorized employees shall be assigned by supervision to operate the lift. An Operator's Manual shall be kept on vehicles for reference should questions arise about correct maintenance or operating procedures.

**4.02** To place the lift in operation, start the auxiliary engine, referring to the starting instructions on the generator, and allow sufficient time for engine warm up.

**4.03** *Warning: Before raising the boom, check for overhead obstructions. If there is a reel on the rear carrier, be sure there is clearance between it and*



*the heel of the boom. Using the controls on the turret (Fig. 9), raise the boom from the carrying support, rotate the turret to place the boom at the side or rear of the truck, and lower it until the platform is approximately 4 feet above the ground.*



**Fig. 9—Controls on Turret**

**4.04** Unhook the platform from its travel position, and using the platform control, place the platform firmly on the ground, as shown in Fig. 10, before entering.

**4.05** Check that the intercom system is on and working. Do not operate the lift if the intercom system is not working. When the operator

is on the platform, the controls on the turret will not be used except in an emergency, or by explicit instructions from the worker aloft.

**4.06** When operating the lift, loads imposed on the boom must not exceed maximum rated loads. When placing self-supporting cable using a moving aerial lift with the boom fully extended, the maximum allowable cable tension is 600 pounds. This load limit allows self-supporting cable to be placed in normal span lengths while maintaining minimum above-ground clearances. Since actual cable tension cannot be determined during the placing operation, above-ground clearance and span length limits have been determined that are equivalent to a cable tension of 600 pounds. For example, when placing 50-pair 22-gauge self-supporting cable where the average pole attachment height is 19 feet and a minimum ground clearance of 15 feet must be maintained, the maximum span length is limited to 200 feet. With the same size self-supporting cable, the 19-foot pole attachment height, and a minimum allowable ground clearance of 10 feet, the maximum span length is limited to 300 feet. See Section 627-700-201 for detailed information. If lower ground clearances can be tolerated during the stringing operation, the aerial lift can be used for stringing operation for longer spans. Prior to placing self-supporting cable with the aerial lift, the job should be presurveyed to ensure safe, efficient use of the equipment.

**4.07** After work operations aloft have been completed, the operator shall leave the platform only after it has been placed firmly on the ground. Tools and equipment used by the operator will be removed and the platform hooked for carrying. The lift is then placed in the stowed position using the controls on the turret.

## **5. EMERGENCY PROCEDURES**

**5.01** Failure of the auxiliary power supply while the aerial lift is in use will make it necessary to lower the lift manually and place it in the stowed position or lower it to a position that will allow the truck to be driven to a location where the auxiliary power supply can be repaired.

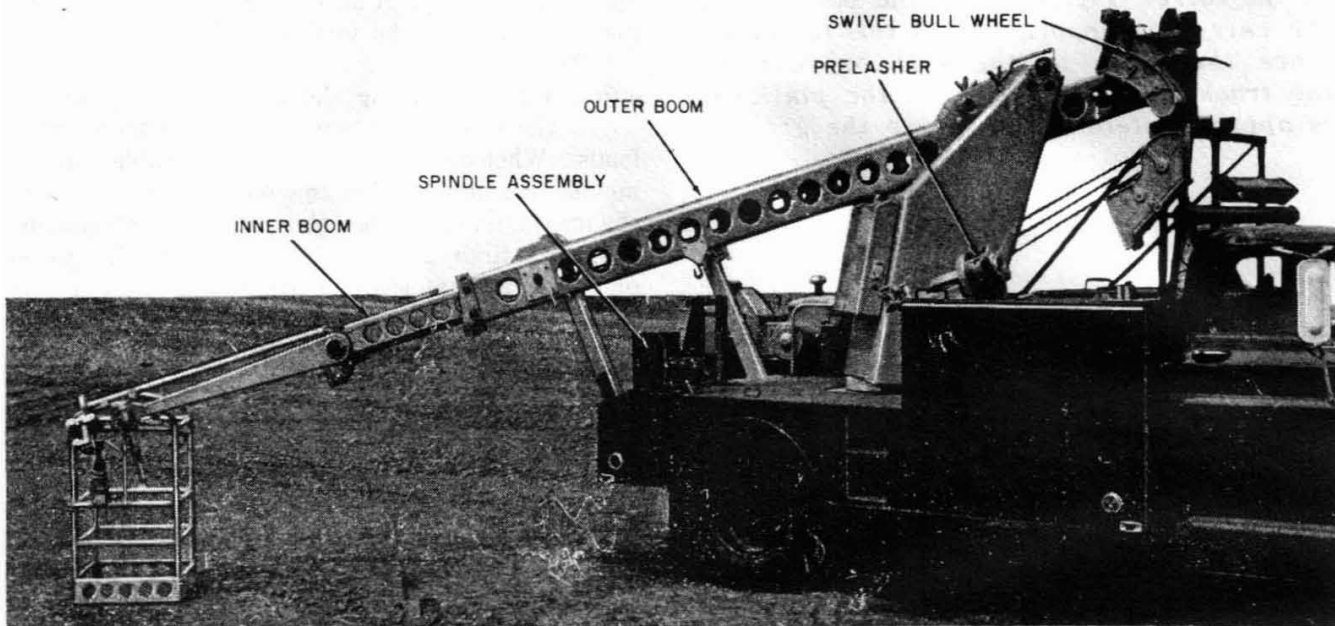


Fig. 10—Boom Lowered to Rest Platform on Ground

**5.02** To manually raise or lower booms equipped with Yale and Towne elevating hoists, proceed as follows:

- (a) Remove the 1/4-inch pipe plug from the end bell of the elevating drive motor.
- (b) Release the spring-operated hoist brake by inserting the long end of the hoist brake releasing tool (No. 100079 hairpin) into the hole in the exposed end of the brake release shaft on the upper right side of the hoist brake assembly (Fig. 11). Rotate the shaft until the tool can be pushed far enough into the hole to allow the short end of the tool to rest on the ledge of the hoist drive housing. This will hold the brake in the released position. Insert the hand crank with extension into the hole in the driver's side of the turret, and engage the slotted end of the elevation drive motor shaft with the crank to raise or lower the boom.
- (c) On lift units equipped with Budgit elevating hoists, the crank handle is inserted from the passenger side of the turret to lower or elevate the boom.

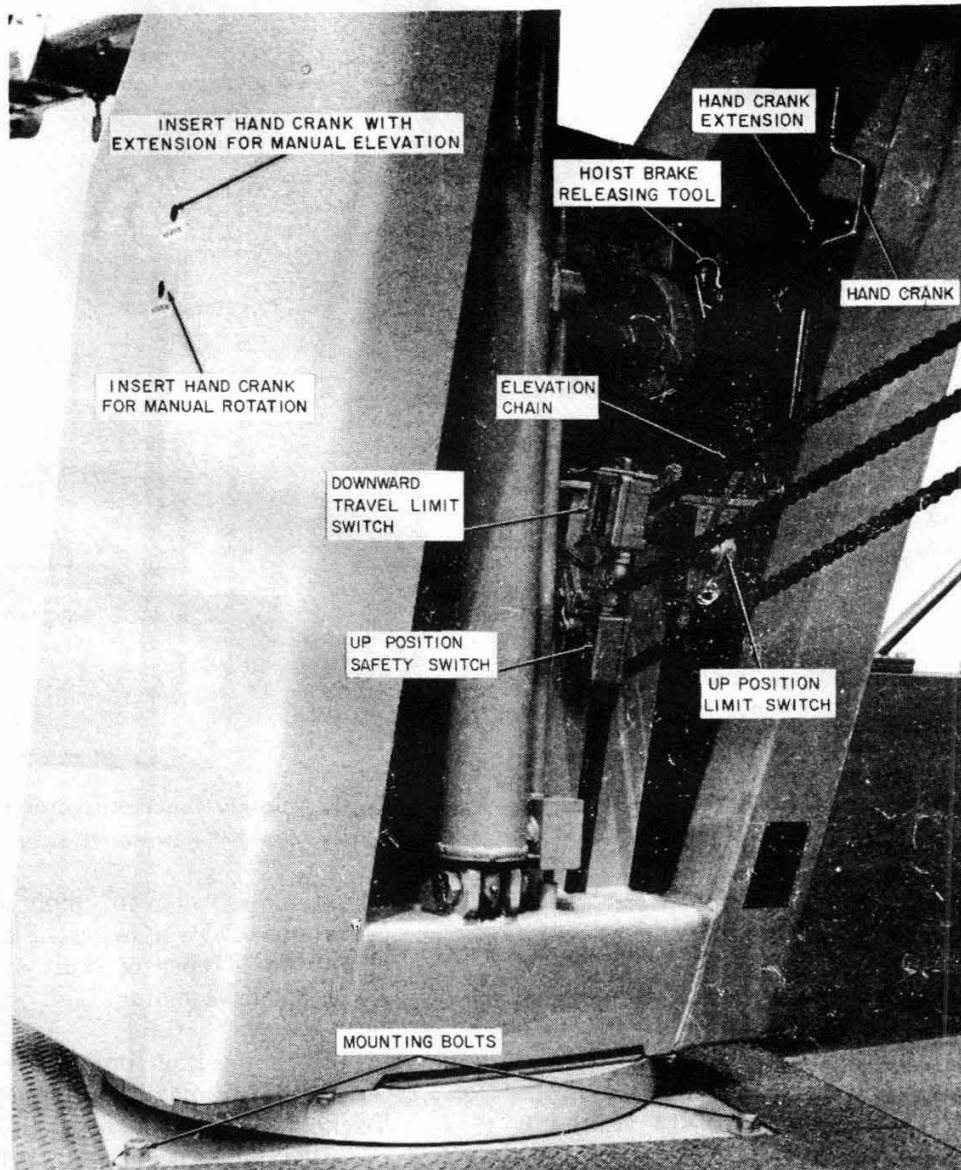
- (d) To rotate the turret, insert the crank through the hole in the turret to engage the square socket on the belt-drive pulley of the azimuth gearbox. The unit can be rotated in either direction by cranking.

**5.03** The telescoping boom is equipped with a safety cam which will automatically engage and prevent retraction of the boom if the telescoping chain fails. If the chain should fail, lower the boom carefully. The safety cam will not keep the boom from extending to its limit if the boom is lowered below horizontal.

**5.04** If the boom cannot be retracted, place rope lashing from the boom to each side of the truck to reduce stress on the components before driving the truck. Drive slowly.

## 6. MAINTENANCE

**6.01** Specified maintenance checks are essential to the safety of personnel assigned to perform work operations from aerial lift units. Failure to perform inspections and correct unsatisfactory conditions when found can result in serious injuries. It is the responsibility of the operator to make



**Fig. 11—Turret**

the specified daily checks and take required action for correction.

**6.02** All equipment malfunctions shall be reported to responsible persons designated by local practice.

**6.03 Daily Checks—Operator:**

(a) Visually inspect all lines, hoses, fittings, cylinder heads, and packing for signs of oil

leakage. Leakage of a few drops of oil per day through a packing seal does not normally indicate trouble and is good for packing lubrication.

(b) Inspect electrical and communication cables for signs of chafing or wear and for twists in the insulation.

(c) Keep oil in the auxiliary engine at the full mark. Operating on steep slopes will cause



engine damage if oil level falls below the oil pump intake.

**Note: Engine-Generator Specifications:**

Use engine oil as recommended by the manufacturer or as instructed. DO NOT OVERFILL.

- (d) Check boom for wire scraps, limbs, cable supports, cable ends, or other foreign items which could foul control and power cables or damage the chain drive mechanism.
- (e) Daily, prior to first use, test all lift controls to ensure proper operation. Include override switch test.
- (f) Keep turret rotation area clear of material, tools, or any item that might interfere with turret rotation.
- (g) Visually check for mechanical defects such as cracks in structural members. Check for slack or play in directional movements.

#### 6.04 Weekly Checks—Operator Responsibility:

- (a) Check oil level in hydraulic reservoirs:

- (1) The fluid level of the safety descending support ram is checked using breather cap dip stick while boom is in the stowed or horizontal position.

**Note:** Add or fill *only* with **Mobil** hydraulic fluid—**Aero, Mil Spec H5606A** (Fig. 12).

- (2) Hydraulic reel carrier—Usually located in the right rear bin. Check 3500-pound carrier with arms in down position. Check 2500-pound carrier with arms in up position. (See Fig. 13.)

**Note:** Use type “A” transmission fluid.

- (b) Check operation of limit switches and control switches. Use controls on turret when checking limit switches.

- (1) The downward travel limit switch should operate when the platform is lowered to some object that prevents further downward movement of the boom. To check switch



Fig. 12—Safety Descent Hydraulic Cylinder

operation, set boom in saddle and continue to operate the DOWN switch. Slack in elevation chain should operate limit switch and stop elevation drive motor.

- (2) The up-position limit switch should operate to control maximum up position of boom. To check limit switch operation, hold UP switch operated. When boom contacts the limit switch arm, the elevation motor should stop.

- (3) The up-position safety switch should operate to stop elevation of the boom if for any reason the up-position limit switch fails. To check, operate the safety switch manually. Operate UP switch. The boom should not move. The up-position safety switch must be reset manually.

- (4) The telescoping limit switch, located on the outboard end of the outer boom, should operate to limit the in and out movement of the boom. To check, operate OUT switch and hold operated. The telescoping drive motor should stop when the limit switch is

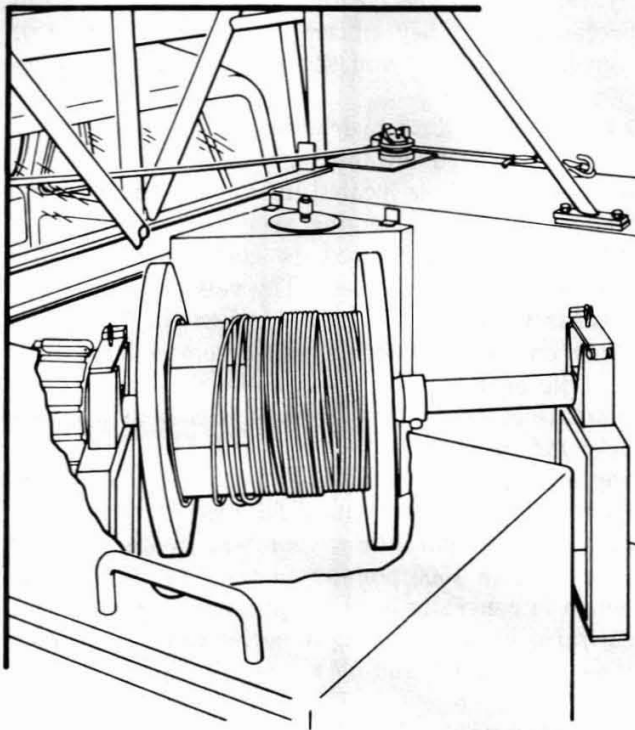


Fig. 13—Strand Reel Carrier

activated. Operate IN switch and hold operated. The telescoping drive motor should stop when the limit switch is activated.

- (5) Check the condition of the safety cam and spring. If there is excessive clearance between cam and stop, adjust chain anchor nut until there is 1/16-inch separation. All malfunctions must be reported and attended to by a qualified mechanic.

***Danger: If any of the limit switches should fail to function properly, do not operate the lift until the trouble is located and repaired.***

#### 6.05 Monthly Checks:

- (a) Change the oil in the auxiliary engine crankcase and air filter every 100 hours of operation as indicated by the hour meter on the turret.
- (b) Check the work platform stabilizer for resistance to free-swing action. When resistance to free-swing decreases, report for stabilizer replacement.

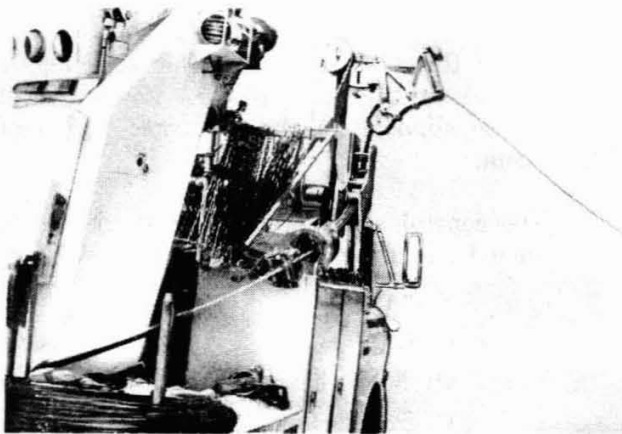
- (c) Check all power and intercom cables for loose connections, twists, chafing, and insulation breaks. Check platform electrical and communications cables for proper sag with boom fully extended.
- (d) Check rear reel carrier-loader hydraulic cylinders for leaks, scoring, and proper function.

#### 6.06 Three-Month Checks (To be performed by qualified mechanic in accordance with Manufacturer's Manual):

- (a) Check oil level of safety descending device using the filler-cap dip stick gauge. Do not overfill.
- (b) Check the oil level in the fluid coupling of the telescoping drive motor. Low oil level will cause slippage in the telescopic action of the boom.
- (c) The control and power cables in the boom should sag approximately 3 inches with the boom fully extended and horizontal. Tighten the tensioner until correct sag is obtained.
- (d) Check all boom bearings for broken seals and free rotation.
- (e) There should be 1/16-inch clearance between the safety cam and stop. If there is excessive clearance, adjust tension.
- (f) Check strand and cable reel carrier copper power contacts for alignment and cleanliness to ensure proper brake control.
- (g) Check the relay panel for tightness of terminal screws.
- (h) Tighten mounting bolts on the base.
- (i) Tighten torsion bar mounting bolts. Check the condition of the torsion bar ball sockets, rubber bushings in the main bearing caps, and tightness of axle U-bolts. Lubricate rubber bushings with rubber lubricant.
- (j) Check clearance of the Yale and Towne elevation drive motor electric brake by rocking the brake cam shaft. If the shaft has no free play, adjust per the instruction manual.

## 7. OPTIONAL EQUIPMENT

**7.01** A Telsta prelasher kit can be attached by means of two bolts on the field side of the T-40B truck body. A positive gear-driven lasher can lash cable to strand with a combined diameter of 1-1/2 inches. However, when this maximum size combination is prelashed, extreme caution must be exercised with long span lengths so that tensions necessary to provide required ground clearances do not overload the boom. (Refer to 4.06.) Either "pull-in" or "drive-off" prelash operations can create high stresses that may be detrimental to the lift. (See Fig. 14.)



**Fig. 14—Prelasher**

**7.02** Personnel involved with prelash activities must be knowledgeable of the 627 series Bell

System Practices, which describe prelash precautions. They must also be well versed in conventional cable and strand placing techniques.

**7.03** A light duty hydraulically driven winch can be placed on the right rear corner of the body with controls located in the stand reel carrier well. With truck engine speed at recommended 2000 rpm, winch speed is controlled by valve feathering up to 100 rpm. The valve automatically returns to center "off" when released. The winch shaft on current models will accommodate either the CR or RS reels; whereas, earlier models are compatible only with RS reels. CR reels are used only for capstan applications. Table A indicates approximate line speed and pull capability at various fractions of full drum. To prevent equipment damage, the hydraulic system will bypass at loads greater than 1500 pounds on the first layer. The winch is generally used for prelash operations, but can also be used for light aerial removal placing. (See Fig. 15, 16, and 17.)

***Danger: Employees working with winches shall observe the procedures outlined in the following Bell System Practices:***

620-020-020—Hand or Voice Signals

627-350 Series—Power Winches

649-305-100—Power Take-Offs

649-315-100—CR Reels

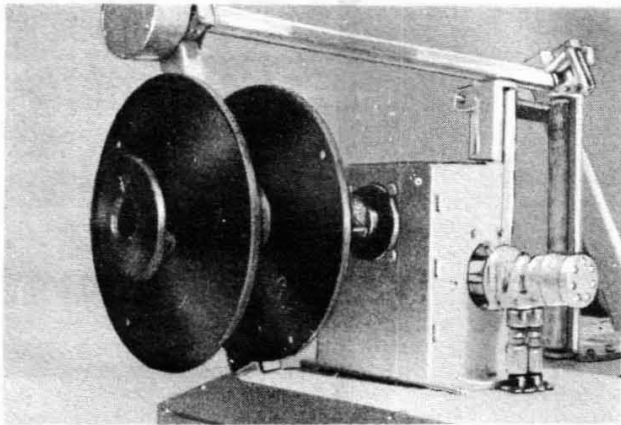
649-315-105—RS Reels.

**TABLE A**

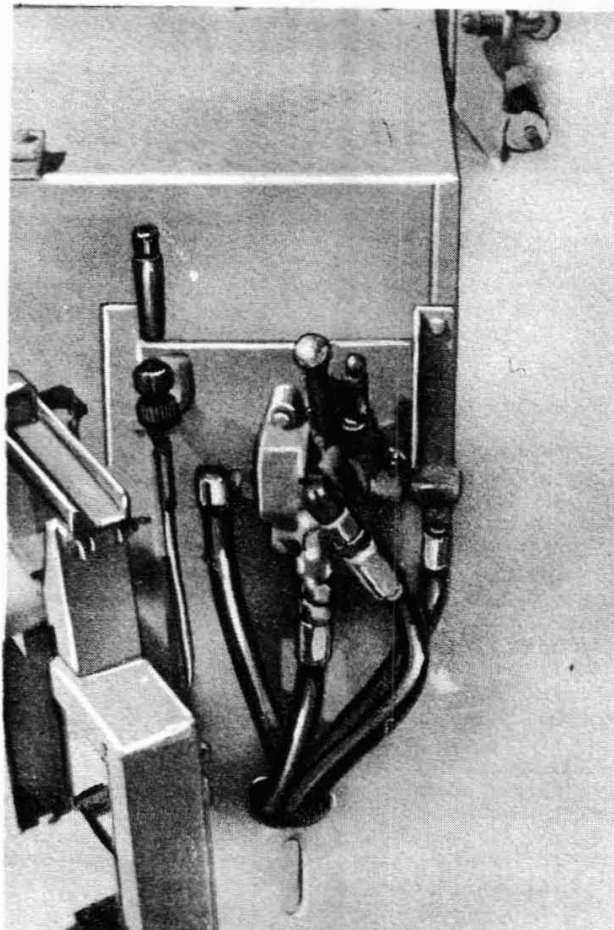
**WITH TRUCK ENGINE SPEED AT RECOMMENDED 2000 RPM**

TYPE REEL	APPROX MAX WINCH LINE SPEED (FT/MIN)			APPROX MAX WINCH LINE PULL (POUNDS)		
	FIRST LAYER	HALF-FULL	FULL	FIRST LAYER	HALF-FULL	FULL
RS	180	250	320	1500	1050	600
CR	340			620		

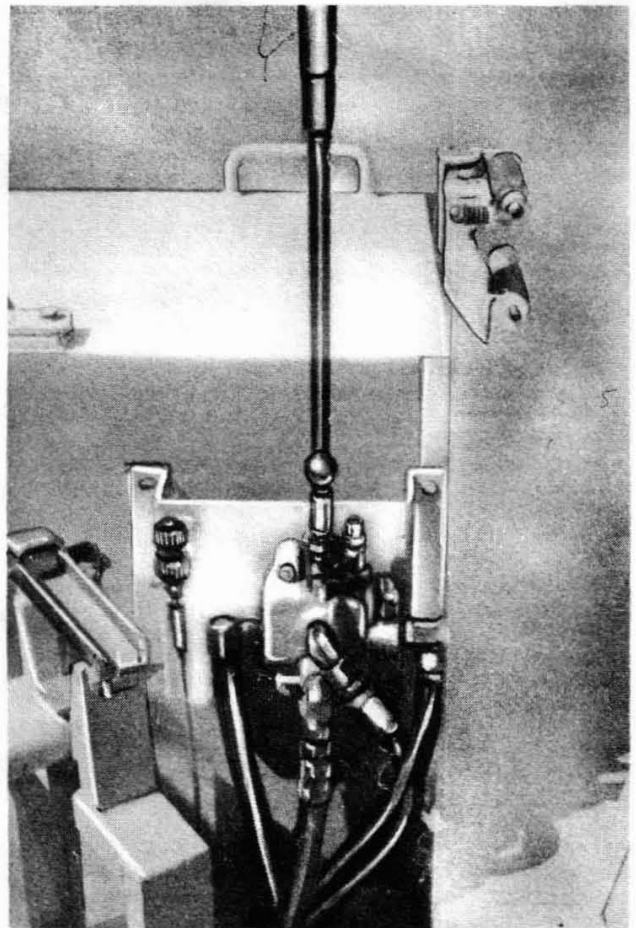




**Fig. 15—Hydraulic Winch Spindle Assembly**



**Fig. 16—Hydraulic Winch Controls in Strand Reel Well to Keep Operator off Ground**



**Fig. 17—Extension Handle Used to Feather Valve for Load Control**