

**TM 9-4910-707-14&P**

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**TECHNICAL MANUAL  
OPERATOR'S, ORGANIZATIONAL, DIRECT  
SUPPORT AND GENERAL SUPPORT  
MAINTENANCE MANUAL INCLUDING REPAIR  
PARTS LIST  
FOR  
MOUNTER-DEMOUNTER  
MODEL 931A  
(NSN 4910-00-675-1478)**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
18 APRIL 1983**

TECHNICAL MANUAL }  
No. 9-4910-707-14&P }HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, DC, 18 April 1983

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT  
AND GENERAL SUPPORT MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS LIST  
FOR

## **MOUNTER-DEMOUNTER**

**(MODEL 931A)**

**(NSN 4910-00-675-1478)**

### **REPORTING OF ERRORS**

**You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter. DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in the back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.**

### **NOTE**

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this equipment is issued.

Manufactured by: Lear Siegler Inc.  
Bishman Div  
400 County Road 18  
Osseo, MN 55369

Procured under Contract No. DAAA09-C-4837

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

- 1 - Manufacturer's Federal Supply Code Number. 70932
- 2 - Manufacturer's Part Number exactly as listed herein.
- 3 - Nomenclature exactly as listed herein, including dimensions, if necessary.
- 4 - Manufacturer's Model Number. 931A
- 5 - Manufacturer's Serial Number (End Item).
- 6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.
- 7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4, 5, 6, list manufacture's Federal Supply Code Number -70932 followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:

Noun: (nomenclature of repair part)

For: NSN:4910-00-675-1478

Manufacturer: Lear Siegler Inc.

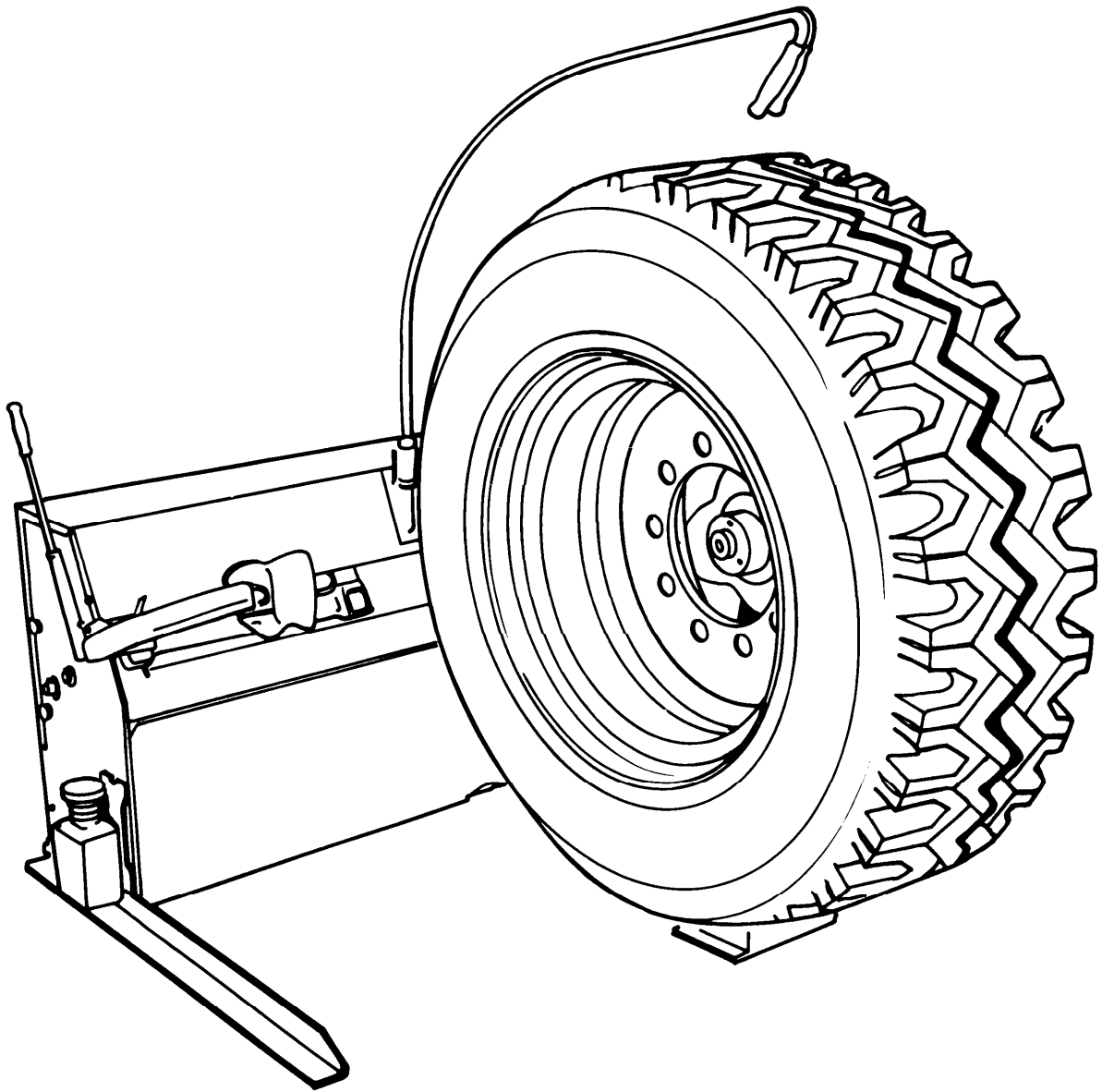
Bishman Div, 400 County Road 18, Osseo, MN 55369

Model: 931A

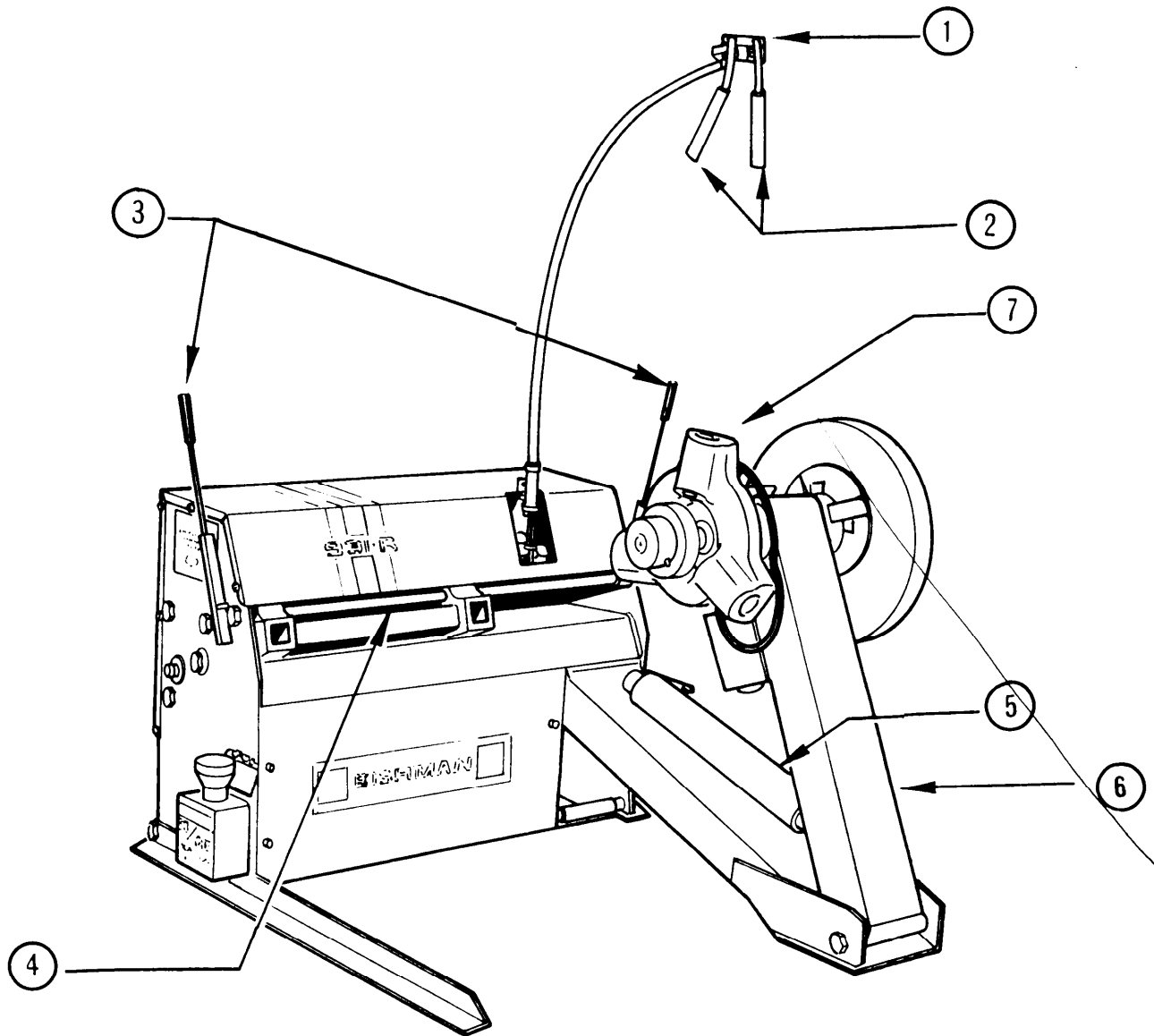
Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

# MODEL 931A TRUCK TIRE CHANGER



**OPERATION AND MAINTENANCE INSTRUCTIONS**  
Be Sure to Read Instructions Carefully Before Operating This Machine



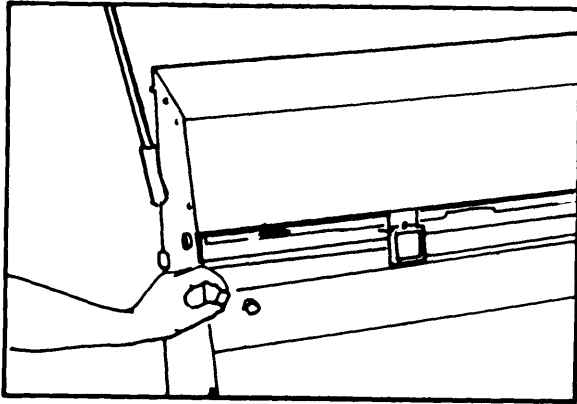
## NOMENCLATURE

1. **CONTROL LEVER ASSEMBLY** – Tube containing the control cables to allow the operator to control the machine, while working on the wheel.
2. **CONTROL HANDLES** – RED - rotation control handle. BLACK - wheel raise - lower control handle.
3. **CARRIAGE CONTROL LEVER** – controls the movement of the carriage for bead breaking or mounting or remounting the tire.
4. **CARRIAGE** – carries the tools used for bead breaking and mounting or remounting of the tire.
5. **BOOM CONTROL CYLINDER** – raises and lowers the boom arm.
6. **BOOM ARM** – carries the chuck and control elements to raise or lower the wheel into position.
7. **CHUCK CASTING** – houses the chuck rods.

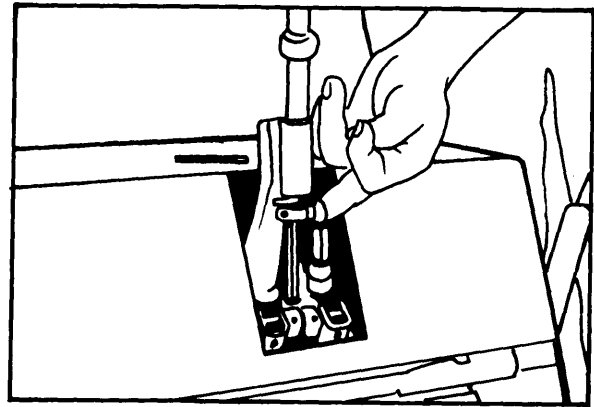
### 931A SPECIFICATIONS

<b>RIMS AND WHEELS—</b>	Flat base 15"- 24" ( 18", 25" and 28" adapters available) Tubeless 17.5"-24.5" including Alto aluminum wheels.
<b>TIRE SIZES —</b>	7.00-15 through 14.00-24 Duplex 10.00 -16.5 through 18.00-22.5. 4-20 ply rating
<b>POWER SOURCE —</b>	Electric only – Motor Electric Rating Voltage – 230 Cycles – 60 Phase – 1 Horsepower – 2 Amps – 10.6 RPM – 3450 Standard - Check Rating Plate For Special Applications
<b>HYDRAULIC PUMP —</b>	3.0 G.P.M. @ 1500 p.s.i. – Hydraulic Motor turns wheel @ 4.5 RPM
<b>OIL CAPACITY —</b>	3 gallons
<b>WEIGHT —</b>	785 lbs. (Shipping weight 850 lbs.)
<b>FLOOR SPACE REQUIRED —</b>	42" x 84" x 62" high

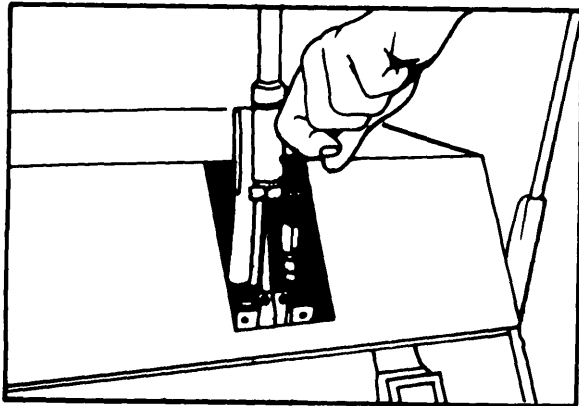
# SET-UP INSTRUCTIONS



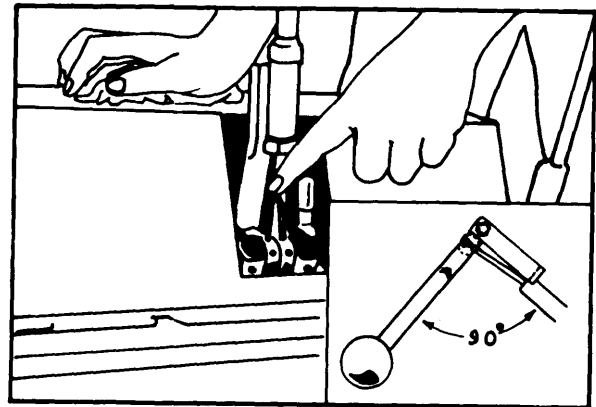
1. Remove all packing material and replace solid plug in top of reservoir with vented plug.



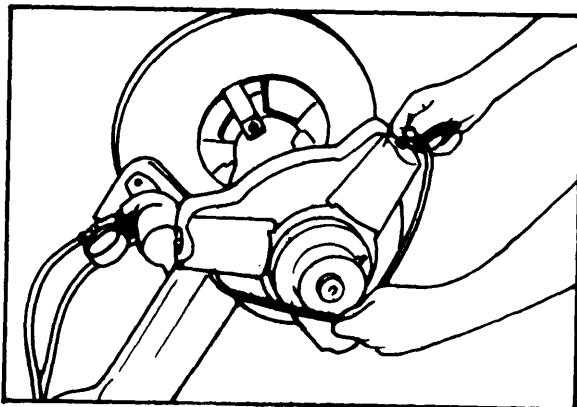
2. Insert control handle assembly through support tube and slide friction washer and nut through control wires. Guide control wires into holes in spool pivots.



3. Assemble friction washer and nut on control tube assembly. Tighten nut until it applies enough friction to control tube assembly to hold control tube assembly whenever it is swung from side to side. Tighten set screw in nut at this position.



4. Position control levers as shown on insert above. Tighten set screws on front and rear of spool pivots when control handles are at position shown.

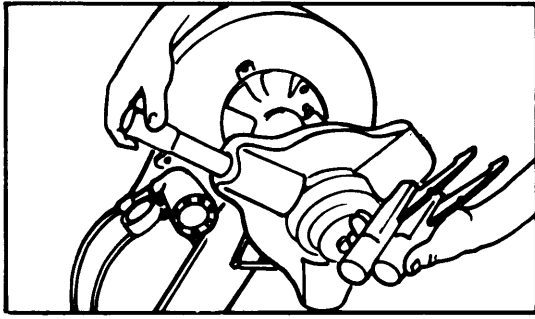


5. Slip the chuck rod retaining spring over the chuck casting and unwrap the tape and wire from the large Acme thread.

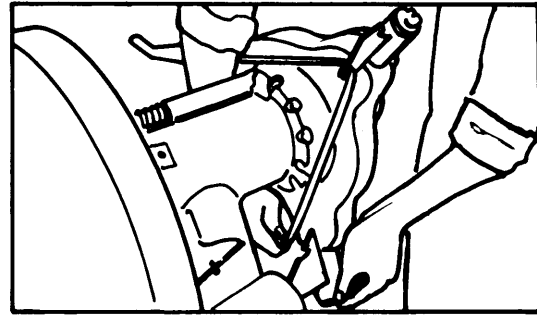


# OPERATING INSTRUCTIONS

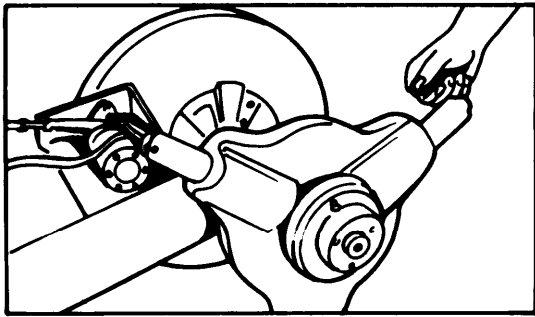
## \*I. CHUCKING WHEELS AND RIMS



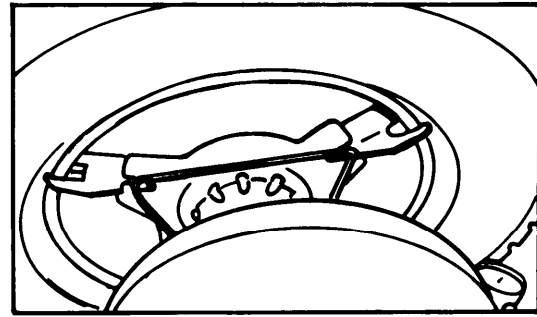
1. Select the proper chuck jaw arm size.
  - A. Jaws marked 15 for 15", 16" flat base and 17.5" tubeless.
  - B. Jaws marked 19.5 for 19.5" tubeless and 20" flat base, use on 18" also.
  - C. Jaws marked 22.5 for 22" flat base and 22.5" tubeless
  - D. Jaws marked 24.5 for 24" flat base and 24.5" tubeless



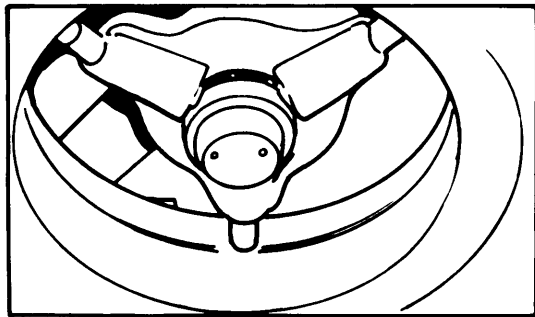
2. Installing chuck jaw arms
  - A. Turn chuck so one jaw arm is turned downward
  - B. Install the two upper jaws
  - C. Hook the spring on the two upper jaws
  - D. Install the remaining jaw and hook to spring



3. Swing boom forward and manually turn chuck so that the roller jaw and one stationary jaw are up and one single stationary jaw is turned downward as shown above. **CAUTION** - Before tightening the chuck, be sure that t-rod ends are positioned in the slots in the large cast nut.

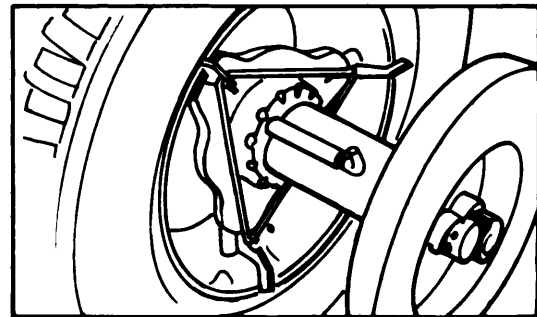


- 4A. Chuck flat base wheels and rims with lock ring side away from chuck. Tip over into position as shown so that the rim flange bumps the stops on the chuck jaws.



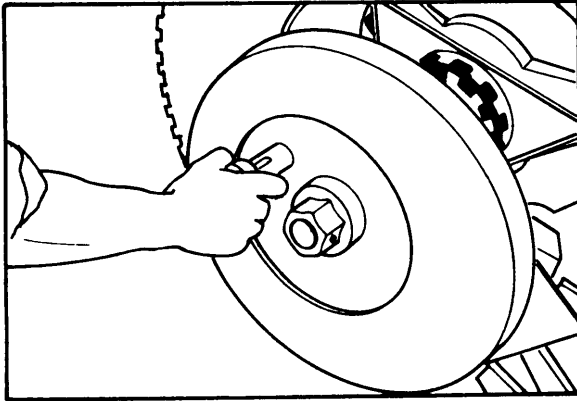
- 4B. Chuck tubeless wheels and rims with drop center on outer side for tire removal and mounting. Tip over into position as shown using either the jaws as stops against the rim well or the regular stops against the rim flange.

'For special rim types, see pages 7-13.

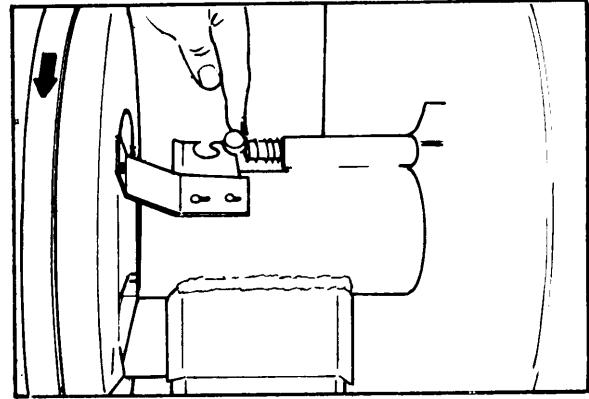


5. Raise the boom until the lower portion of the rim swings in against the bottom stop.

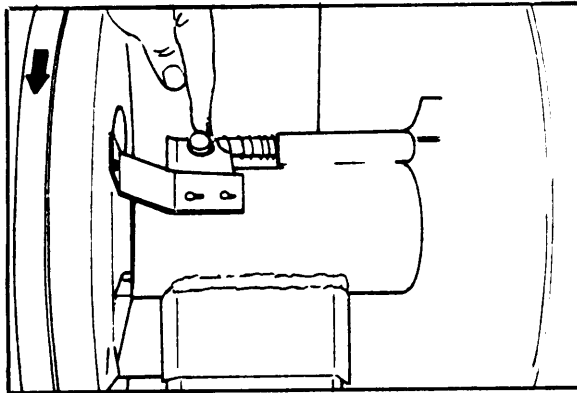
**CHUCKING WHEELS & RIMS (Continued)**



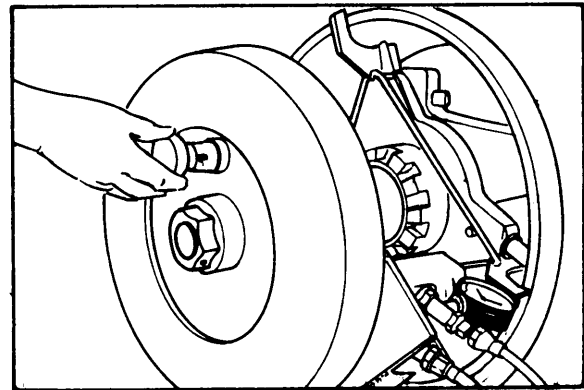
6. Pull out the chuck limit control lock and turn approximately 90 degrees. This will allow the chuck to tighten.



7. Engage the chuck control pin in the nearest slot and place in the inner hold position. Tighten the chuck by pushing back on the rotation (red) control lever. While the chuck is expanding, guide the lower jaw into position by swinging the tire in or out at the bottom. Continue to tighten the chuck until pressure gauge indicates 600 PSI. DO NOT OVER TIGHTEN.

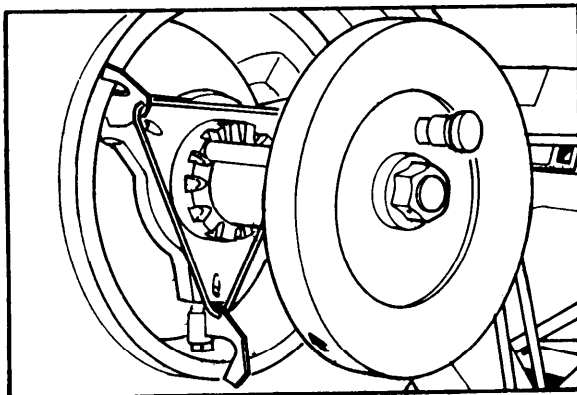


8. Pull back slightly on the rotation (red) control lever. This will relieve the pressure on the chuck lock pin, allowing it to be disengaged from the slot in the chuck casting. Place chuck lock pin in outer position of holding bracket.

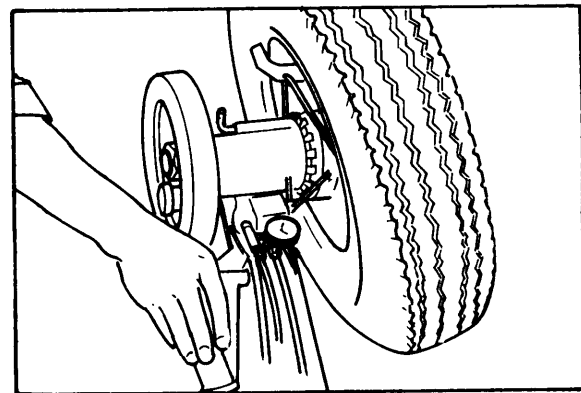


9. Turn the chuck limit control lock until the retaining pin drops into the slot. (This prevents the chuck from automatically over-tightening.)

**II. LOOSENING THE CHUCK**

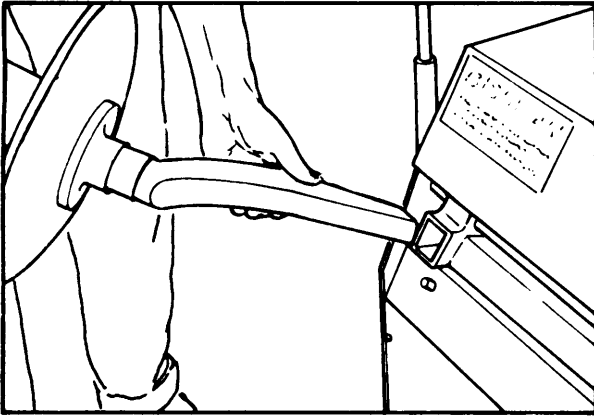


A. Swing the boom down until tire is approximately 3" from the floor. (If the tire has been removed from the rim or wheel, swing the boom to the lowest position.) Rotate the chuck until one chuck arm is pointing straight down.

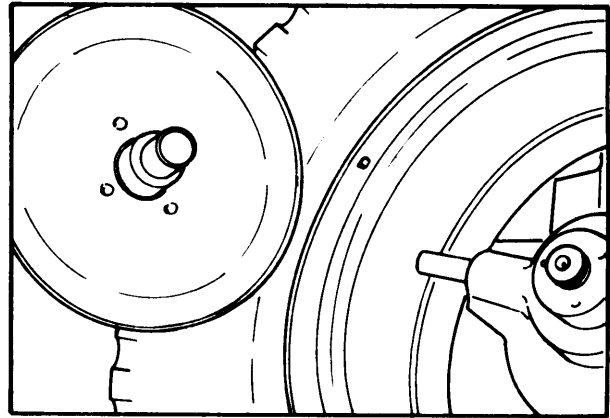


B. Engage the chuck control pin in the nearest slot and lock in outer hold position. Pull the rotation lever (red) forward to loosen the chuck. As soon as the chuck is free swing the tire assembly out on bottom and lower it to the floor. If removing an empty rim or wheel, merely loosen chuck and lift the assembly from the machine.

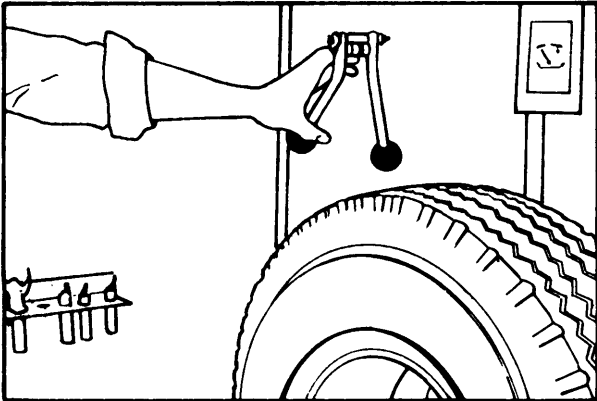
### III. REMOVING TIRES FROM FLAT BASE WHEELS AND RIMS



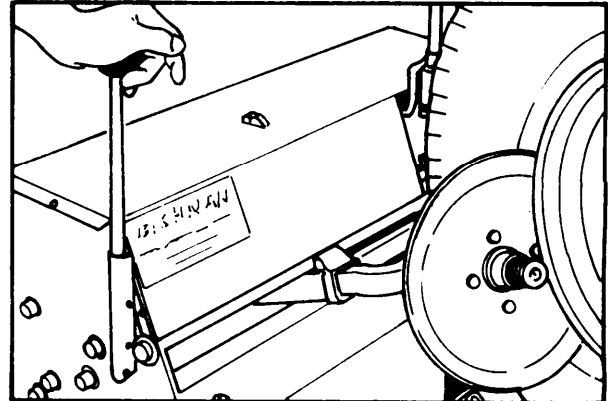
A. Chuck the assembly with the lock ring side turned away from the chuck. Install the standard arm (part #8782) and press wheel in the right-hand carriage socket. (Be sure that the arm is turned so that round shaft on end is pointing away from the tire. This positions the press wheel at the correct angle in relation to the tire.)



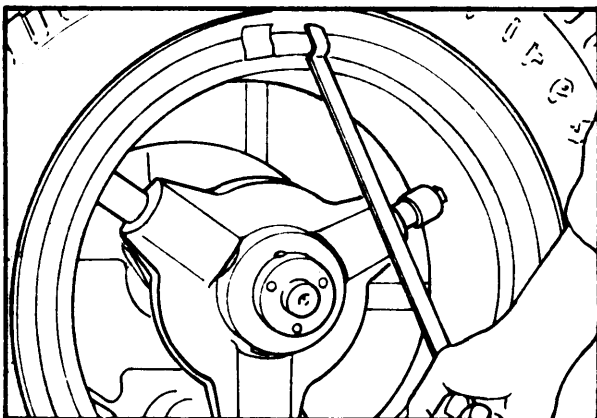
B. Swing boom back and position the press wheel so that it will clear the rim flange by approximately  $\frac{1}{2}$ ". Check to be sure that the tire is completely deflated.



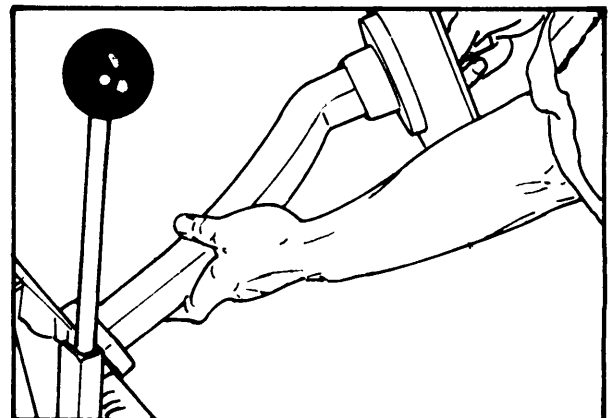
C. Pull back on the rotation (red) control lever to rotate the tire down toward the press wheel. **Caution:** Always rotate the wheel in this direction for every operation except loosening the chuck.



D. While continuously rotating the tire, intermittently apply pressure with the press wheel until the bead is pushed away from the flange. (As the press wheel is forced against the bead, it will tend to travel toward the end of the press wheel shaft. This can be corrected by pulling back on the boom control lever, forcing the press wheel against the collar on the arm. This procedure should also be used if the press wheel starts to climb up on the sidewall of the tire.)

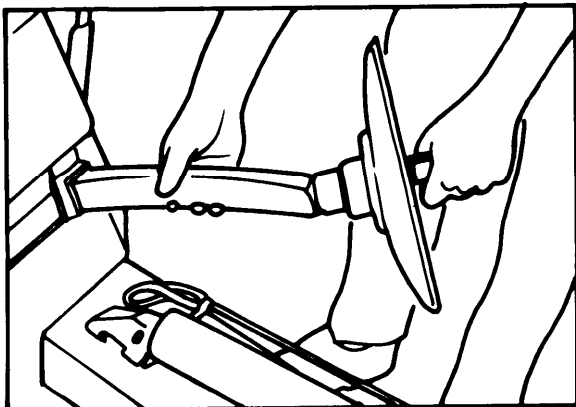


E. After the bead has been pushed back, stop the machine and remove the lock ring with tire irons.



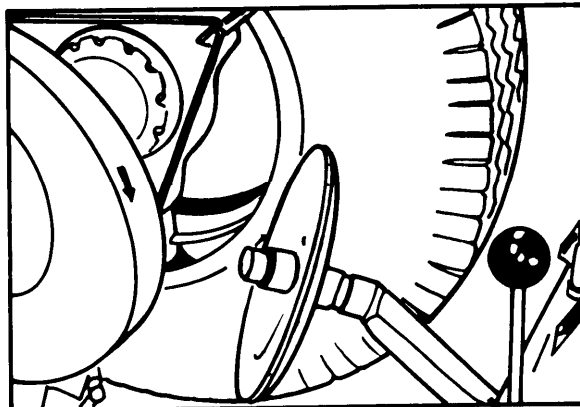
F. Back the press wheel away from the tire and swing the boom down far enough to allow the operator to remove the press wheel and arm.

**CONTINUED (REMOVING TIRES FROM FLAT BASE WHEELS AND RIMS)**



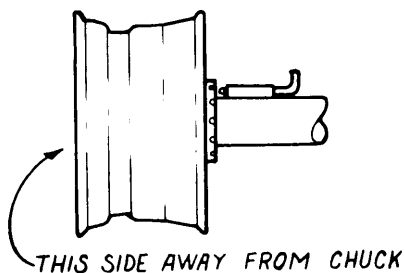
G. Step over to the other side of the machine and install the press wheel and arm in the opposite side of the carriage.

NOTE: Mounting tires on flat base wheels and rims is easily accomplished manually on the floor.

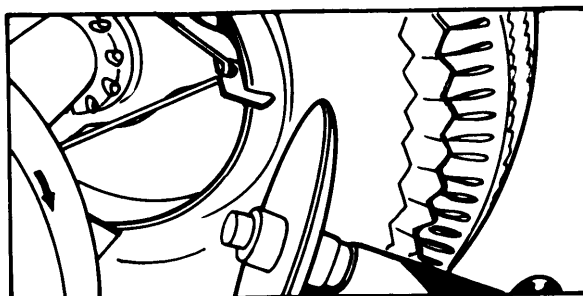


H. Repeat preceding steps C and D. Continue to push the tire back until it can either be easily tipped off by hand or until the press wheel has pushed it completely off the rim. (Be sure to push the valve stem out of the hole in the rim if it is necessary to force the tire all the way off with the press wheel. Notice that when the Dress wheel shaft is protruding through the press wheel casting, it will strike the rim flange after the bead has been moved back approximately 5 1/2". To correct this, swing the boom forward far enough to allow the center of the press wheel to move past the flange. **CAUTION** - Never allow the press wheel hub to move past the end of the shaft when pushing on the bead or breakage of the hub may result.

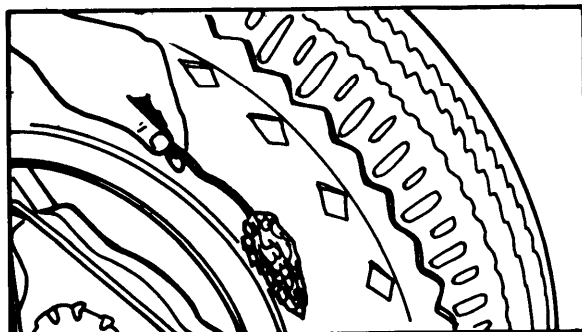
**IV. REMOVING TIRES FROM TUBELESS DROP CENTER WHEELS AND RIMS**



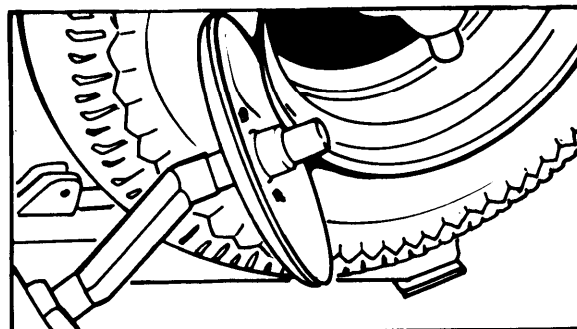
A. Chuck the assembly on the machine with the side nearest the drop center well turned away from the chuck. **IMPORTANT** - The tire must always be mounted and demounted from the side nearest the drop center well.



B. Install the press wheel on the left side of the carriage and force the bead on that side into the well.

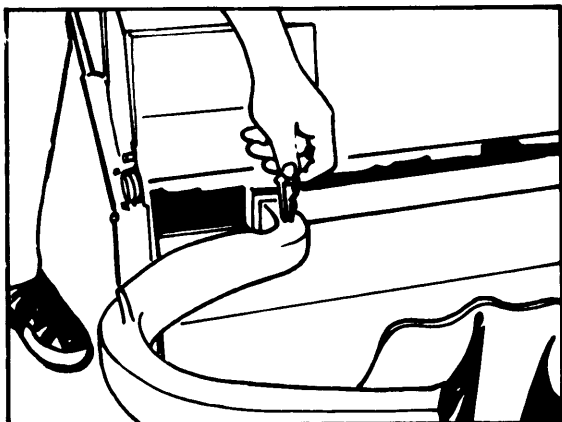


C. While the press wheel is holding the bead into the well, continue to rotate the wheel and apply a liberal amount of tire lubricant to bead.

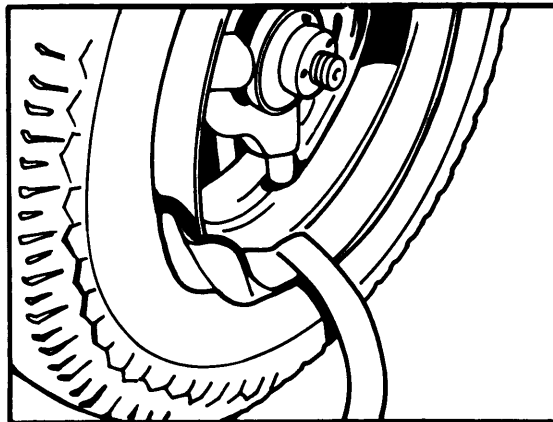


D. Move the press wheel assembly to the other side of the carriage, break the bead and repeat step "C".

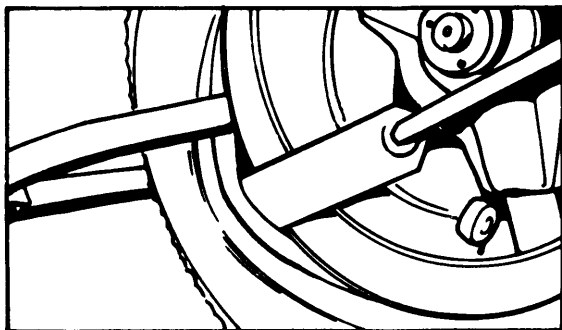
**CONTINUED (REMOVING TIRES FROM TUBELESS DROP CENTER WHEELS AND RIMS)**



E. Remove the press wheel assembly from the machine and install the combination mount and demount tool in the right-hand side of the carriage, being sure to install the retaining pin.



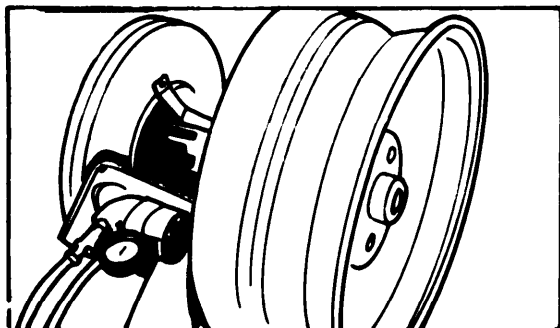
F. Position the mount-demount shoe against the flange as shown above. Be sure that the groove on the surface of the shoe is in line with the flange. **CAUTION** - Do not force the flange against the shoe. It should only be touching.



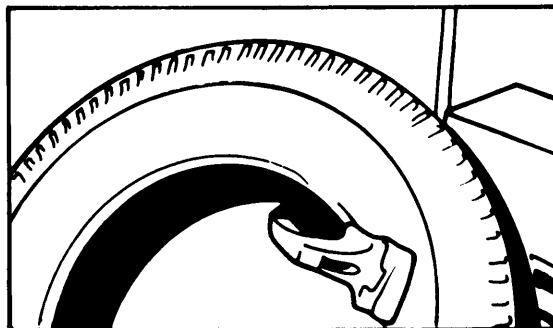
G. Insert the bead lifting tool between the flange and tire bead directly below the combination tool and lift the bead onto the face of the combination tool as shown at left. Rotate the wheel in the same direction as for loosening beads to demount the first bead. After the first bead has been removed, repeat operation for second bead.

**NOTE:** If the tubeless assembly has a tube in it, be sure to remove the tube after remounting the first bead.

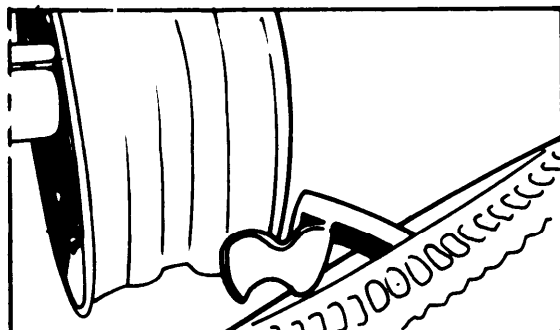
**V. MOUNTING TIRES ON TUBELESS DROP CENTER WHEELS AND RIMS**



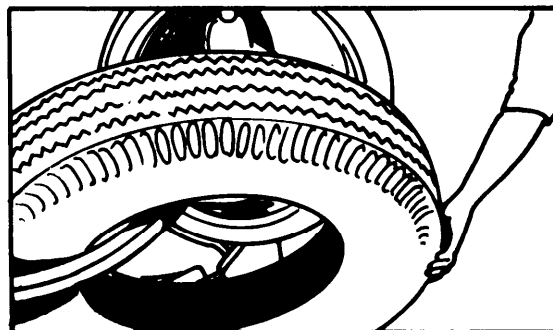
A. Chuck the rim or wheel so that the side nearest the drop-center well is turned away from the chuck.



B. Lubricate both beads and hook the tire over the mount- demount tool arm.

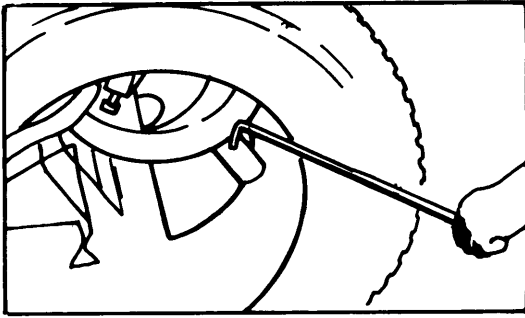


C. Swing the boom backward until the mount-demount shoe is positioned correctly against the flange.

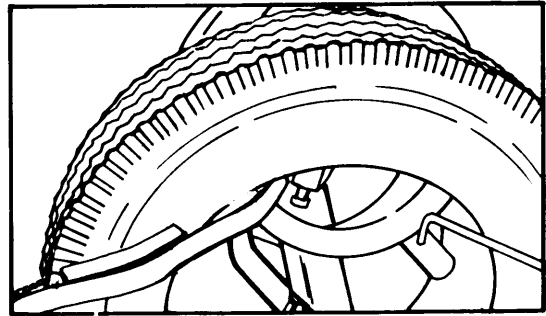


D. Slide the bottom of the tire underneath the rim or wheel.

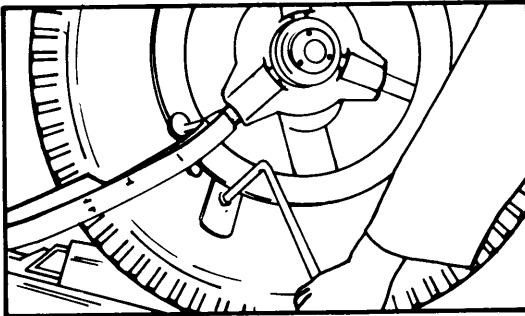
**CONTINUED (MOUNTING TIRES ON TUBELESS DROP CENTER WHEELS AND RIMS)**



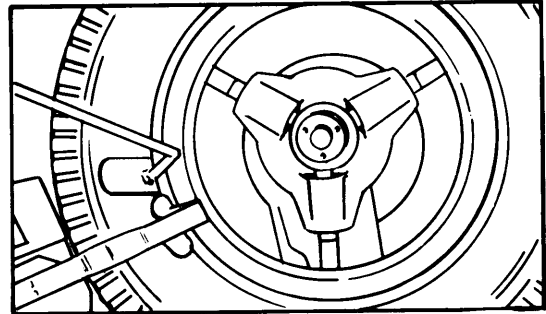
E. Hook the bead starting tool on the rim flange as shown above.



F. While applying pressure on the bead starting tool handle to lock it in place, rotate the wheel to lift the tire and mount the first bead.



G. After the first bead is completely mounted, hook the bead starting tool directly below the mount-dismount shoe to push the second bead onto the face of the shoe. Rotate the wheel to mount the second bead.



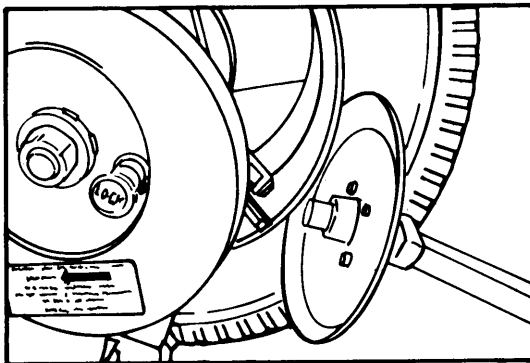
H. Insert bead lifting tool behind the flange and push the second bead off the face of the mount-dismount shoe.

**NOTE:** In cases where a tube is installed in a drop-center assembly, place the tube in the casing and inflate slightly. Mount the first bead and slide the tire around the rim to position the valve stem. Mount the second bead in normal manner.

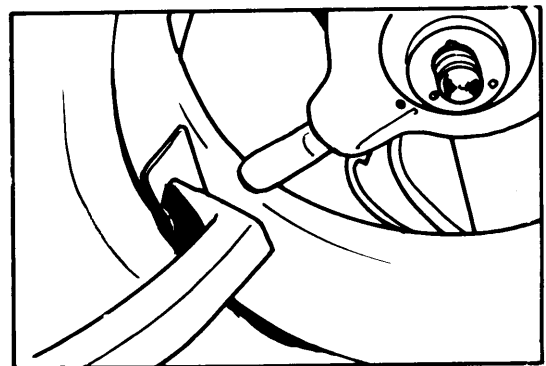
**CAUTION:** Before positioning the valve stem, be sure to shut off electric motor

**VI. SPECIAL RIM AND WHEEL TYPES**

**1. GRADER SEMI-DROP (REMOUNTING)**



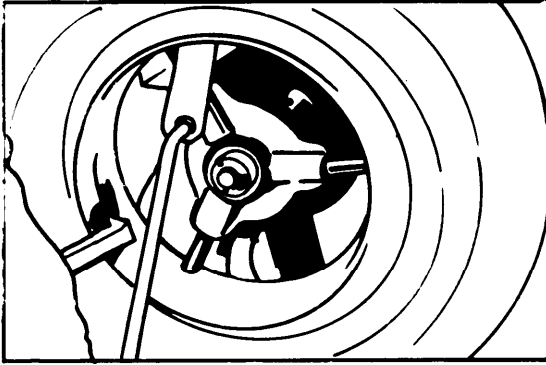
A. Chuck rim, loosen the bead on the lock ring side and remove the lock ring. While holding the bead back with the press wheel, rotate the rim and lubricate very thoroughly,



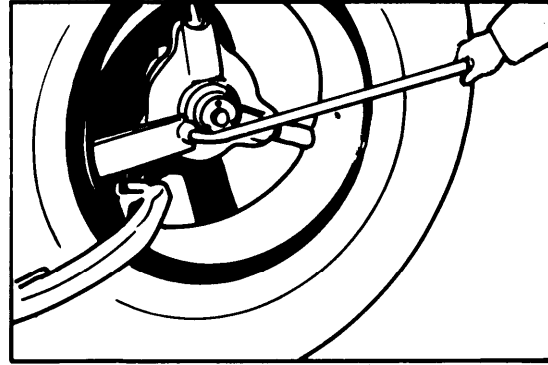
B. Install the combination mount-dismount tool and position it in front of the rim as shown above.

(Continued Next Page)

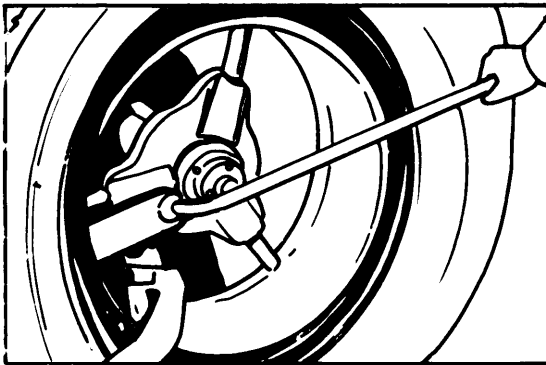
**CONTINUED REMOUNTING GRADER TIRES**



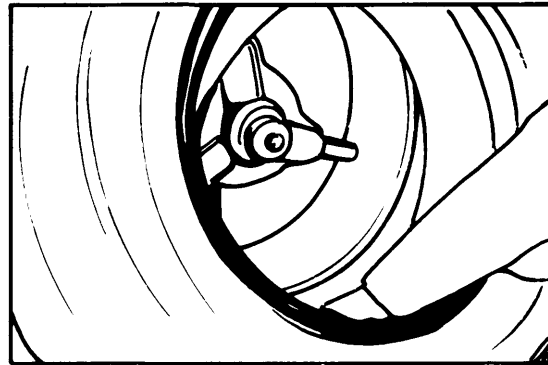
C. Rotate the valve stem to a 6 o'clock position, remove the stem retaining nut and push the stem back into the hole. Insert the bead lifting tool under the first bead in a 12 o'clock position and pull the handle down to lift the bead over the edge of the bead seat as shown above. Be very sure that the tube is not pinched.



D. Rotate the rim until the bead lifting tool comes to rest on top of the mount-demount shoe.

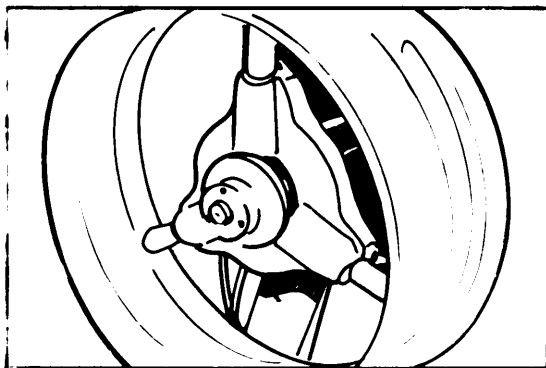


E. Grasp the handle of the bead lifting tool firmly and rotate the rim to demount the first bead.

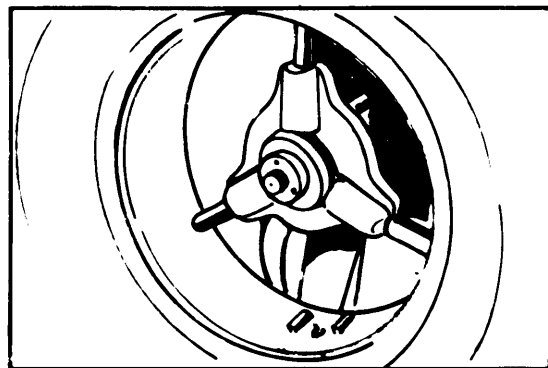


F. Remove the mount-demount shoe, install the press wheel assembly on the left side of the carriage and loosen the second bead, pushing it all the way off the bead seat. Grasp the tire and swing it off the rim.

**2. GRADER SEMI-DROP (MOUNTING)**

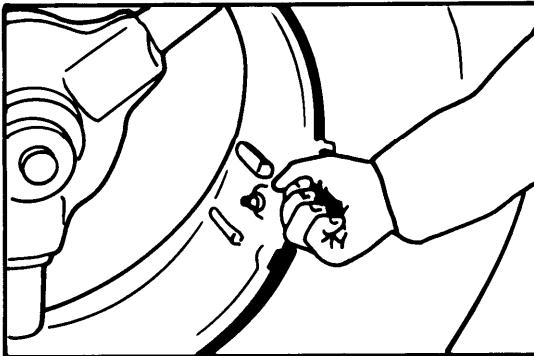


A. Chuck the rim on the machine and rotate the wheel until the valve hole is at 6 o'clock. Generously lubricate both beads, being very sure to apply lubricant on the inner edge as well as the face of the bead. (Tube and flap should be installed in the casing).

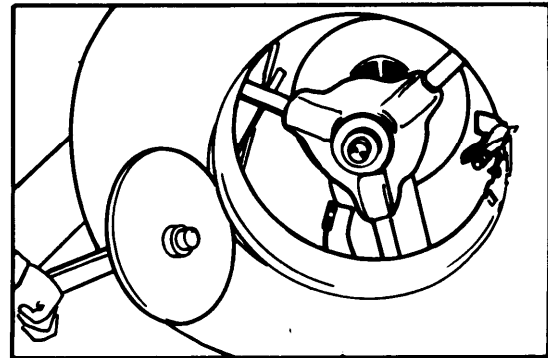


B. Lean the tire against the rim, lift the boom and notice that the first bead will slip over the edge of the rim. Align the valve stem with the hole in the rim and install the stem retaining nut. Manually push the tire over until the second bead is against the rim.

**CONTINUED (MOUNTING GRADER TIRES)**

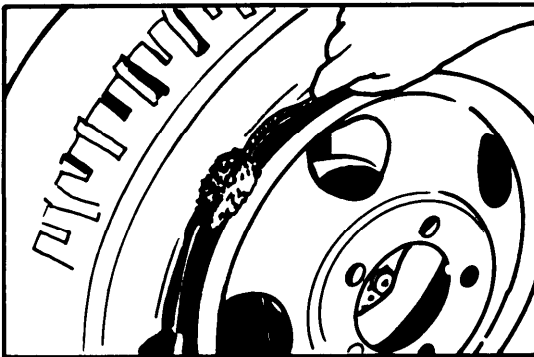


C. With the valve stem in a 4 o'clock position, install a vise-grip pliers on the rim flange in a 3 o'clock position.

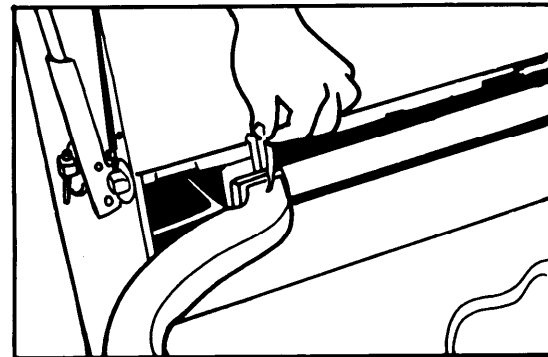


D. With the press wheel, push the second bead onto the bead seat. Turn the rim intermittently, allowing the bead to snap into place. Install the lock ring and inflate.

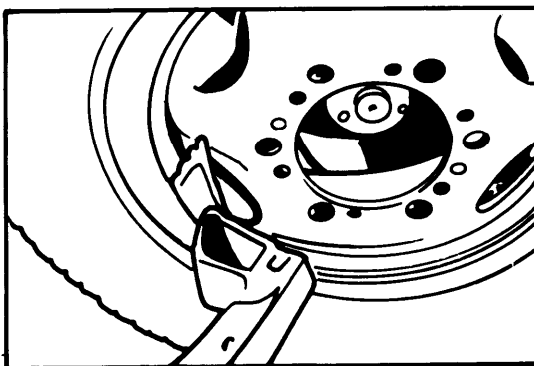
**3. DIVCO SEMI-DROP CENTER LIGHT TRUCK WHEELS (DEMOUNTING)**



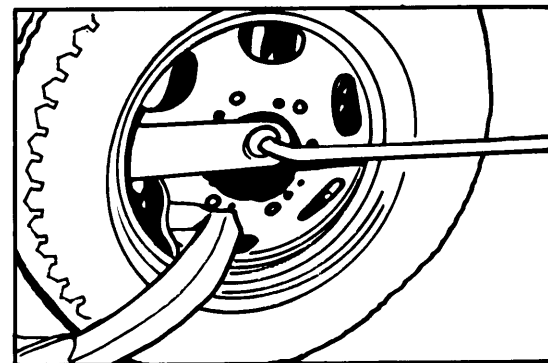
A. Chuck the wheel, break the bead on the side opposite the lock ring and lubricate the bead thoroughly with NAS 1101-06-12. Break the bead on the lock ring side and remove the lock ring. Lubricate the bead thoroughly.



B. Install the mount-demount arm in the carriage as shown above. (For this operation, insert the retaining pin in the hole in the arm only and drop it against the end of the carriage socket.)



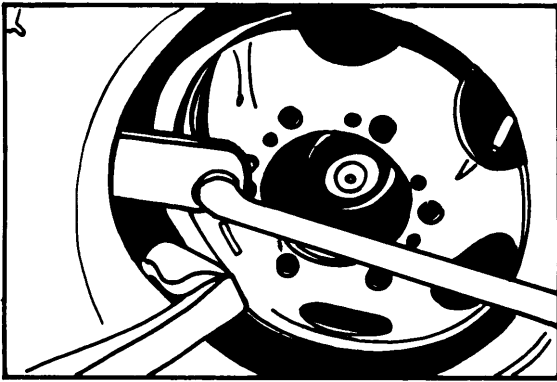
C. Position the mount-demount shoe in front of the wheel as shown above. Then rotate the wheel until the valve stem is in a 6 o'clock position and push the stem back into the hole.



D. Insert the bead lifting tool under the first bead in a 12 o'clock position and pull the handle down to lift the bead over the edge of the bead seat. (Be very sure that the tube is not pinched above the end of the tool.) Rotate the wheel until the tool comes to rest on the mount-demount shoe. Grasp the handle of the bead lifting tool firmly and continue to rotate the wheel to demount the first bead as shown above.

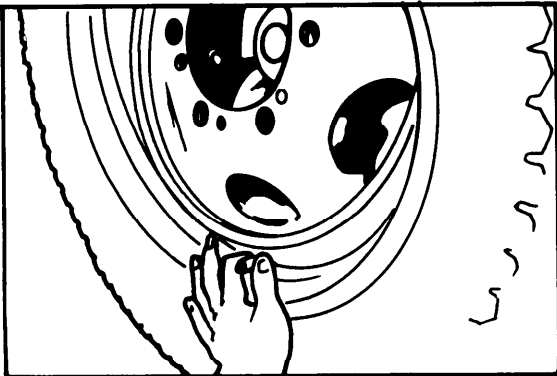


CONTINUED (REMOUNTING TIRE FROM DIVCO WHEEL)

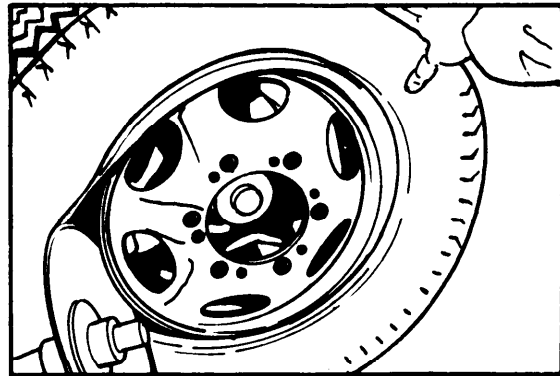


E. Turn the wheel until the valve stem is again in a 6 o'clock position. Repeat steps "D" to demount the second bead as shown at left.

4. DIVCO SEMI-DROP CENTER LIGHT TRUCK WHEELS (MOUNTING)

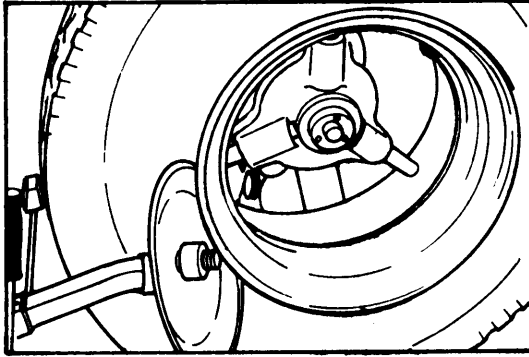


A. Chuck the wheel on the machine and rotate it until the valve hole is at 6 o'clock. Generously lubricate both beads and manually slip the first bead over the edge of the wheel. Position the valve stem at 6 o'clock and pull it through the hole in the wheel.

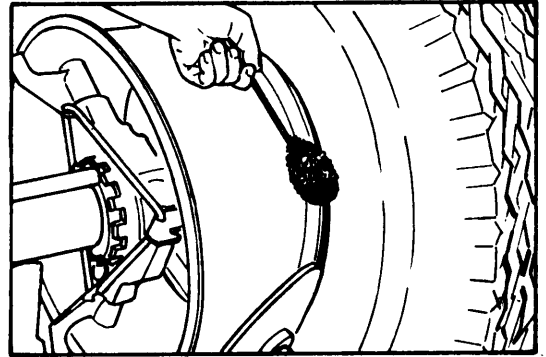


B. Use the Dress wheel to push on the second bead. Turn the wheel intermittently, allowing the bead to snap into place. Install the lock ring and inflate.

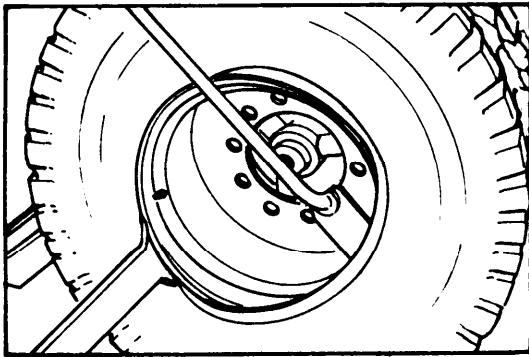
**5. REMOUNTING DUPLEX OR SUPER SINGLE TRUCK TIRE ASSEMBLIES**



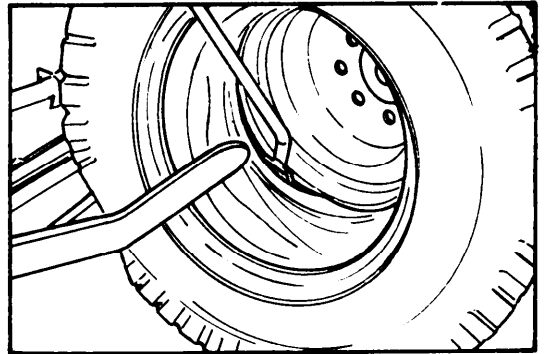
A. Chuck the rim or wheel with the flange nearest the drop center facing away from the chuck. Install the press wheel in right-hand side of carriage and break the outside bead.



B. Install the offset arm (part # 8782) and press wheel in the left-hand side of the carriage, break bead and lubricate thoroughly with NAS 1101-06-12.

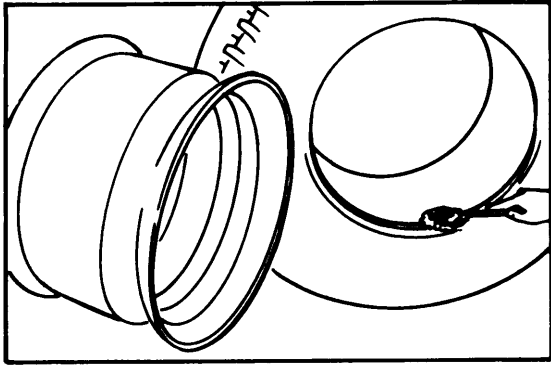


C. Install the duplex tool into both carriage sockets and pin. Lubricate the bead with NAS 1101-06-12, Remove the first bead as shown above.

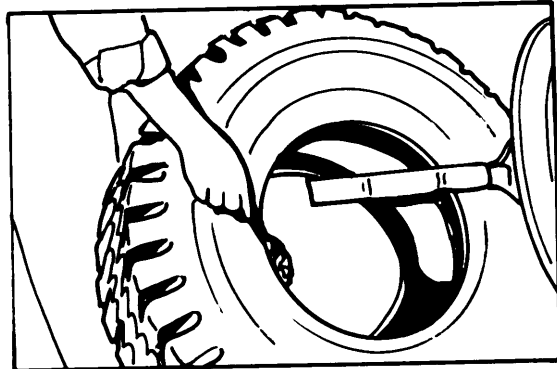


D. Place the remaining bead of the tire into the rim well. Continue to remove the tire as shown above.

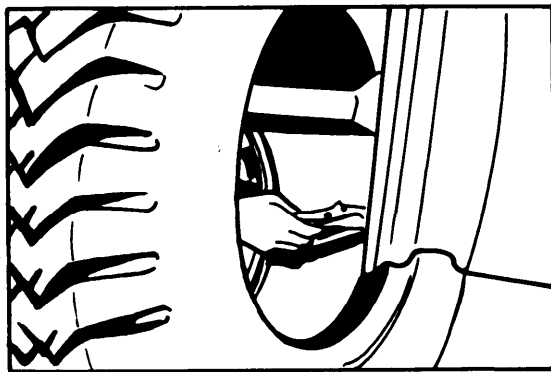
## 6. DUPLEX OR SUPER SINGLE ASSEMBLIES



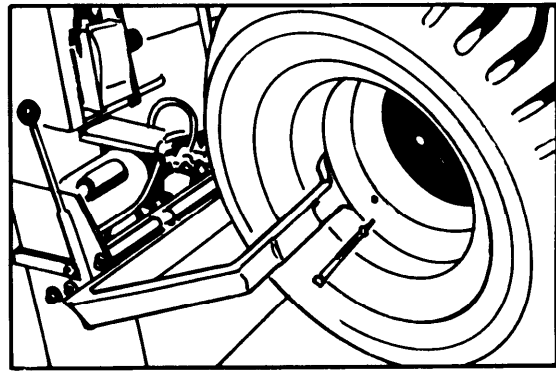
A. Chuck the rim or wheel on the machine and lubricate both beads thoroughly with NAS 1101-06-12.



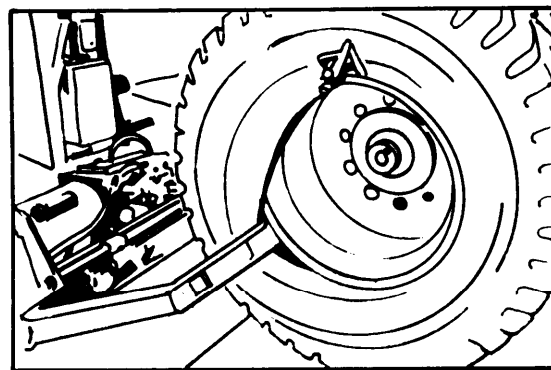
B. With the tire located, position the duplex tool against the rim flange as shown above.



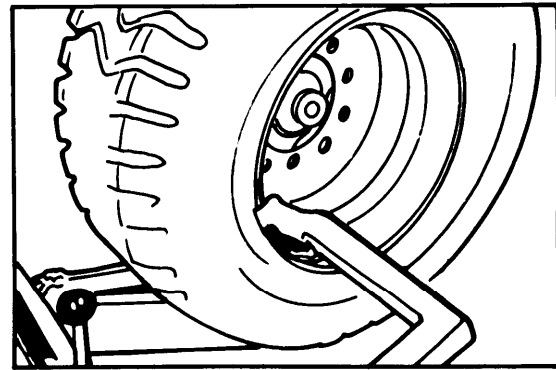
C. Position the lower side of the first bead of the tire near the area of the rim well. Clamp the mounting tool securely to the rim. Rotating the tool in the normal manner, the mounting tool should place the tire bead over the rim flange.



D. Move the tire over, so the outer bead is near the outer rim flange. Clamp the mounting tool on the rim flange as shown above.

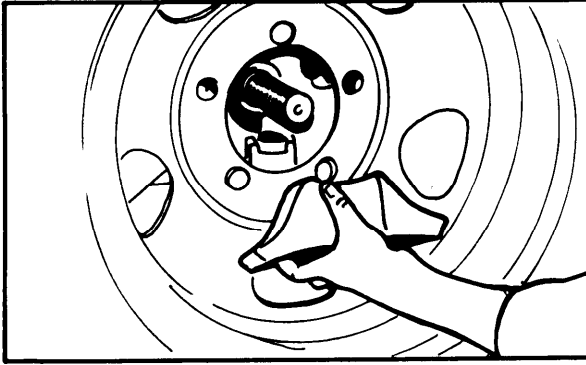


E. By rotating the wheel assembly, the mounting tool should place the second bead over the rim flange.

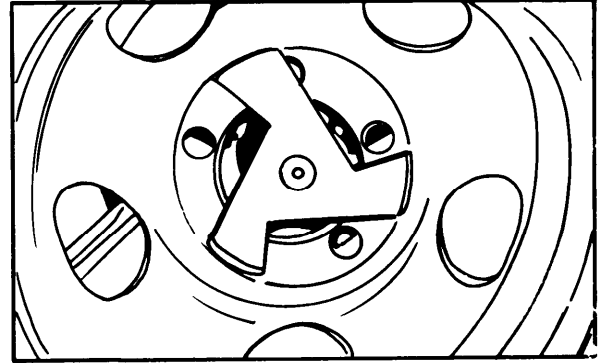


F. The photo above shows the tire mounted on the rim. Remove the bead mounting tool and position the duplex tool away from the tire and wheel assembly.

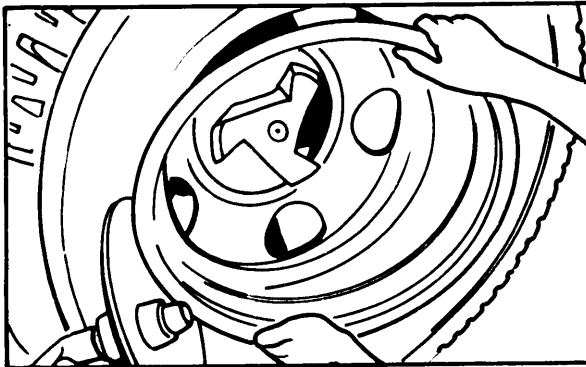
7. RH 5° SPLIT WHEEL ASSEMBLY (DEMOUNTING)\*



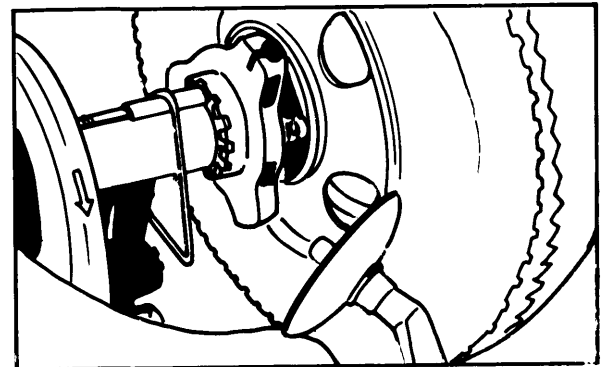
A. Remove the chuck rods and nut (part #3020) from the machine. Position the shaft through the center hole of the wheel and spin on the special reverse disc cone (part #3710), with the tapered side toward the chuck.



B. Place the arms on the special cone alongside of the bosses on the chuck casting and tighten the chuck. **CAUTION:** When tightening the chuck, be very sure not to exceed 300 lbs. as indicated on pressure gage.



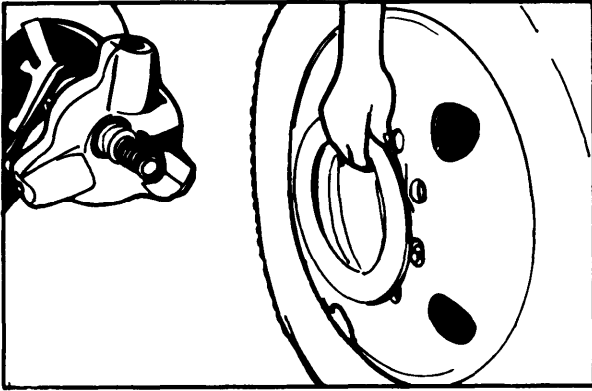
C. Break the bead on the side opposite the chuck and remove the outer half, using a tire iron.  
\*NOTE: This unit can also be serviced by using the standard chuck rods: Chuck wheel in normal manner, break both beads, lubricate beads and remove the wheel from machine. Wheel can now be taken apart on the floor.



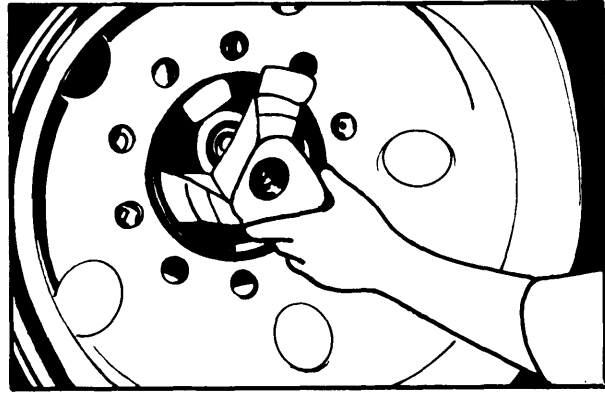
D. Move the press wheel assembly to the other side of the carriage and push the tire off of the remaining portion of the wheel.

NOTE: Mounting the tire on this type of wheel is a manual operation.

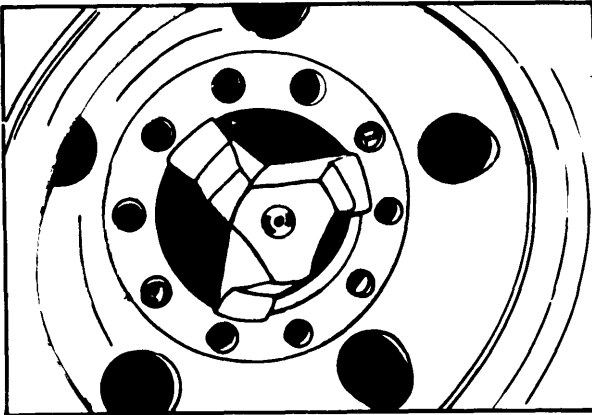
## 8. ALUMINUM AND REVERSE DISC DROP CENTER ASSEMBLIES



A. These wheels must be chucked from the disc side and the tire must be demounted and mounted from the opposite side. To do this, remove the chuck rods and nut and install the steel backing ring on the outside of the disc with the spring clips positioned through the bolt holes as shown above.



B. Position the shaft through the center hole of the wheel and spin on the special reverse disc cone with the flat side toward the chuck.

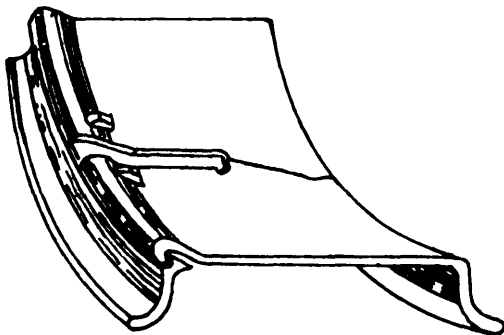


C. Line up the arms of the cone directly over the bosses on the chuck casting and tighten the chuck to 300 lbs.

NOTE: After the wheel is chucked, the remounting and mounting operations are identical to the standard tubeless assemblies, (See pages 5 - 7) except that in place of the offset press wheel arm, the straight arm (part #9546) is used.

9.

## KW OR KB SPLIT RIMS



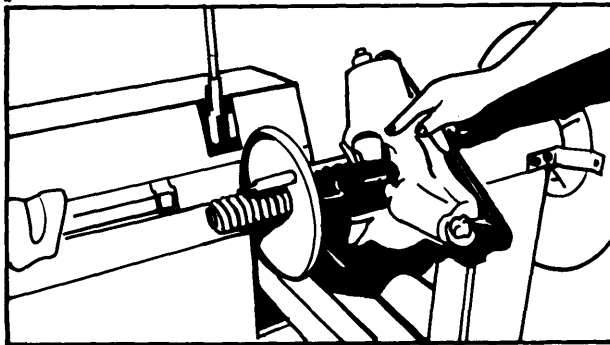
A. The diagram at left is a cut-away view. To service this rim, follow these steps:

1. Chuck the rim using the standard chuck rods. (Be very careful not to over-tighten chuck, as this rim has very little support on the side opposite the lock ring.)
2. Break both beads and lubricate beads.
3. Remove assembly from machine.
4. Remove lock ring.
5. The assembly can now be easily taken apart on the floor.

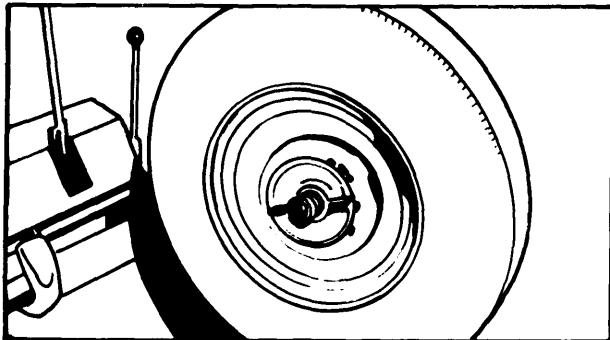
# OPERATING INSTRUCTIONS

## 9850 Small Wheel Adapter for 931A Truck Tire Changer

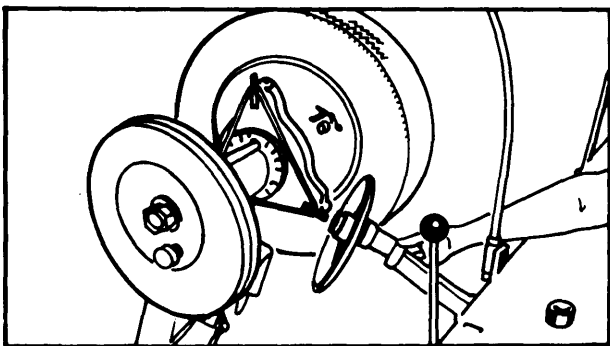
This adapter provides the capability to handle 14", 15" and 16" automobile pick-up truck delivery van and other



Place the adapter over the center main-shaft and insert one of the 15 inch jaws into the collar. Secure the 3 jaws with the standard spring.



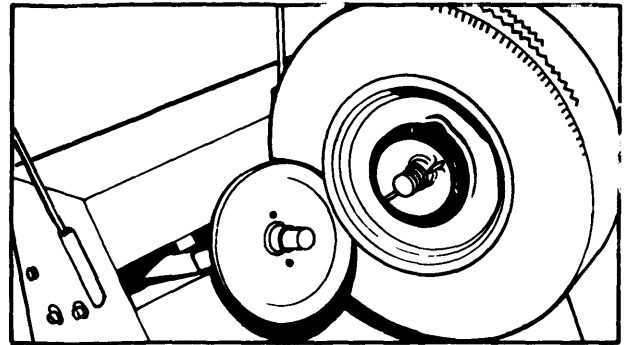
Tire and wheel assembly shown installed on the adapter. Make sure the cast core is tight on wheel. If thread engagement is such that the core does not tighten against the wheel, insert #4083 spacer core between the wheel and the cast core.



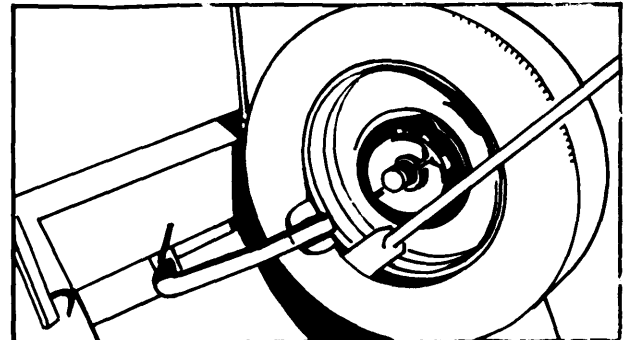
### BREAKING THE BEADS

The tire and wheel assembly is shown from the back side and the inner bead is being broken first. Note the spaces sleeve behind the press wheel hub. This sleeve is important in that it prevents accidental contact of the press wheel arm shaft and the spring hooks on the 15" jaws. Rotation is clockwise looking at the inside of the rim.

small wheels equipped with a center mounting hole. The following sequence photographs illustrate the procedure.

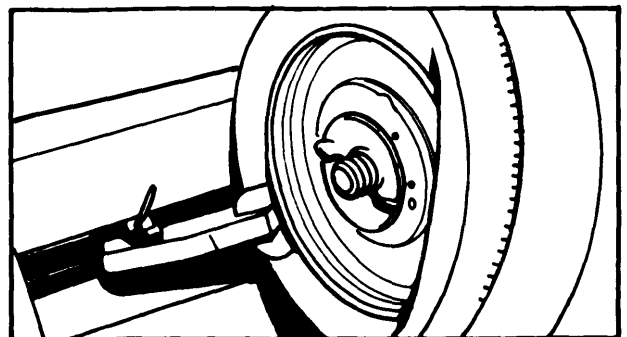


Breaking the outer bead. Rotation is counterclockwise looking at the outside of the rim.



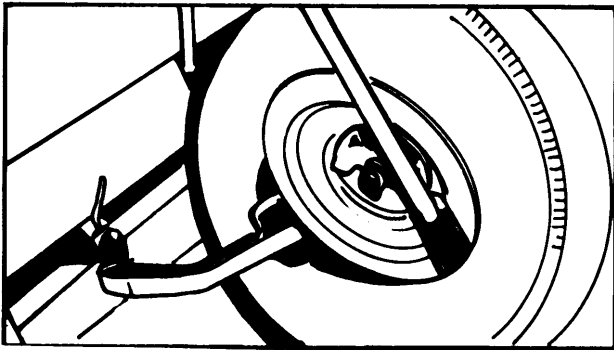
### DEMOUNTING

The mount-demount shoe is shown in position between the outer bead and the rim flange in the conventional manner. The bead lifting tool is placed just below and to the right of the mount-demount shoe and has lifted the bead over the end of the shoe. Rotation is counterclockwise.



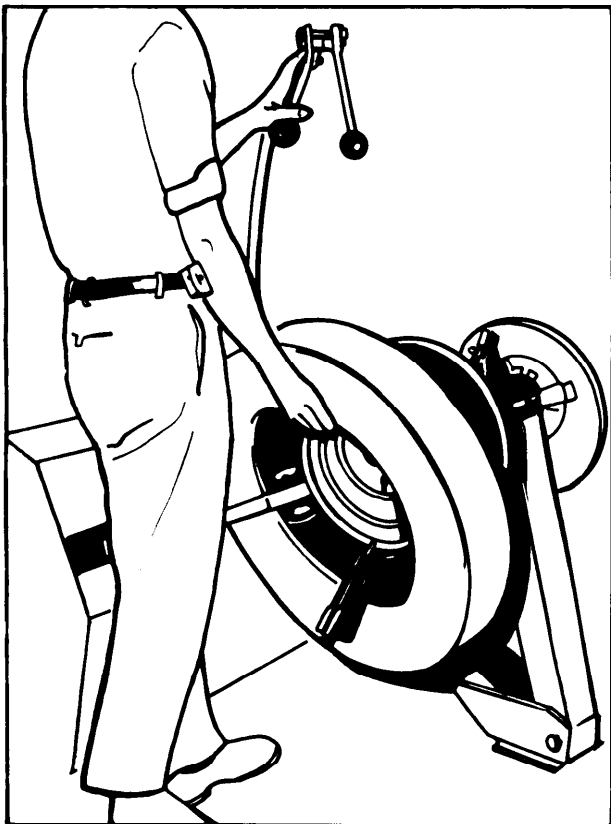
Outer bead being demounted.

**OPERATING INSTRUCTIONS (Continued)**

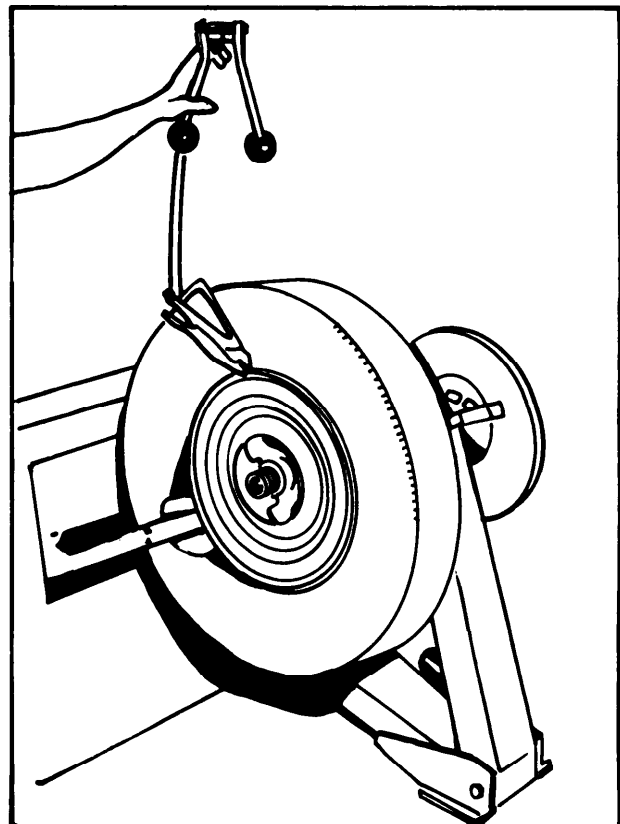


Demounting of the second bead The bead lifting tool has been inserted under the inner bead in the same manner as #5 above

**MOUNTING**



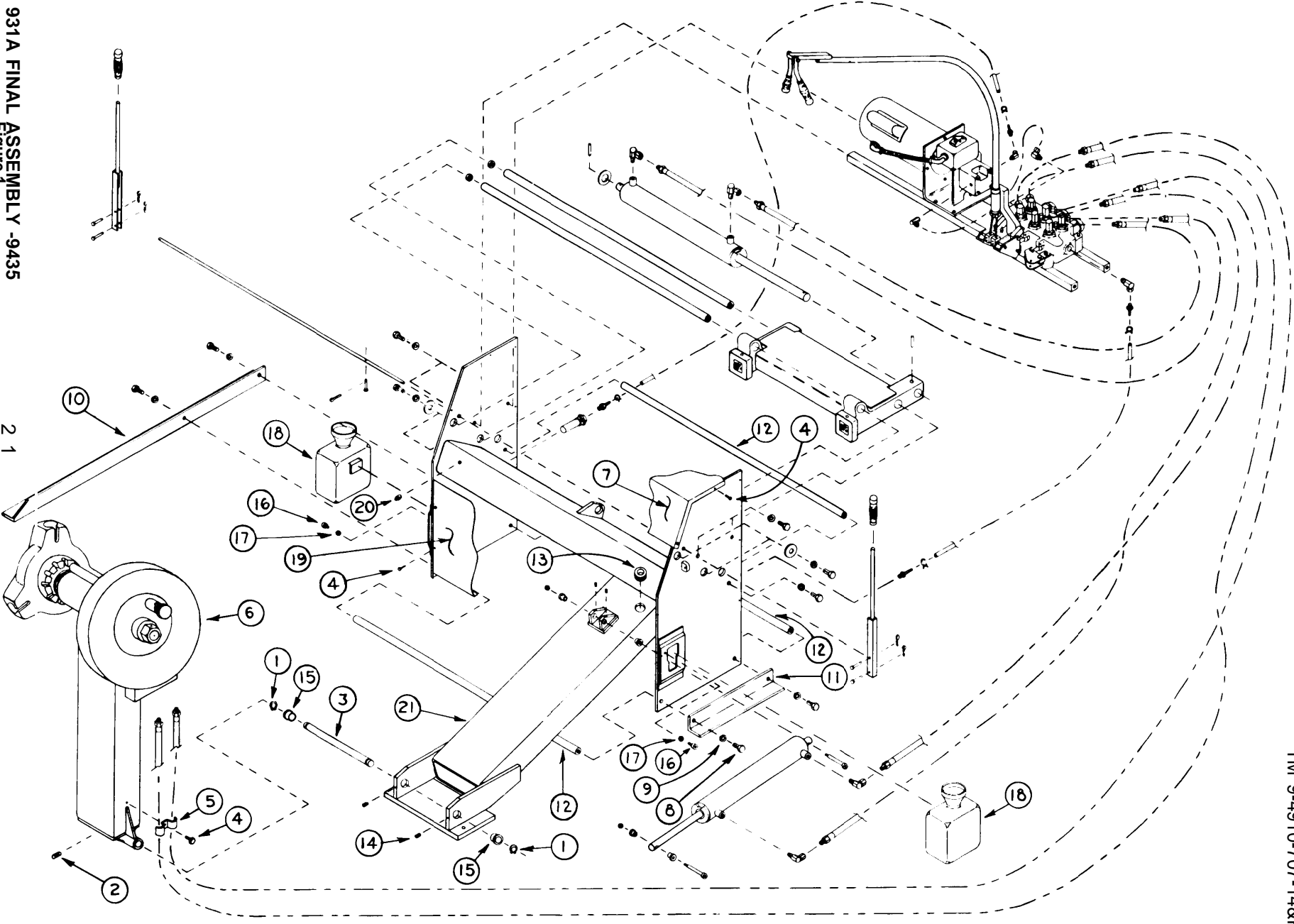
The mount-demount shoe is shown in position between the inner bead and the rim flange The bead-seating tool (vise-grip) is clamped to the flange just below and to the right of the mount-demount shoe Rotation is counter-clockwise Remove the bead-seating tool after approximately 200° of rotation



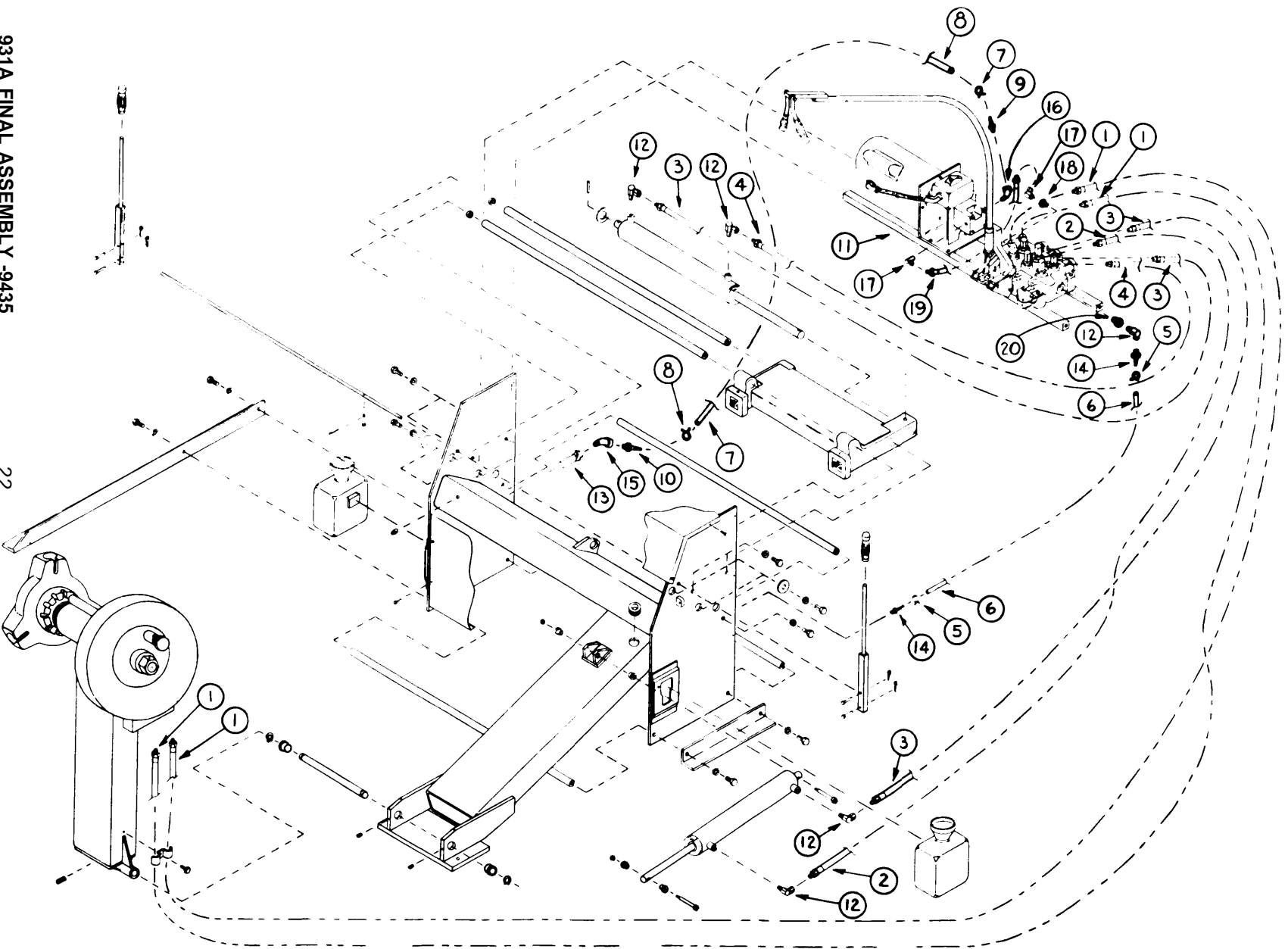
Mounting the outer bead in the same manner as #8 above

NOTE: Be sure to use Tire Lubricant to avoid damage to beads

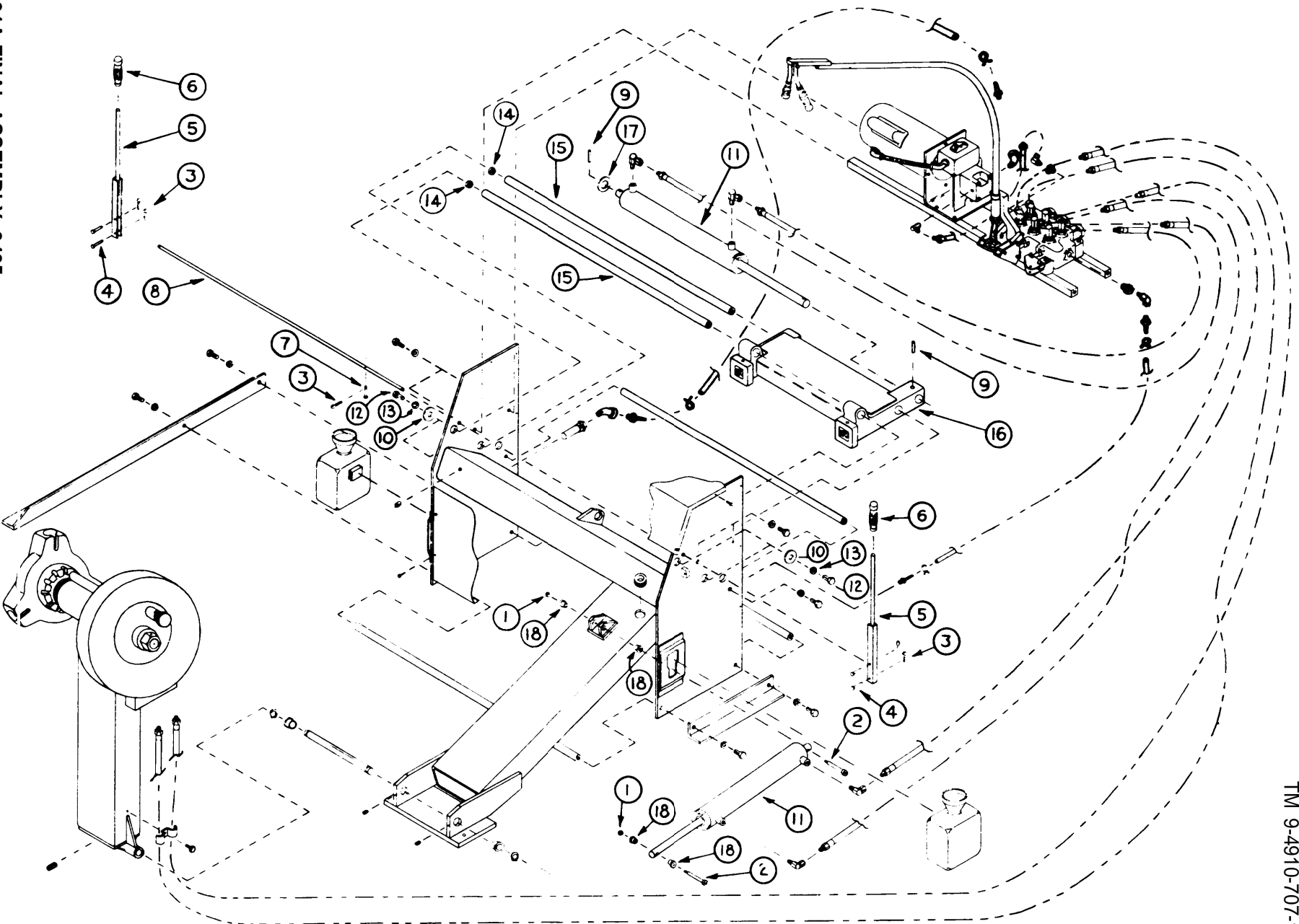
931A FINAL ASSEMBLY -9435  
Figure 1



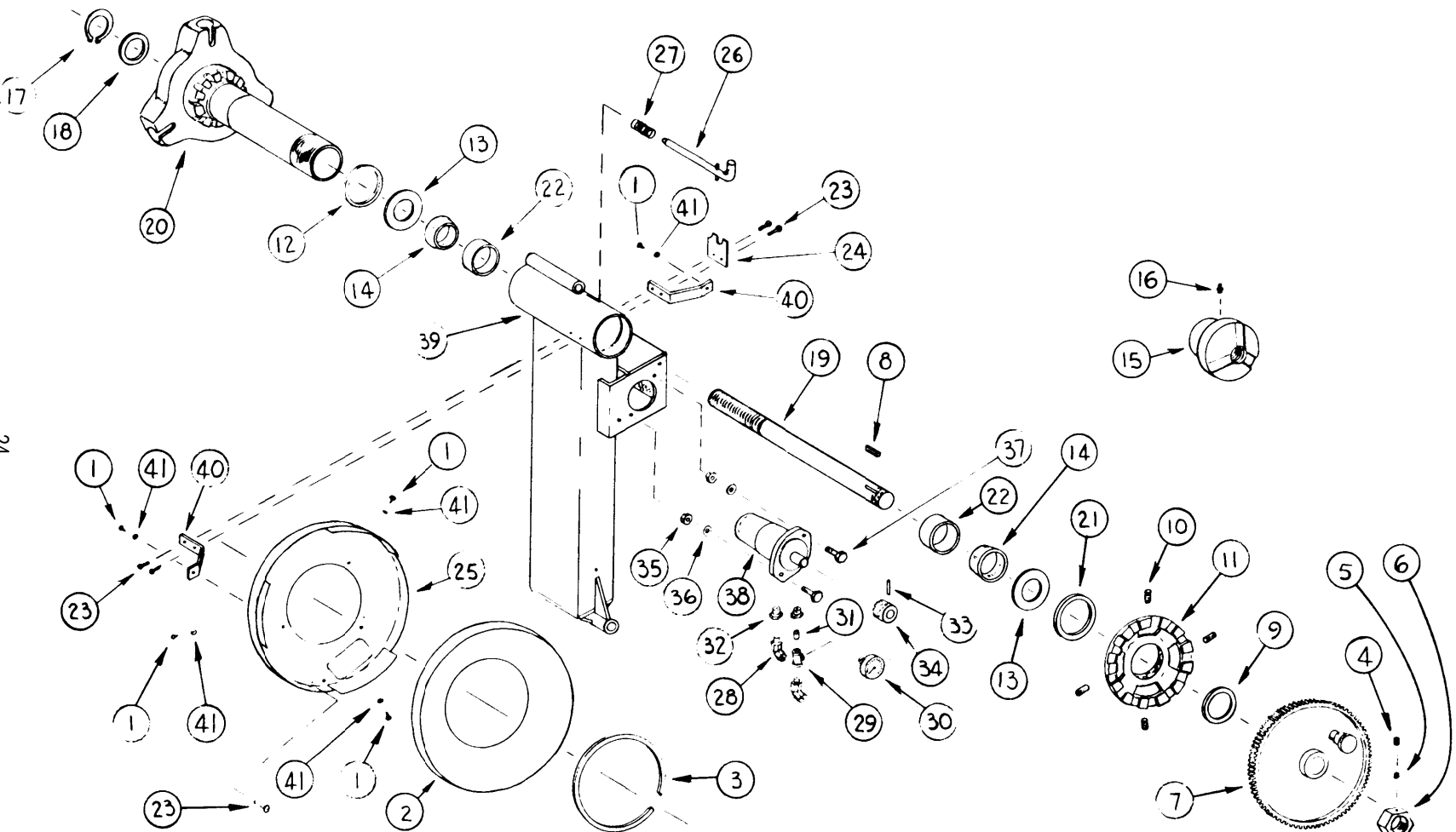




931A FINAL ASSEMBLY -9435  
Figure 2

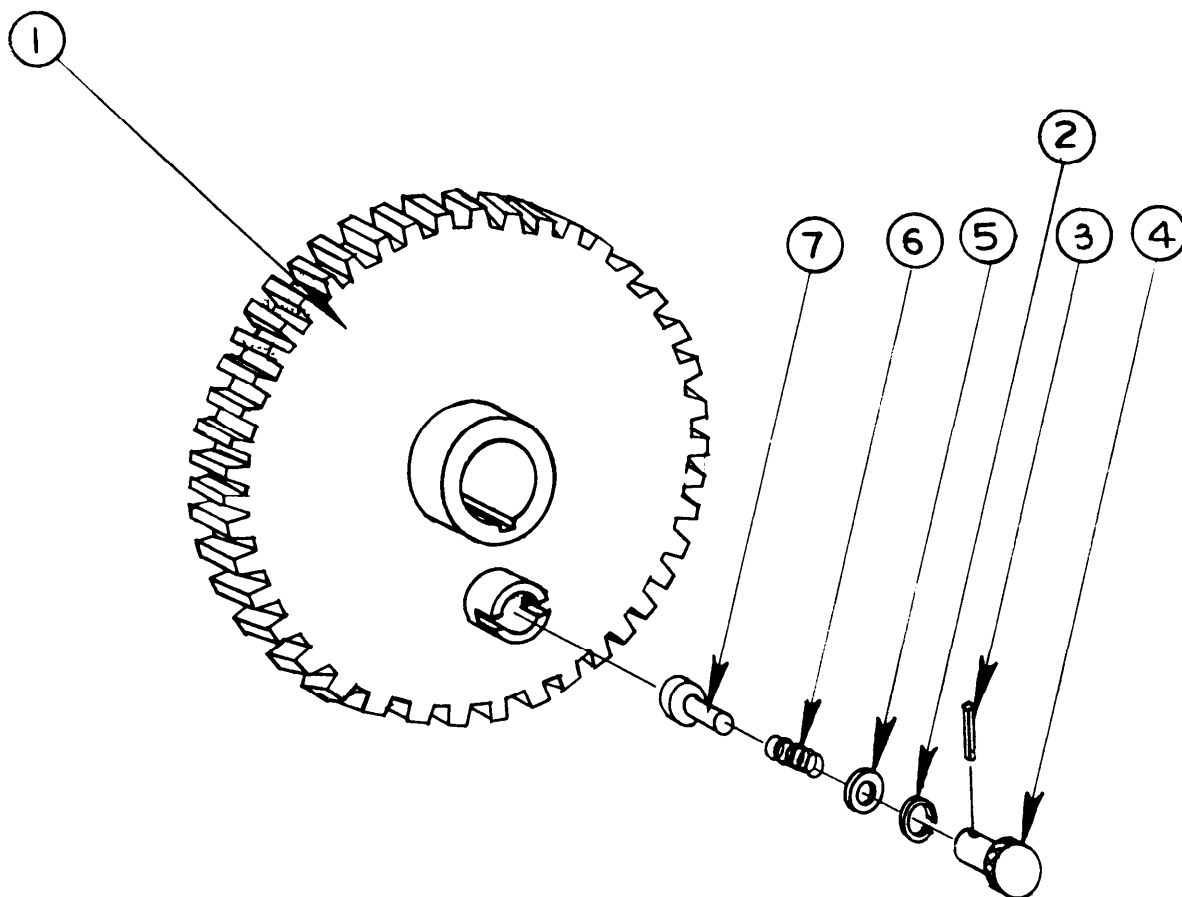


931A FINAL ASSEMBLY -9435  
Figure 3

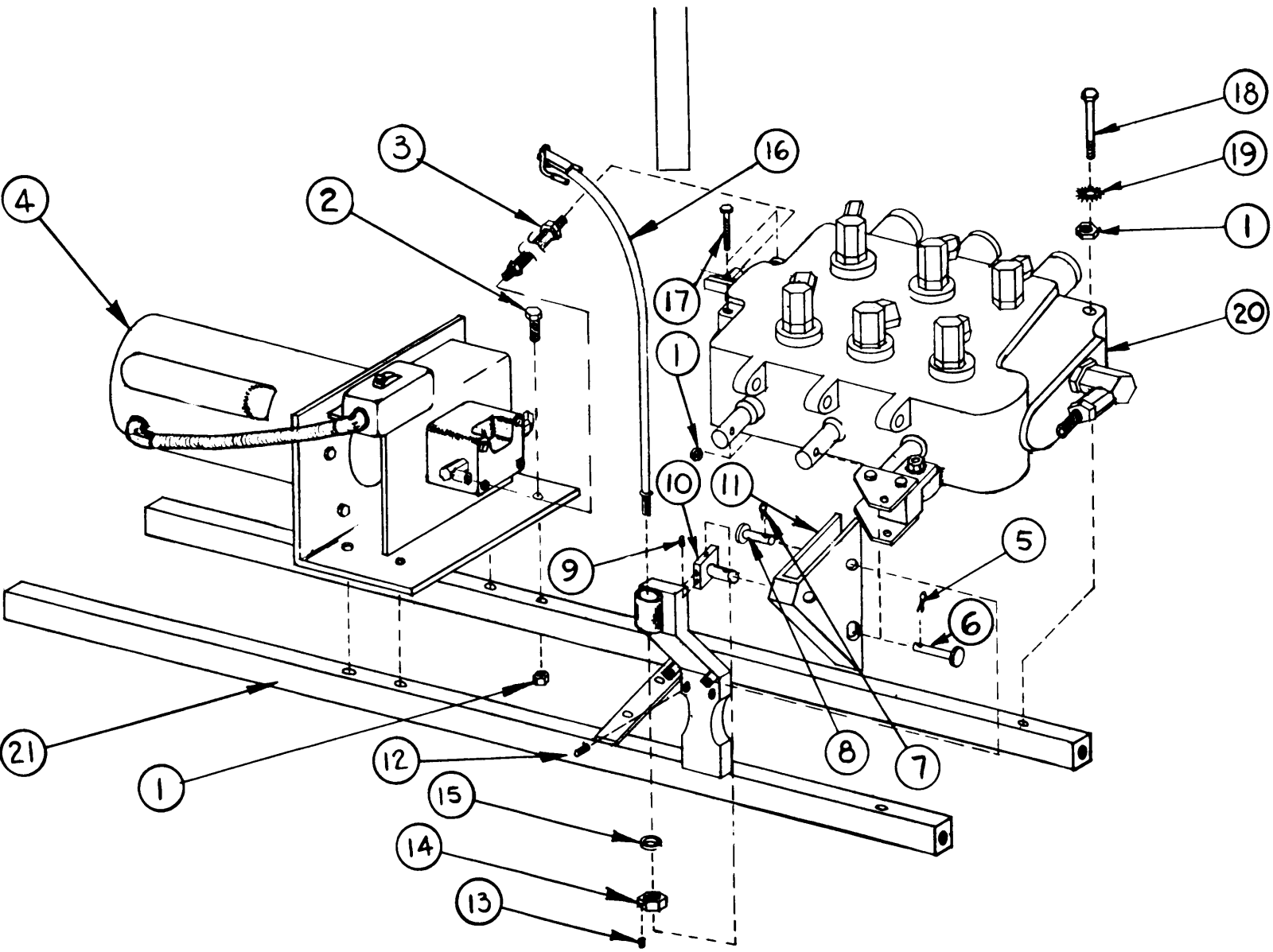


24

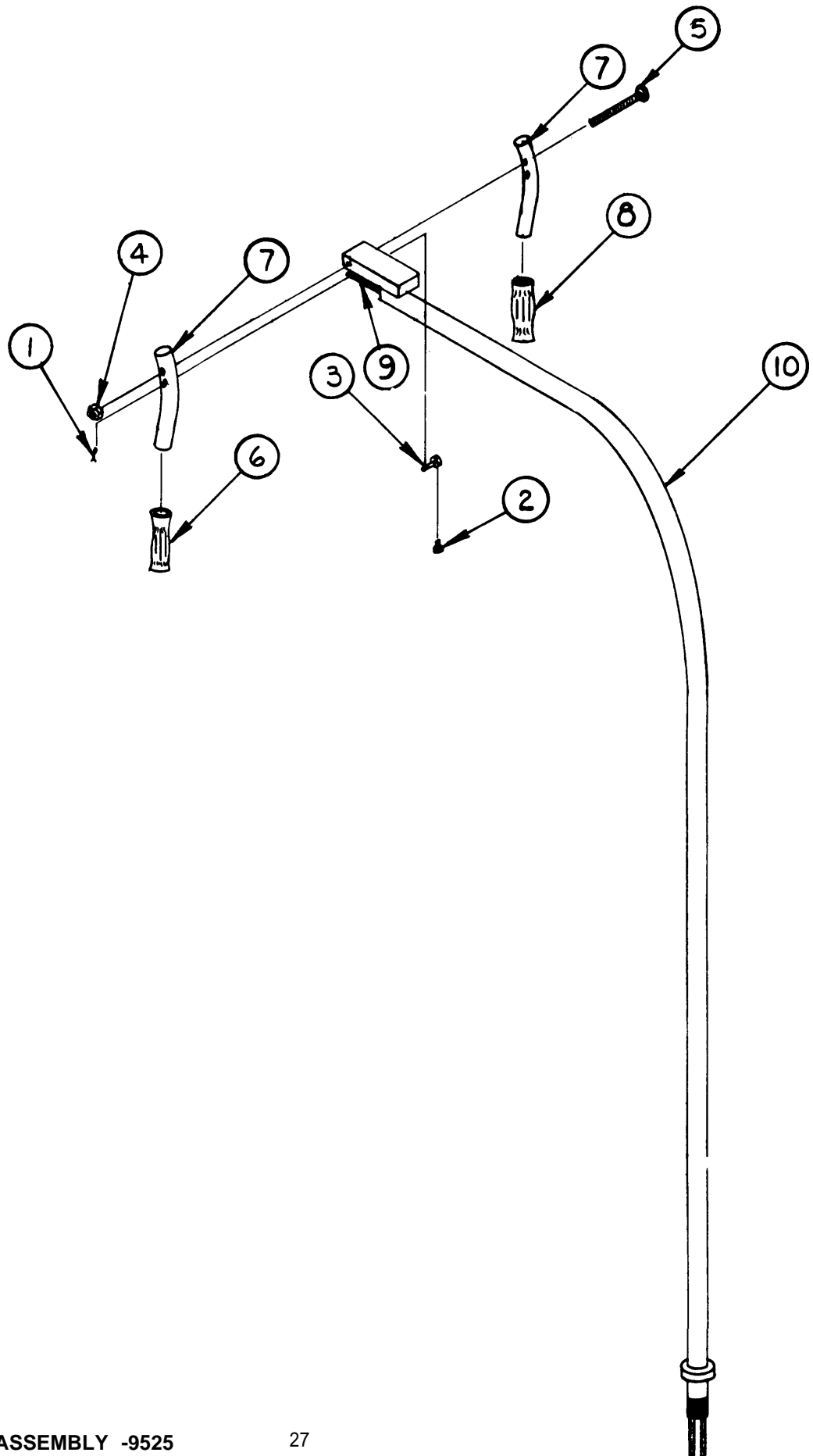
COMPLETE BOOM ASSEMBLY -9987  
Figure 4



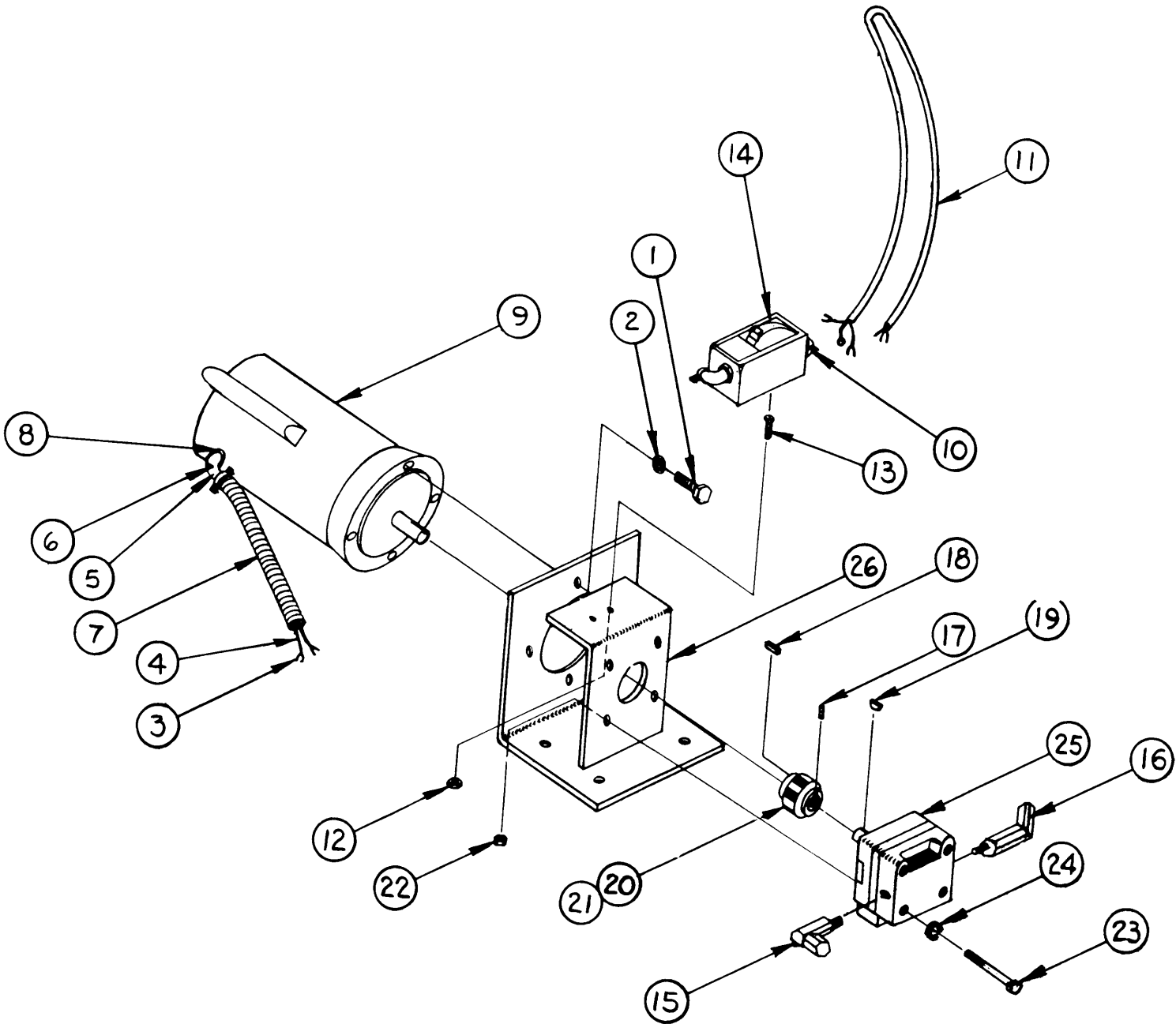
RING GEAR FITTING ASSEMBLY -9608  
Figure 5

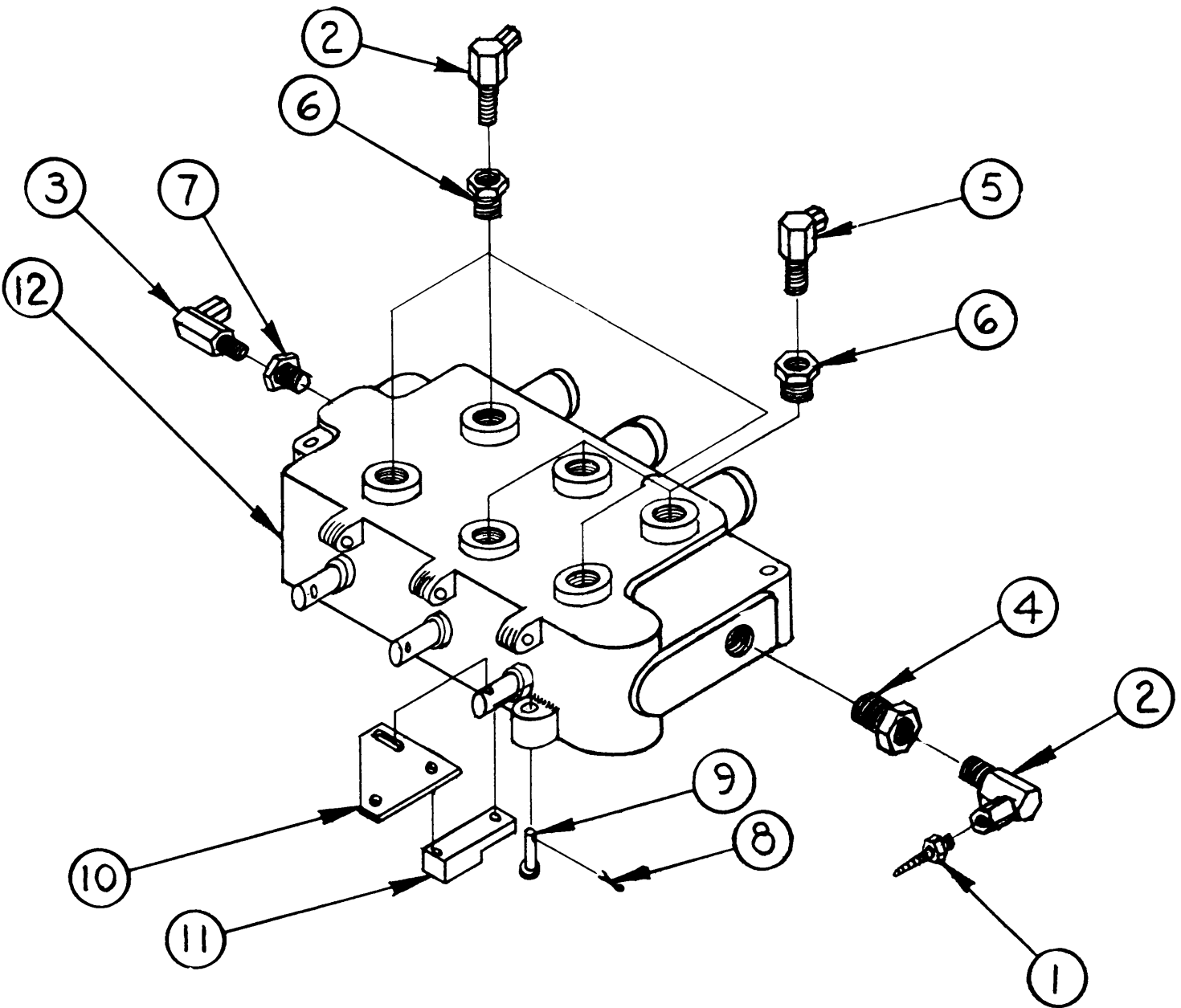


MOTOR AND VALVE ASSEMBLY  
Figure 6



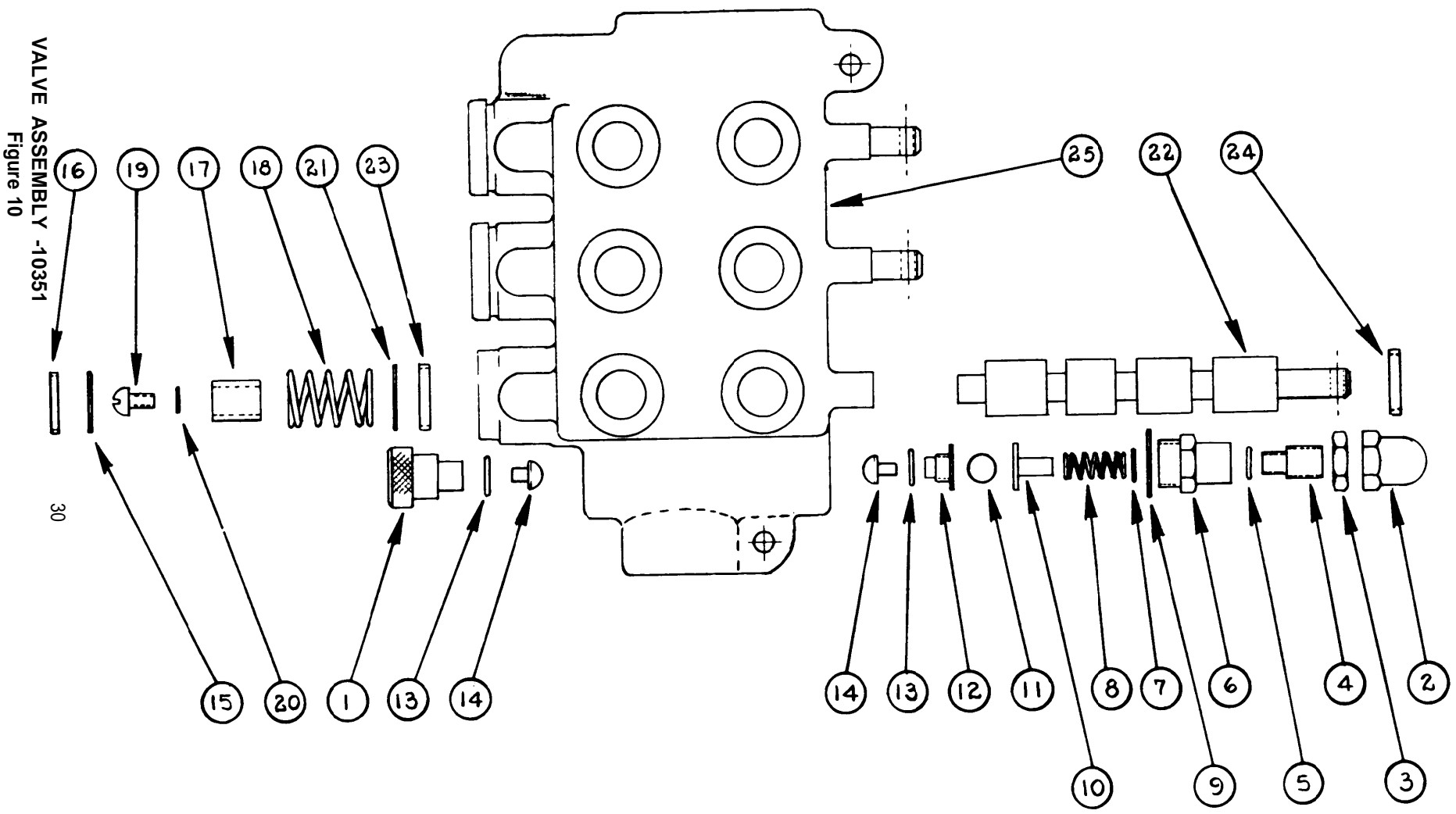
UPRIGHT TUBE ASSEMBLY -9525  
Figure 7



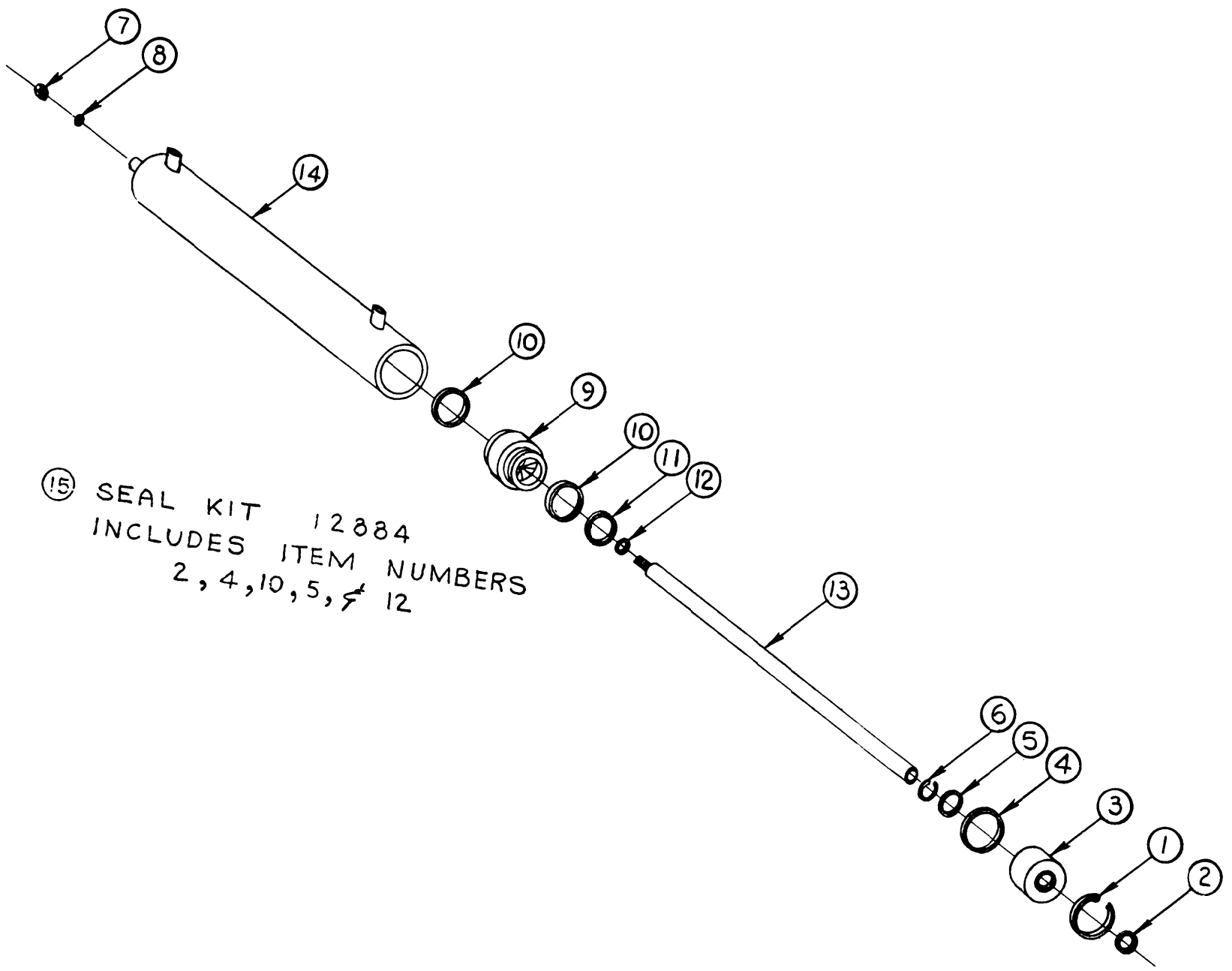


VALVE FITTING ASSEMBLY -9524  
Figure 9





VALVE ASSEMBLY -10351  
Figure 10



⑮ SEAL KIT 12084  
INCLUDES ITEM NUMBERS  
2, 4, 10, 5, 12

CYLINDER ASSEMBLY -9428  
Figure 11

ILLUSTRATION					QTY.
FIG. NO.	IT. NO.	PART NUMBER	DESCRIPTION	U/M	INC. IN UT.
LEGS & HARDWARE					
1	1	12412	RING, RETAINING	EA	2
1	2	3407	SCREW, SET, KNURLED CUP POINT, SOCKET HEAD, 5/16-18X 5/16, STEEL, PLAIN	EA	1
1	3	12413	PIN	EA	1
1	4	4899	SCREW, THREAD FORMING, HEX HEAD, TYPE "D", 1/4-20X 5/8, STEEL, PLAIN	EA	19
1	5	10383	CLIP, HOSE	EA	1
1	6	9987	BOOM, ASSEMBLY	EA	1
1	7	10373	HOOD	EA	1
1	8	10322	SCREW, CAP, HEX, 5/8-11X1-1/2, STEEL, ZINC PLATED	EA	4
1	9	10321	WASHER, LOCK, SPRING, 5/8, STEEL ZINC PLATE	EA	4
1	10	10323	LEG	EA	1
1	11	10320	BASE ANGLE	EA	1
1	12	10319	RAIL	EA	3
1	13	10527	GROMMET	EA	1
1	14	739	SCREW, SET, CUP POINT, SOCKET HEAD, 1/4-20X1-1/4, STEEL, ZINC PLATED	EA	2
1	15	12414	BUSHING	EA	2
1	16	4991	LUBE CONTAINER	EA	2
1	17	10372	PANEL	EA	1
1	18	10367	VENTED PLUG	EA	1
1	19	9940	FRAME, MAIN	EA	1
HOSE ASSEMBLIES					
2	1	10362	HOSE, ASSEMBLY	EA	2
2	2	10365	HOSE, ASSEMBLY	EA	1
2	3	10364	HOSE, ASSEMBLY	EA	2
2	4	10366	HOSE, ASSEMBLY	EA	1
2	5	10361	CLAMP, HOSE	EA	2
2	6	10360	HOSE, ASSEMBLY	EA	1
2	7	10356	CLAMP, HOSE	EA	2
2	8	10354	HOSE, ASSEMBLY	EA	1
2	9	10355	CONNECTOR, HOSE, BARBED, BRASS	EA	1
2	10	10353	CONNECTOR, HOSE, BARBED, BRASS	EA	1
2	11	90120	MOTOR & VALVE ASSEMBLY	EA	1
2	12	4848	ADAPTER UNION 90°	EA	4
2	13	10352	STRAINERQ	EA	1
2	14	2328	CONNECTOR, HOSE	EA	2
2	15	3642	STREET ELBOW, 1/2-14, BLK.	EA	1
2	16	4993	STREET ELBOW, 1/2-18, BLK.	EA	1
2	17	10357	ADAPTER UNION, 90°	EA	
2	18	4025	BUSHING, HEX, STEEL, 3/4	EA	1
2	19	10358	HOSE, ASSEMBLY	EA	1
2	20	2878	BUSHING, HEX, STEEL, 3/4 HPT X NPT, PLAIN	EA	1

ILLUSTRATION				QTY.	
FIG. NO.	IT. NO.	PART Q NUMBER	DESCRIPTION	U/M	INC. IN UT.
CYLINDERS					
3	1	12133	NUT, LOCK, HEX, 3/8 - 16, STEEL, ZINC PLATED	EA	2
3	2	12544	SCREW, SHOULDER, SOCKET HEAD, 1/2 X 2-1/4, STEEL, PLAIN	EA	2
3	3	112	PIN, COTTER, 3/32 X 3/4, STEEL, PLAIN	EA	5
3	4	3707	PIN, CLEVIS, 1/4 X 1, STEEL, PLAIN	EA	4
3	5	9422	LEVER	EA	2
3	6	240	GRIP, RUBBER, BLACK	EA	2
3	7	356	PIN, CLEVIS, 1/4 X 1-1/4, STEEL, PLAIN	EA	1
3	8	10329	SHAFT	EA	1
3	9	4020	PIN, SPRING, SPIRAL, 1/2 X 1-3/4, CARBON STEEL, PLAIN	EA	2
3	10	10345	WASHER, PLAIN, 5/8, ZINC PLATED	EA	2
3	11	9428	CYLINDER, ASSEMBLY	EA	2
3	12	10322	SCREW, CAP, HEX HEAD	EA	10
3	13	10321	WASHER, LOCK, SPRING, 5/8, STEEL, PLAIN	EA	10
3	14	10645	SPACER	EA	4
3	15	10344	RAIL	EA	2
3	16	9937	CARRIAGE	EA	1
3	17	3431	WASHER, PLAIN 1"	EA	1
3	18	12433	BUSHING	EA	4
BOOM ASSEMBLY					
4	1	4174	SCREW, THREAD FORMING, HEX HEAD, SLOTTED, TYPE "A" STEEL, PLAIN	EA	3
4	2	4176	COVER, GUARD	EA	1
4	3	4187	WELTING	EA	1
4	4	3407	SCREW, SET, KNURLED CUP POINT, SOCKET HEAD, 5/16 - X 5/16, STEEL, PLAIN	EA	1
4	5	2965	PLUG, BRASS	EA	1
4	6	2740	NUT, HEX	EA	1
4	7	9608	RING GEAR & LOCK, ASSEMBLY	EA	1
4	8	2959	KEY	EA	1
4	9	2756	BEARING, THRUST	EA	1
4	10	4148	SCREW, SET, DOP POINT, SOCKET HEAD, 1/2 - 13 X 1, STEEL, PLAIN	EA	4
4	11	9527	PLATE, RATCHET	EA	1
4	12	2761	PACKING, FELT	EA	1
4	13	2757	RETAINER	EA	2
4	14	2888	CONE, BEARING	EA	2
4	15	3020	CONE, CHUCK	EA	1
4	16	752	FITTING, GREASE	EA	1
4	17	11063	RING, RETAINING	EA	1
4	18	4157	WASHER	EA	1

ILLUSTRATION				QTY.	
FIG. NO.	IT. NO.	PART NUMBER	DESCRIPTION	U/M	INC. IN UT.
BOOM ASSEMBLY (CON'T)					
4	19	2741	SHAFT, MAIN	EA	
4	20	8769	DRIVE TUBE	EA	1
4	21	4178	PACKING, FELT	EA	1
4	22	2889	CUP, BEARING	EA	2
4	23	4899	SCREW, THREAD, FORMING, HEX HEAD, TYPE "D", 1/4 - 20 X 5/8, STEEL, PLAIN	EA	2
4	24	10455	BRACKET	EA	1
4	25	9260	GUARD	EA	1
4	26	9177	PIN, LOCK	EA	1
4	27	11010	SPRING	EA	1
4	28	10363	ADAPTER UNION, 45°	EA	2
4	29	1549	PIPE TEE, STD, 1/4 NPT, MALLEABLE, PLAIN	EA	1
4	30	3994	GAUGE, PRESSURE	EA	1
4	31	1548	NIPPLE, STD. PIPE, CLOSE, STEEL, PLAIN	EA	1
4	32	2843	BUSHING, REDUCER, HEX, STEEL, 1/2 X 1/4 NPT, PLAIN	EA	2
4	33	2762	PIN, SPRING, 5/16 X 1-1/2, STEEL, PLAIN	EA	1
4	34	2738	GEAR, PINION	EA	1
4	35	1540	NUT, HEX, 1/2-20, STEEL, ZINC PLATED	EA	2
4	36	1255	WASHER, LOCK, STAR, 1/2", STEEL, ZINC PLATED	EA	2
4	37	1921	SCREW, CAP, HEX, 1/2 - 20 X 1-1/2, STEEL, ZINC PLATED	EA	2
4	38	10494	FLUID MOTOR ASSEMBLY	EA	1
4	39	9420	BOOM WELDMENT	EA	1
4	40	4177	GUARD BRACKET	EA	1
4	41	11623	WASHER, LOCK, STAR	EA	1
RING GEAR ASSEMBLY					
5	1	9607	GEAR, RING	EA	1
5	2	4185	RING, RETAINING	EA	1
5	3	3445	PIN, SPRING, 3/16 X 1-1/2, STEEL, PLAIN	EA	1
5	4	4186	KNOB	EA	1
5	5	4184	WASHER	EA	1
5	6	2946	SPRING	EA	1
5	7	4182	BOLT, RATCHET	EA	1
POWER UNIT					
6	1	12133	NUT, LOCK, HEX, 3/8 - 16, STEEL, ZINC PLATED	EA	
6	2	3815	SCREW, CAP, HEX, 3/8 - 16 Z 1-3/4, STEEL, ZINC PLATED	EA	
6	3	10358	HOSE, ASSEMBLY	EA	1
6	4	9523	MOTOR & PUMP ASSEMBLY	EA	1
6	5	112	PIN, COTTER, 3/32 X 3/4, STEEL, PLAIN	EA	2

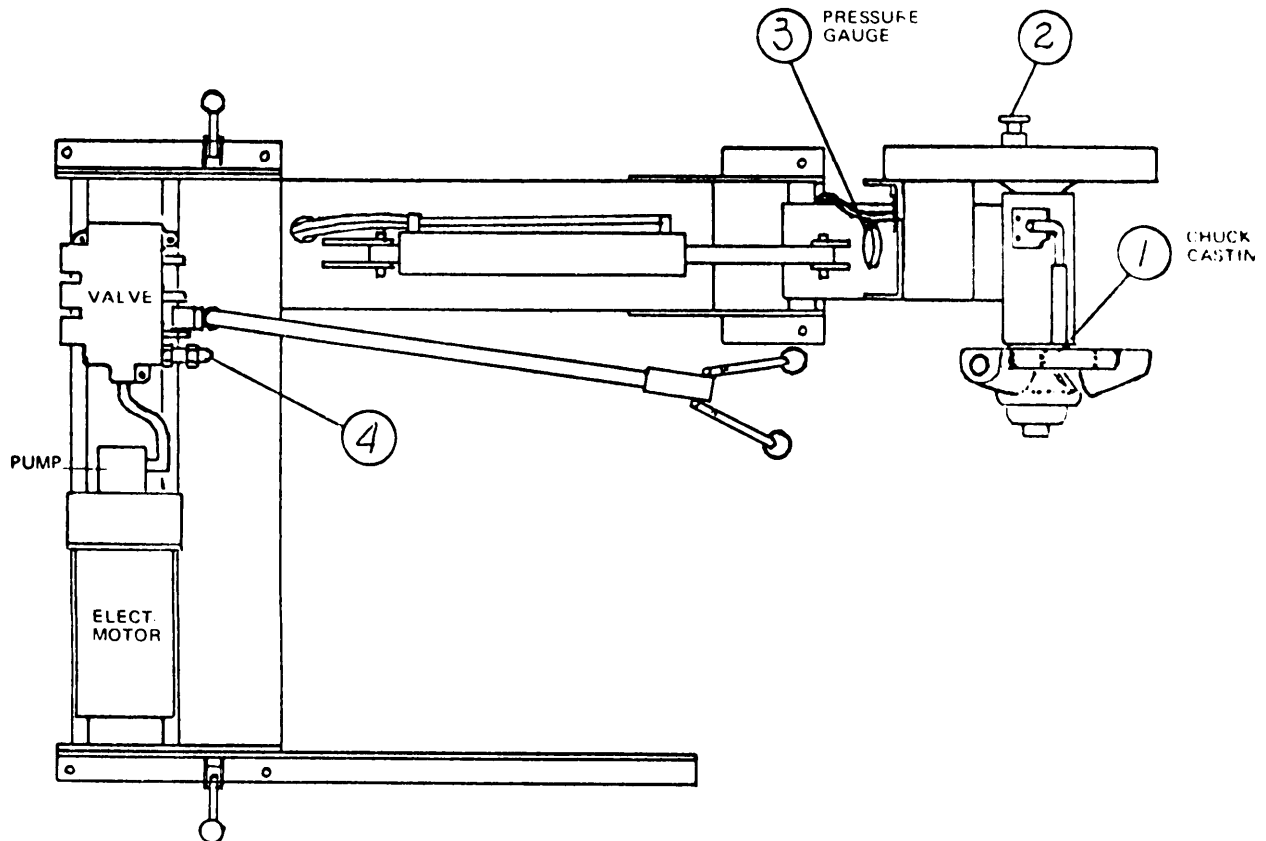
ILLUSTRATION				QTY.
FIG. NO.	IT. NO.	PART NUMBER	DESCRIPTION	INC. IN UT.
POWER UNIT (CON'T)				
6	6	356	PIN, CLEVIS, 1/4 X 1-1/4, STEEL, PLAIN	EA 2
6	7	2266	PIN, COTTER, 1/8 X 3/4, STEEL, PLAIN	EA 4
6	8	10395	PIN, CLEVIS, 3/8 X 5/16, STEEL, PLAIN	EA 4
6	9	3407	SCREW, SET, KNURLED CUP POINT, SOCKET HEAD 5/16-18 X 5/16, STEEL, PLAIN	EA 4
6	10	11005	PIVOT	EA 2
6	11	10335	BELL CRANK	EA 2
6	12	739	SCREW, SET, KNURLED CUP POINT, SOCKET HEAD, 1/4-20 X 3/4, STEEL, PLAIN	EA 3
6	13	1046	SCREW, SET, CUP POINT, SOCKET HEAD, 1/4 - 20 X 1/4, STEEL, PLAIN	EA 1
6	14	10457	NUT, HEX	EA 1
6	15	10458	WASHER, LOCK, SPRING	EA 1
6	16	9525	TUBE ASSEMBLE	EA 1
6	17	3235	SCREW, CAP, HEX HEAD, 3/8 - 16 X 2-1/4, STEEL, ZINC PLATED	EA 1
6	18	11175	SCREW, CAP, HEX HEAD, 3/8 - 16 X 3-1/4, STEEL, ZINC PLATED	EA 2
6	19	2153	WASHER, LOCK, EXTERNAL STAR, 3/8, STEEL, ZINC PLATED	EA 2
6	20	9524	VALVE AND FITTING ASSEMBLY	EA 1
6	21	9421	SUPPORT WELDMENT	EA 1
CONTROL LEVER ASSEMBLY				
7	1	2266	PIN COTTER, 1/8 X 3/4, STEEL, PLAIN	EA 2
7	2	1046	SCREW, SET, CUP POINT, SOCKET HEAD 1/4 - 20 X 1/4 STEEL, PLAIN	EA 4
7	3	10460	SPOOL	EA 2
7	4	1058	NUT, LOCK, HEX, 5/16 - 18, STEEL, ZINC PLATED	EA 1
7	5	12593	SCREW, CAP, HEX HEAD, 5/16 - 18 X 3, STEEL, ZINC PLATED	EA 1
7	6	3243	GRIP, RUBBER, RED	EA 1
7	7	10341 LH	HANDLE	EA 1
7	7	10341 RH	HANDLE	EA 1
7	8	2076	GRIP, RUBBER, BLACK	EA 1
7	9	10342	WIRE	EA 2
7	10	9424	TUBE WELDMENT	EA 1
MOTOR AND PUMP ASSEMBLY				
	1	10131	SCREW, CAP, HEX, 3/8 -16 X 1, STEEL, ZINC PLATED	EA 4
8	2	10131	WASHER, LOCK, SPRING, 3/8, STEEL, ZINC PLATED	EA 4
8	3	3794	TERMINAL, SPADE, WIRE	EA 4
8	4	10369	WIRE, MOTOR TO SWITCH	EA 2

ILLUSTRATION				QTY.
FIG. NO.	IT. NO.	PART NUMBER	DESCRIPTION	U/M IN UT.
MOTOR AND PUMP ASSEMBLY (CON'T)				
8	5	2815	CONNECTOR, 3/8 X 90°	EA 2
8	6	990	BUSHING, INSULATED	EA 2
8	7	10370	CONDUIT	EA 1
8	8	3585	WASHER	EA 2
8	9	4831	ELECTRIC MOTOR	EA 1
8	10	756B	CONNECTOR	EA1 1
8	11	4817	ELECTRIC CORD #1 2 AWG-3 CONDUCTOR X 94"	EA 1
8	12	3734	NUT, LOCK, HEX, STEEL, #10-24, PLAIN	EA 2
8	13	629	SCREW, ROUND HEAD, STEEL, #10-24 X 5/8, PLAIN	EA 2
8	14	2812	SWITCH	EA 1
8	15	10357	ADAPTER UNION, 90°	EA 1
8	16	4993	STREET ELBOW, 3/8 - 18, BLK.	EA 1
8	17	1046	SCREW, SET, CUP POINT, SOCKET HEAD, 1/4 -20 X 1/4, STEEL, PLAIN	EA 2
8	18	10966	KEY, 3/16 X 3/16, STEEL, PLAIN	EA 1
8	19	20021	KEY, WOODRUFF #2	EA 1
8	20	10368	COUPLING, FLEXIBLE, ASSEMBLY	EA 1
8	22	483	NUT, HEX, 5/16 - 18,STEEL, ZINC PLATED	EA 4
8	23	1916	SCREW, CAP, HEX, 5/16 - 18 X 3-1/2,STEEL, ZINC PLATED	EA 4
8	24	646	WASHER,LOCK,SPRING,5/16,STEEL,ZINC PLATED	EA 4
8	25	12961	PUMP	EA 1
8	26	9425	MOUNT, MOTOR & PUMP	EA 1
VALVE ASSEMBLY				
9	1	2328	CONNECTOR,HOSE	EA 1
9	2	4848	ADAPTER UNION 90°	EA 4
9	3	10357	ADAPTER UNION 90°	EA 1
9	4	2878	BUSHING, HEX, STEEL, 3/4 NPT X 1/4 NPT, PLAIN	EA 1
9	5	2953	ADAPTER UNION, RESTRICTED,90°	EA 3
9	6	2843	BUSHING, HEX, STEEL, 1/2 X 1/4 NPT, PLAIN	EA 6
9	7	4025	BUSHING, HEX, STEEL, 3/4 X 3/8 NPT, PLAIN	EA 1
9	8	112	PIN, COTTER, 3/32 X 3/4, STEEL, PLAIN	EA 2
9	9	356	PIN, CLEVIS, 1/4 X 1-14, STEEL, PLAIN	EA
9	10	10330	BELL CRANK	EA
9	11	10331	BELL CRANK SUPPORT	EA 1
9	12	10351	VALVE	EA 1

ILLUSTRATION					QTY.
FIG. NO.	IT. NO.	PART NUMBER	DESCRIPTION	U/M	INC. IN UT.
VALVE ASSEMBLY					
10	1	5072-6630	PLUG, LOAD CHECK	EA	1
10	2		NUT, ACORN	EA	1
10	3	973-001	NUT, JAM	EA	1
10	4	925-001	SCREW, ADJUSTING	EA	1
10	5	926-001	"O" RING	EA	1
10	6	924-004	BODY, RELIEF	EA	1
10	7	1213-001	WASHER, RELIEF	EA	1
10	8	922-001	SPRING	EA	1
10	9	923-001	GASKET	EA	1
10	10	994-001	SPACER	EA	1
10	11	071-001	BALL	EA	1
10	12	2785-001	SEAT	EA	1
10	13	2706-001	SEAL	EA	1
10	14	2781-001	POPPET	EA	2
10	15	912-001	DISC	EA	3
10	16	914-001	RETAINING RING	EA	3
10	17	911-001	COLLAR	EA	3
10	18	913-001	SPRING	EA	3
10	19	510-001	SCREW	EA	3
10	20	2529-001	WASHER, LOCK	EA	3
10	21	1202-001	WASHER	EA	3
10	22	2891-001	SPOOL	EA	3
10	23	932-001	SEAL	EA	6
10	24	5032-6455-001	HANDLE	EA	3
10	25	2703-012	HOUSING	EA	1
CYLINDER ASSEMBLIES					
11	1	10381	RING, RETAINING	EA	1
11	2	3607	WIPER ROD	EA	1
11	3	10377	CAP	EA	1
11	4	10203	"O" RING	EA	1
11	5	3609	"U" CUP	EA	1
11	6	10958	RING, RETAINING	EA	1
11	7	482	NUT, HEX, 5/8 - 18, STEEL, ZINC PLATED	EA	1
11	8	10321	WASHER, LOCK, SPRING, 5/8, PLAIN	EA	1
11	9	11201	PISTON	EA	1
11	10	10380	"U" CUP	EA	2
11	11	10916	RING, RETAINING	EA	1
11	12	3614	"O" RING	EA	1
11	13	11202	ROD, PISTON	EA	1
11	14	9427	CYLINDER	EA	1
11	15	12884	SEAL KIT	EA	1



## 931A HYDRAULIC SYSTEM PRESSURE CHECK



1. Lock # 9177 Pin in groove in Chuck,
2. Engage # 4186K Control Knob.
3. Observe pressure on gauge when Rotation Lever is moved to Normal Rotation Position. If pressure is not at least 1500 PSI:
4. Loosen Hex Nut and with Screw Driver turn Slotted Relief Valve Screw (in for more pressure, out for less).

NOTE: On some Duplex Tires it may be necessary to set Relief Valve at 1800 PSI.

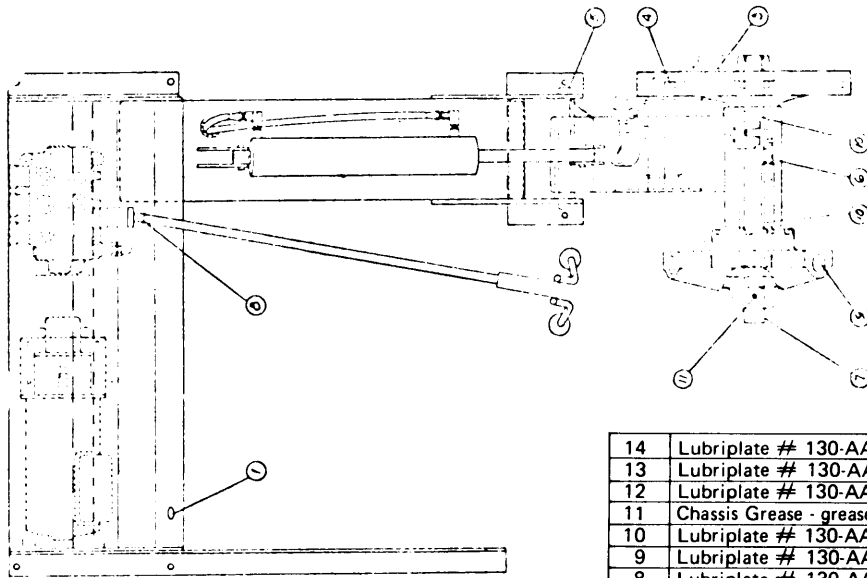
Figure 12

**TROUBLESHOOTING**

PROBLEM	CAUSE	REMEDY
A. Motor fails to start with switch in "on" position	<ol style="list-style-type: none"> <li>1. Circuit Breaker overloaded</li> <li>2. Defective switch or electric connection</li> <li>3. Electric motor malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Reset circuit breaker - should be at least 30 AMPS</li> <li>2. Check switch for open or defective switch - repair connection or replace switch</li> <li>3. Clean motor commutator or replace motor assembly.</li> </ol>
B. Chuck fails to hold rim	<ol style="list-style-type: none"> <li>1. Worn or dirty chuck jaw rollers</li> <li>2. Chuck jaws not expanding when adapter cone is engaged</li> <li>3. Dirty or broken chuck screw</li> <li>4. Pressure gauge malfunction</li> </ol>	<ol style="list-style-type: none"> <li>1. Check chuck and chuck jaw rollers or allen screws for wearing-or chipping - clean or replace worn parts</li> <li>2. Clean adapter cone threads and check cone ramps for nicks or damage - repair ramps or replace cone</li> <li>3. Clean and lubricate screw threads or replace broken screw (broken screw probably caused by chucking with red chuck roller in wrong position - see chucking decal on machine)</li> <li>4. Check pressure gauge - no lead gauge pressure should be 150-2-00 PSI - replace-gauge</li> </ol>
C. Tire will not raise or rotate	<ol style="list-style-type: none"> <li>1. Broken control cable</li> <li>2. Boom control cylinder malfunction problem could show as lack of power or speed</li> <li>3. Hydraulic motor malfunction - problem could show as slow tire rotation or lack of power on rotation</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace control cable</li> <li>2. Check boom hydraulic cylinder for internal leakage - replace seals inside cylinder or entire cylinder</li> <li>3. Clean motor or check for internal or external leakage - replace motor</li> </ol>
D. Lack of speed or power on any function	<ol style="list-style-type: none"> <li>1. Hydraulic Pump malfunction</li> <li>2. Hydraulic system leakage</li> <li>3. Suction line between tank and pump not air tight or suction screen plugged - pump will activate (snapping sound)</li> <li>4. Bead breaking or mount-demount inoperative or malfunction</li> <li>5. Low hydraulic pressure occurs mainly on mounting or remounting of duplex tires</li> <li>6. Unit being used primarily outside and/or in cold weather situations</li> </ol>	<ol style="list-style-type: none"> <li>1. Check pump for internal or external leakage - replace pump</li> <li>2. Check individual power components for leakage (see D2 and D3 above)</li> <li>3. Tighten line or clean suction screen</li> <li>4. Check carriage cylinder for leakage - replace hydraulic cylinder or replace seals inside cylinder</li> <li>5. Adjust relief valve (figure 10- lower right) to 1800 PSI maximum, check as shown in Figure 12</li> <li>6. Change from oil to transmission fluid in hydraulic system</li> </ol>
E. Loss of any individual function	<ol style="list-style-type: none"> <li>1. Hydraulic control valve malfunction</li> <li>2. Sticking valve spools in hydraulic control valves - generally due to warpage of control valve</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace seals or broken spool valve -</li> <li>2. Loosen and retighten mounting screws on control valve unequal mount bolt tension can distort valve body. Valve body distortion can also occur from fittings screwed too tight</li> </ol>

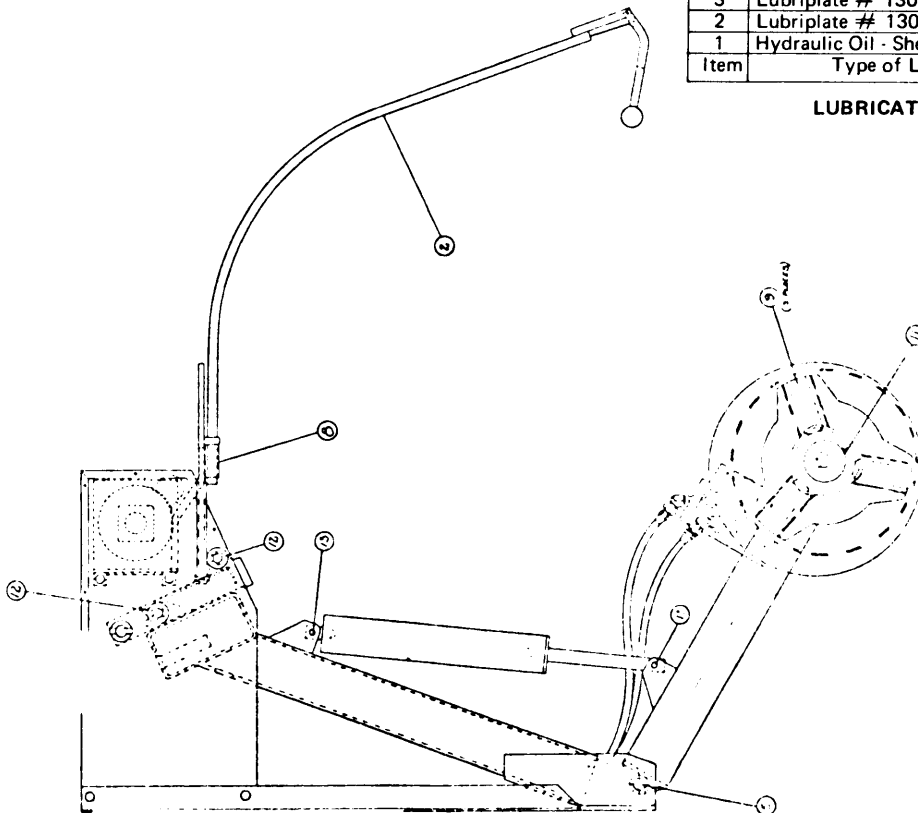
**TROUBLE SHOOTING (Continued)**

PROBLEM	CAUSE	REMEDY
F. Boom would't hold position	<ol style="list-style-type: none"> <li>1. Boom cylinder internal leak</li> <li>2. Control cable set screws loose or in wrong position</li> </ol>	<ol style="list-style-type: none"> <li>1. Rebuild cylinder</li> <li>2. Reposition control cables and tighten set screws (two set screws each end) see installation instructions</li> </ol>
G. Tire rotation stops when press wheel is pushed against tire	<ol style="list-style-type: none"> <li>1. Hydraulic control valve malfunction - too much oil being ported to carriage cylinder</li> </ol>	<ol style="list-style-type: none"> <li>1. Add restrictor (Part # 2953) to inlet and outlet of carriage cylinder</li> </ol>
H. Oil level continuously low	<ol style="list-style-type: none"> <li>1. Oil tank leaks</li> <li>2. External leakage of individual control elements</li> </ol>	<ol style="list-style-type: none"> <li>1. Repair or replace tank</li> <li>2. Repair or replace leaking element</li> </ol>



14	Lubriplate # 130-AA (carriage support bracket)	
13	Lubriplate # 130-AA (cylinder hinge pins)	
12	Lubriplate # 130-AA (carriage slide rails)	
11	Chassis Grease - grease gun on zerk	3 strokes
10	Lubriplate # 130-AA	
9	Lubriplate # 130-AA	
8	Lubriplate # 130-AA	
7	Lubriplate # 130-AA	
6	Lubriplate # 130-AA	
5	Lubriplate # 130-AA	
4	Lubriplate # 130-AA	
3	Lubriplate # 130-AA (Assembly 9608)	
2	Lubriplate # 130-AA (Assembly 9525)	
1	Hydraulic Oil - Shell # 27 or equal	3½ gal.
Item	Type of Lubricant	Qty.

LUBRICATION CHART



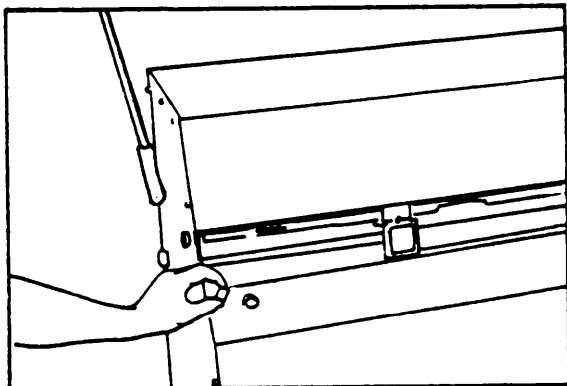
LUBRICATION DIAGRAM

Figure 13

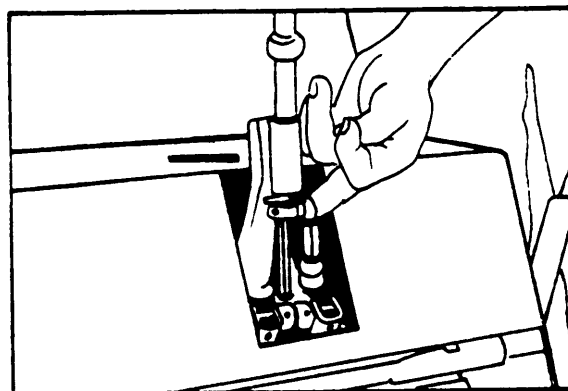
**NOTE:**

1. Lubricate all linkage controls, handle pins, and bellecranks with a No. 30 lubricating oil.
2. Timken bearings on chuck drive tubes to be packed with an approved bearing grease.

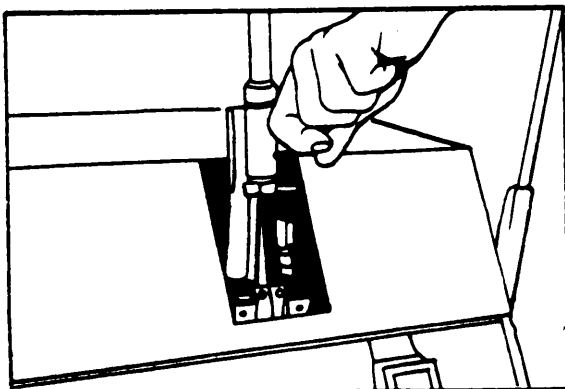
### INSTALLATION



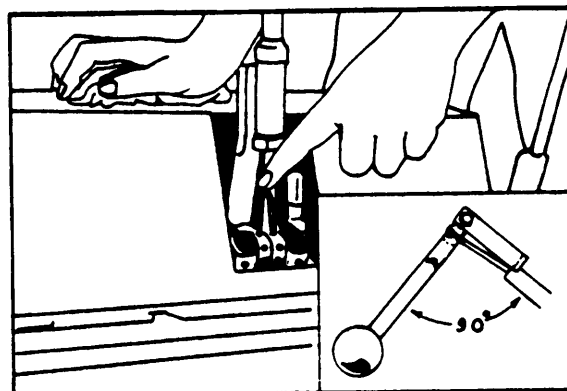
1. Remove all packing material and replace solid plug in top of reservoir with vented plug.



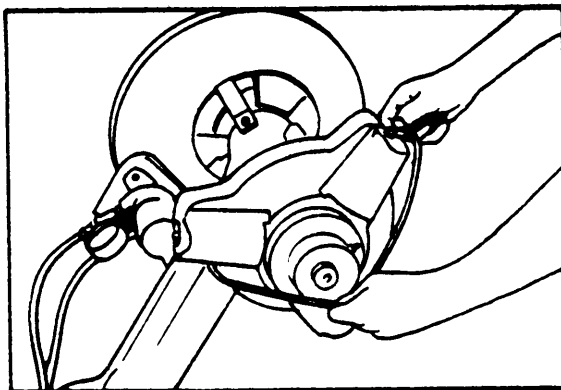
2. Insert control handle assembly through support tube and slide friction washer and nut through control wires. Guide control wires into holes in spool pivots.



3. Assemble friction washer and nut on control tube assembly. Tighten nut until it applies enough friction to control tube assembly to hold control tube assembly whenever it is swung from side to side. Tighten set screw in nut or this position.



4. Position control levers as shown on insert above. Tighten set screws on front and rear of spool pivots when control handles are at position shown.

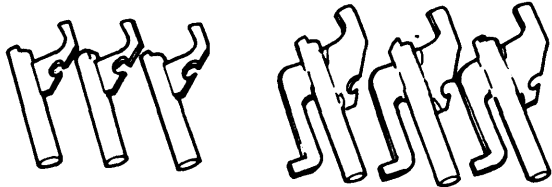


5. Slip the chuck rod retaining spring over the chuck casting and unwrap the tape and wire from the large Acme thread.

BASIC 931A is standard with 1 set of 19.5 (P/N 90073) and 1 set of 22.5(P/N 90074) chuckrods (other sizes may be substituted on request) and includes:

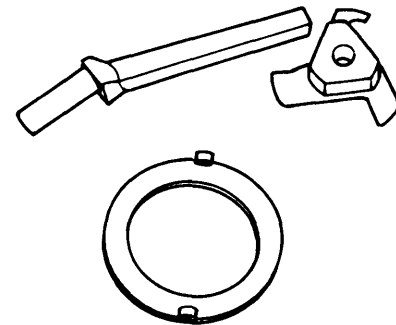
- Bead Starting Tool (For mounting tubeless tires – P/N 9000)
- Tire Spade (Used for remounting tubeless tires – P/N 8338)
- Mount-Demount Shoe (For mounting and remounting tires on drop center rims – P/N 8995)
- 1 Qt. Applicator (P/N 1037)

**OPTIONAL ACCESSORIES**



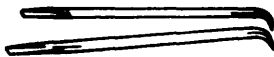
Chuck Rods  
**90072** – 18"      **90071** – 15" - 17.5"  
**90076** – 28"      **90075** – 24" - 24.5"

**90077** – Reverse Disc Adapter  
(May be used as 24" - 24.5" chuck jaw)

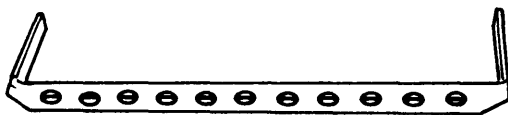


**9546** – Straight Press Wheel Arm – used for duplex, reverse disc and aluminum wheel assembly.

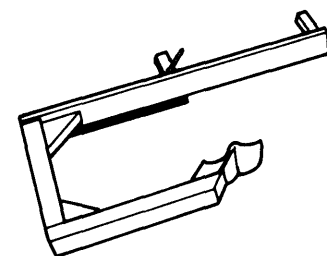
**8985** – Pressure Ring and Cone for reverse disc and aluminum wheel assembly.



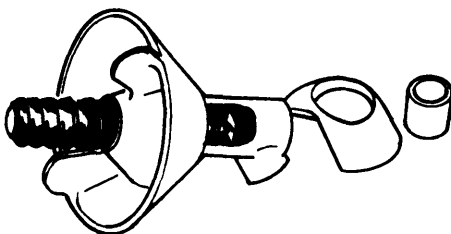
**2806** – Tire Irons for removing lock rings



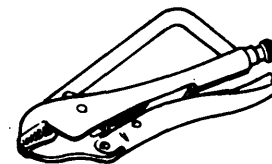
**9496** – Tool Rack



**5705** – Duplex Tool



**9850** – Small Wheel Adapter (14" to 17.5")  
(used with 90071)



**5837** – Vice Grips for mounting duplex tires

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TEAR ALONG PERFORATED LINE

## THE METRIC SYSTEM AND EQUIVALENTS

### LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches  
 1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches  
 1 Kilometer = 1000 Meters = 0.621 Miles

### SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inches  
 1 Sq Meter = 10,000 Sq Centimeters = 10.76 Sq Feet  
 1 Sq Kilometer = 1,000,000 Sq Meters = 0.386 Sq Miles

### WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces  
 1 Kilogram = 1000 Grams = 2.2 Lb  
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

### CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches  
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

### LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces  
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

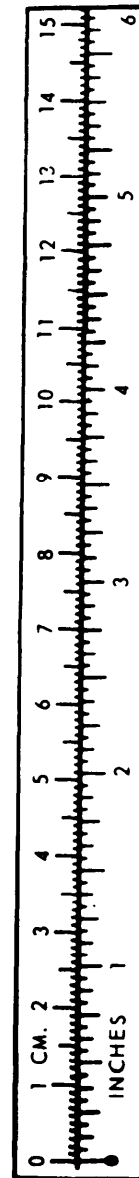
### TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$   
 212<sup>o</sup> Fahrenheit is equivalent to 100<sup>o</sup> Celsius  
 90<sup>o</sup> Fahrenheit is equivalent to 32<sup>o</sup> Celsius  
 32<sup>o</sup> Fahrenheit is equivalent to 0<sup>o</sup> Celsius  
 $9/5 \text{ C}^{\circ} + 32 = \text{F}^{\circ}$

### APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches . . . . .	Centimeters . . . . .	2.540
Feet . . . . .	Meters . . . . .	0.305
Yards . . . . .	Meters . . . . .	0.914
Miles . . . . .	Kilometers . . . . .	1.609
Square Inches . . . . .	Square Centimeters . . . . .	6.451
Square Feet . . . . .	Square Meters . . . . .	0.093
Square Yards . . . . .	Square Meters . . . . .	0.836
Square Miles . . . . .	Square Kilometers . . . . .	2.590
Acres . . . . .	Square Hectometers . . . . .	0.405
Cubic Feet . . . . .	Cubic Meters . . . . .	0.028
Cubic Yards . . . . .	Cubic Meters . . . . .	0.765
Fluid Ounces . . . . .	Milliliters . . . . .	29.573
Pints . . . . .	Liters . . . . .	0.473
Quarts . . . . .	Liters . . . . .	0.946
Gallons . . . . .	Liters . . . . .	3.785
Ounces . . . . .	Grams . . . . .	28.349
Pounds . . . . .	Kilograms . . . . .	0.454
Short Tons . . . . .	Metric Tons . . . . .	0.907
Pound-Feet . . . . .	Newton-Meters . . . . .	1.356
Pounds per Square Inch . . . . .	Kilopascals . . . . .	6.895
Miles per Gallon . . . . .	Kilometers per Liter . . . . .	0.425
Miles per Hour . . . . .	Kilometers per Hour . . . . .	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters . . . . .	Inches . . . . .	0.394
Meters . . . . .	Feet . . . . .	3.280
Meters . . . . .	Yards . . . . .	1.094
Kilometers . . . . .	Miles . . . . .	0.621
Square Centimeters . . . . .	Square Inches . . . . .	0.155
Square Meters . . . . .	Square Feet . . . . .	10.764
Square Meters . . . . .	Square Yards . . . . .	1.196
Square Kilometers . . . . .	Square Miles . . . . .	0.386
Square Hectometers . . . . .	Acres . . . . .	2.471
Cubic Meters . . . . .	Cubic Feet . . . . .	35.315
Cubic Meters . . . . .	Cubic Yards . . . . .	1.308
Milliliters . . . . .	Fluid Ounces . . . . .	0.034
Liters . . . . .	Pints . . . . .	2.113
Liters . . . . .	Quarts . . . . .	1.057
Liters . . . . .	Gallons . . . . .	0.264
Grams . . . . .	Ounces . . . . .	0.035
Kilograms . . . . .	Pounds . . . . .	2.205
Metric Tons . . . . .	Short Tons . . . . .	1.102
Newton-Meters . . . . .	Pound-Feet . . . . .	0.738
Kilopascals . . . . .	Pounds per Square Inch . . . . .	0.145
Kilometers per Liter . . . . .	Miles per Gallon . . . . .	2.354
Kilometers per Hour . . . . .	Miles per Hour . . . . .	0.621



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