DRILL DOCTOR'S HANDBOOK

FOR CANUN ROCK DRILLS

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A HANDBOOK OF ESTABLISHED PRACTICES AND PRATICAL SUGGESTIONS

FOR MAINTENANCE AND REPAIR OF CANUN MODEL 260B

JACKLEG, SINKER AND STOPER ROCK DRILLS

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INTRODUCTION

This Handbook is intended for the use of service personnel whose job it is to care for and repair,

CANUN Airleg (Jackleg), Sinker and Stoper Rock Drills.

Modern rock drills are precision machines, manufactured to very close tolerances

that are subjected to a great deal of hard service and abuse by those who operate them.

In spite of our efforts to make a drill that will run forever, rock drills can and do wear out and break down.

We hope the information provided in this handbook will make easier the task of keeping

CANUN drills operating at peak efficiency.

SECTION 1

TYPICAL PROPERTIES OF ROCKDRILL LUBRICANT (1*)

Viscosity for Air Temperatures	ISO Viscosity Grade *(*2)*	Flash Point (minimum) *(*3)*		Pour Point *(*4)*		PIN Wear Test Film Strength (PSI) *(*5)*	Steam Emulsion Number *(*6)*
		°F	°C	°F	°C		
Below 20°F (7°C)	32	360	182	-55	-48	300,000	1200+
20°F à 40°F (-7°C à 4°C)	68	405	207	-30	-34	300,000	1200+
40°F à 80°F (4°C à 27°C)	100	420	216	-10	-23	300,000	1200+
80°F à 110°F (27°C à 43°C)	150	445	229	-5	-21	300,000	1200+
Above 110°F (43°C)	220	470	243	5	-15	300,000	1200+

(1) Rockdrill oils used in air line lubricators should adhere to metallic surfaces under conditions which exist in a rockdrill.

(2) Viscosity is a measure of oil's resistance to change due to temperature fluctuations. The higher the number, the less its viscosity changes.

(3) Flash point is the minimum temperature at which sufficient liquid is vaporized to create a mixture of fuel and air that will burn if ignited, and is only of an instant's duration.

(4) Flash point is the minimum temperature at which sufficient liquid is vaporized to create a mixture of fuel and air that will burn if ignited, and is only of an instant's duration.

(5) The film strength and lubricity is a measure of the load an oil will sustain between two metal surfaces without scoring.

(6) Steam emulsion number is a measure of the life of an emulsion developed between volumes of oil and water under certain standard conditions. A high number (1200+) indicates good lubrication in the presence of water and also prevents foaming in the lubricator.

DRILL SHOP TOOL REQUIREMENTS
(see layout Drawing #7)

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1) Two or three work benches - steel - minimum 1/2" plate top.
2) One bench or stand with facilities to: (see drawings #1 and #2)
    a. remove and install C1508 Rifle Nut
    b. remove and install C1512 Chuck Nut
    c. mount to assemble Jackleg and Sinkers
3) Two or Three – 8" regular vise. One on each work bench, mounted.
4) One pipe vise or cone clamp to assemble Stopers. Mounted on work bench.
5) 50-ton hydraulic press with appropriate protective guards
6) 100-amp electric welding machine (optional)
7) One set of acetylene cutting and welding torches (optional)
8) Drill press - chuck size 1/2" minimum - variable speed
9) Rotary (pencil) grinder with chuck size 1/8" – 1/4" approximately 20,000 RPM, with complete set of grinding stones of good quality.
10) At least two extendable air hoses (1/4") with quick disconnects for air tools.
11) Torque wrenches 0 - 300 FT/LBS (manual)
12) Impact wrench - minimum 100 FT/LB torque for Jacklegs and Stoper
    - also larger model, where larger machines are repaired.
13) Test area for running drills should include:
    a) air and water pressure gauges
    b) air consumption meter
    c) Sufficient 1" air hose and 1/2" water hose.
14) Double grinder with a minimum 6" stone and wire wheel
15) Angle grinder (4" wheel) - Approximately 10,000 RPM with grinding discs
16) Air or electric drills 3/8" and 1/2" chuck - Approximately 1000 RPM
17) Wash tank (covered) for varsol or equivalent cleaners - large enough to immerse complete drill (less leg) & with drain screen or tray for draining varsol off parts.
18) Sufficient fire extinguishers to protect shop in the event a fire occurs
19) Overhead or electric hoist (1000# capacity) for use with large drills
    - on a track or arm to cover areas for receiving - repairing and shipping.
20) Desk or table with filing area for drill records - parts lists etc. and sufficient space for mine telephone.
21) Shelving and drawers. Sufficient to store, separate and identify drill parts, tools etc...

DRILL SHOP TOOL REQUIREMENTS
(see layout Drawing #7)

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(22) SPECIALIZED TOOLS :

(a) Complete set of **CANUN** Repair Shop Tools (T201 to T224 included)
(b) Rifle Nut (C1508) remover - (see Drawing #2)
(c) Chuck Nut (C1512) remover - (see Drawing #1)

(23) REGULAR TOOLS :

(a)	Adjustable Wrenches	8” - 10” - 12” - 16” - 24”
(b)	Pipe Wrenches	6” - 12” - 18”
(c)	Complete set of sockets to 1 1/2”	
(d)	Complete set of wrenches to 1 1/2” (box end and open end on same wrench)	
(e)	Micrometers inside and outside	0”- 6”
(f)	Vernier calipers	0”- 6”
(g)	Mechanics square with level	
(h)	Straight edge	
(i)	Feeler gauges	
(j)	Hammers - machinists small to 8# sledge	
(k)	Soft headed hammer for drill assembly	
(l)	Pliers - standard - wire cutters - vise grips - circlip pliers (inside-outside type)	
(m)	Die and tap set	1/8” to 1”
(n)	Pipe die and tap set	1/8” to 3/4”
(o)	Hones	
	- one set up to 1 1/2”	
	- one set up to 4 1/2” (special for honing over keyways - use “Sunnen” or equivalent)	
(p)	Extension light	
(q)	Small pencil type magnet	
(r)	Complete set of Allen wrenches	
(s)	Complete set of high-speed drill bits	1/16” to 1/2”
(t)	Misc: Emery paper (coarse - medium - fine - very fine)	
	Oil base grinding compound	
	Blueing	
	Hand stones	
	Wheel dresser	
	Gloves for varsol wash tank	
	Hand held wire brushes	
	Heavy duty paint brushes for wash tank - round and flat	

ROCK DRILL REPAIR AND MAINTENANCE

DRILL WILL NOT START	
Reason	***Repair Procedure***
Airline or hose blocked	Clear blockage.
Piston stuck and air blowing from exhaust ports.	Cylinder damaged, broken piston or main valve stuck. Rotation jammed, fronthead seized.
Piston stuck and no air is blowing.	Cylinder damaged. Rotation jammed, fronthead seized.
Water leaking from exhausts and/or kicker port relief holes etc…	High pressure water backing up into drill. Check 164231 "O" Ring water tube as well as Water Valve "O" rings 164301 and 164521.
Frozen muffler or exhaust ports.	Install moisture trap in air line. Check water tube.
Damaged or tight Front Cylinder Washer liner.	Hone or ream liner to proper size.

ERRATIC OR SLUGGISH OPERATION	
Reason	***Repair Procedure***
Rockdrill oil too heavy for temperature.	Change grade of oil.
Too much oil.	Check lubricator and set properly.
Not enough or no oil.	Check lubricator and set properly. Check lubricator hose length, not over 12 feet.
Machine heating up.	Check lubricator. Fill, clean or reset as required.
Dirt in machine.	Disassemble. Clean and check for damage. Use clean oil and containers. Protect drill when blasting or moving.
Main valve sticking.	Check for burrs or nicks.
Broken or damaged parts, pawls or pawl springs.	Make certain all parts are clean, undamaged and operating freely.

EXCESSIVE WEAR OF PARTS	
Reason	***Repair Procedure***
Faulty lubrication.	Replace necessary parts. Check grade of oil and lubricator for proper operation.
Dirt in drill.	Check Stopers for front end blow. Plug or cover all openings of drill when blasting or when storing drill.

DRILL LACKS POWER BUT SOUNDS GOOD	
Reason	***Repair Procedure***
Short or long shank on Drill Steel.	Check steel.
Worn or broken Piston.	Replace.
Plugged hose or air leakage.	Clean.
Low air pressure.	Check air lines and valves. Min-80 PSI.
Lack of oil.	Front End Cylinder will be warm, check lubricator.
Loss of front-end cushion.	Worn Piston or Front Cylinder Washer liner.
Cylinder damaged.	Repair.
Worn C1418A insert.	Replace.
Damaged Chuck or Fronthead.	Repair or replace.

SLOW DRILL SPEED	
Reason	***Repair Procedure***
Low air pressure.	Should be 80 PSI or higher.
Plugged air screen or airline.	Clean.
Low water pressure or volume.	Check Water Valve, Water Tube, Drill Steel, water lines.
Improper alignment in hole.	Keep drill steel centred in the hole.
Bent Drill Steel.	Change steel. Return for repair.

SLOW ROTATION – NO ROTATION	
Reason	***Repair Procedure***
Bit gauge improper.	Replace.
Worn Pawls, Rifle Bar, Rifle Nut, Piston	Replace worn parts.
Damage or lack of lubrication to front end of drill.	Check for oil and damage.
Machine not assembled properly - Side Rods loose.	Check for proper assembly. Tighten Side Rods evenly (90 FT/LB. torque).

BIT MUDDING IN HOLE – CUTTINGS NOT BEING REMOVED	
Reason	***Repair Procedure***
Plugged steel or water tube.	Clear obstruction.
Low water pressure.	Check water lines, water screen etc...
High water pressure.	Over 250 PSI. Put Reducing Valve in water line, because automatic Water Valve will not operate.
Water tube hole too small.	- At high drilling speeds (35”/min), it may be necessary to use water tubes with holes larger than 5/64” - Check with **CANUN** for further information.

DRILL MUFFLER FREEZING	
Reason	***Repair Procedure***
Excessive moisture in air. Broken water tube.	Drain air line. Install moisture traps.
Broken seal or “O” ring.	Replace.
Excessive moisture in air. Broken water tube.	Replace: - D1675 Water Tube Seal. - 164301 Water Valve “O” ring (Small). - 164521 Water Valve “O” ring (Large). - 164231 Water Valve Backhead “O” Ring.

DRILL OVERHEATS	
Reason	***Repair Procedure***
Lack of oil.	Fill lubricator. Check lubricator for faulty operation.
Insufficient push on airleg allowing machine to bounce.	Adjust feed pressure.
Improper oil	- Do not operate machines on full throttle when pulling steel or at any time for more than a couple of seconds. - Change oil. Engine oil is no good for a rockdrill and its use will damage the drill.

FOGGING	
Reason	***Repair Procedure***
Broken water tube.	Replace.
Excessive moisture in air supply.	Blow air lines. Install moisture traps.
Too much oil.	Check lubricator.
Water leaking around water tube.	Change D1675 Water Tube seal.

PISTON CHIPPED OR BROKEN	
Reason	***Repair Procedure***
Worn Drill Steel.	Check drill shanks. Reface all crowned, worn, bevelled or chipped steel.
Poorly refaced Piston.	Reface Piston so that the axis of the piston is exactly at right angles to the striking face.
Worn Chuck insert.	Replace. Use **CANUN** chuck gauge.

BRONZE CUTTINGS IN DRILL	
Reason	***Repair Procedure***
Lack of oil.	Check lubricator. Use only Rock Drill oil.
Rough or damaged Rifle Bar.	Replace or use fine grindstone to smooth parts.
Rough or damaged Piston.	Replace or use fine grindstone to smooth parts.

CUT-OFF OR SPLIT WATER TUBES	
Reason	***Repair Procedure***
Plugged, damaged or mushroomed shanks on Drill Steel.	Replace or refurbish Drill Steel.
C1418A Chuck Bushing – worn beyond acceptable limits	Replace.

C1525 AIR BEND C1526 AIR BEND NUT 164731 AIR BEND "O" RING	
Reason	***Repair Procedure***
Wear, causing air leak.	Check for snug fit of "O" Ring on air bend. If air leakage occurs, check parts for wear and replace faulty ones.

WATER LEAKING FROM BLEED-OFF HOLE IN BACKHEAD UNDER THROTTLE VALVE HANDLE	
Reason	***Repair Procedure***
Water leaking into air in Backhead and Water Valve	Change 164301 Water Valve "O" Ring (Small). Change 164521 Water Valve "O" Ring (Large). Change 164521 Water Valve Backhead "O" Ring.

C1481A – INSERTS BREAKING	
Reason	***Repair Procedure***
Worn Chucks or Chuck Bushing.	Replace chuck. Breakage is a result of expansion of the Chuck Bore caused by improper alignment when pressing insert in. Because of the cost of an insert, one should carefully check Chucks before replacing insert.

SECTION 2

CANUN 260 JACKLEG AND SINKER

ALL NUMBERS REFER TO JACKLEG AND SINKER PARTS LIST

PARTS LIST #	PART NUMBER	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
1	A699	Steel Retainer Hex 7/8" - 22 mm	- Check that retainer will still hold drill steel collar. - Check alignment of flats between Steel Retainer and Retainer Pin matching faces. (Part Number #3 - C6908) - If not matching, any movement will allow Retainer to bounce off of the drill steel while drilling. Replace worn parts. - Check wear on stop and on front end of Retainer.
2 **2A**	1358164 D6205M	Buffer Buffer c/w spacers	Replace when worn or broken.
3	C6908	Steel Retainer Pin	Replace when flats are worn or thread is damaged.
4	12812UF	Nylock Nut	Replace when damaged or nylock is worn
5	A2598A	Fronthead	Check the following items: - Steel Retainer Stop. If worn, it can be built up with weld - Square bore for buffers. If worn, insert shims between buffers and bore to increase tension. If badly worn, replace Fronthead. - Side Rod lugs - use D2154 washers to take up space if required - Faces that match cylinder - Use NBS00C or NB500P gaskets to seal faces. If gaskets do not stop leak replace Fronthead. - Check for cracks. If cracks exist replace Fronthead. - Check for scores or dents on inside bore. - Check all ports to make sure they are not plugged.
6	D1388D	Side Rod Nut	- Tighten nuts to torque of 90-100 ft/lb. - Tighten both nuts evenly to ensure proper alignment of drill. - Replace when worn or threads are damaged. - Damaged threads can give a false torque reading.
7 **7A**	NB500C NB500P	Copper Gasket Plastic Gasket	- Use when air leaks are detected between the Fronthead and the cylinder. In some cases, more than one gasket can be installed but if leaks persist replace Fronthead or reface cylinder
8	C1418A	Chuck Bushing Hex 7/8" x 4 1/4" shank	- Check for wear by using NB787 Chuck Gauge. Worn Bushings cause Water Tube breakage and Piston striking face cupping. - Never hammer Bushing into Chuck. - Use a press and proper tools to avoid breakage. - Press bushing in using T219 or T221. - Press bushing out with T218 removal support and T217 punch. - The T217 punch has splines cut into it which fit the chuck nut so it is not necessary to remove Chuck Nut unless it is worn. - Chuck Bushing must be a tight fit in Chuck to prevent breakage. (8-ton minimum press fit on installation) - see drawing #3. - Chuck bushings are very hard but brittle, and must be well supported. - Always keep tools for pressing in good condition - A worn punch can cause chuck bushing to split or chip.

PARTS LIST #	PART NUMBER	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
9	B1178	Chuck Includes: - C1516 (#10) Chuck Washer	- Clearance between Chuck and Fronthead should not exceed 1.0mm (0.040"). - When pressing C1418A (#8) bushing into Chuck, use **CANUN** T219 Assembly Guide or T221 Punch. - Press bushing out using T218 Removal Support and T217 Punch. Note that it is not necessary to remove the Chuck Nut when using these tools. See Drawing #3. - Chuck Nut is a left-hand thread and should be tightened into position firmly. A handy set-up can be made for this purpose by welding the spline section of a piston to a bench or stand. - The chuck with the C1418A bushing in position is placed on this splined section. - A tool is made by welding an appropriate Drill Steel to a handle. The steel is placed in the insert and tapped, tightening the chuck nut. To loosen, strike with a sharp blow in the opposite direction. See Drawing #1. - The C1516 Chuck Washer comes with the Chuck and usually does not require replacing. The Washer is a snug fit in the Chuck Nut Bore and is tapped into position with a small hammer and appropriate tool.
10	C1516	Chuck Washer	- Comes installed in the B1178 Chuck. Replace when broken. - Tap into place with an appropriate tool.
11 **11A**	C1512 12146	Chuck Nut Chuck Nut (6 spline)	- C1512 Chuck Nut is used with the B2334 Piston. - 12146 Chuck Nut is used with the 11116S Six Spline Piston. - Replace when wear exceeds one half the original spline width. See B1178 for installation and removal of Chuck Nut.
12 **12A**	E393 E393M	Cylinder Cylinder (Muffled)	- When a 0.006" Feeler Gauge can be inserted between a new Piston and the Cylinder wall near the exhaust ports, the Cylinder is worn out. The mating face with the A2598A Fronthead should be kept flat and any bumps or ridges taken off. - This can be done in a machine shop or manually by standing the Cylinder on a large grindstone and moving the Cylinder in a circular motion, keeping the area to be ground flat on the stone. - The addition of oil will help. - Check the outside Cylinder for wear, dents, cracks, loose welds. - Check the main bore for dents or cracks. Dents can be taken out with a proper hone or where a hone is not available. - Ground out with a pencil grinder and fine stone. - The Valve Chest Bore should be checked for wear, scoring etc. A proper fit for a Valve Chest is such that it must be tapped or pressed into position. - One should not be able to easily push it in by hand nor on the other hand should it be necessary to pound it in. Too tight a fit creates distortion - too loose a fit allows air leakage. - The Valve Chest Bore should be honed, when necessary, with a hone for honing over keyways. - The Ratchet Ring should be positioned on the Valve Chest and put into the Cylinder Bore with it.

		Continued	This prevents misalignment, scoring and distortion of the Ratchet Ring and Cylinder.
12 **12A**	E393 E393M	Cylinder Cylinder (Muffled)	- The Ratchet Ring should also be snug in the Cylinder. - A loose Ratchet Ring can cause misalignment of air passages and also damage D1397 (#33) Valve Box Locating Pin. - The Cylinder Boss should be checked for wear and scoring. - The C1523 (#19) Cylinder Lug Bushing must be a tight fit to prevent air leakage. (Oversize bushings are available - See C1523) - When installing the C1523 (#19) align the flat on the Bushing with the one on the Cylinder. Cylinders can be rebuilt and re-chromed if they are sound otherwise. - **CANUN** Cylinders are fitted with Nylon Plugs for all ports. To clean porting, drill out Nylon Plug (spare plugs are available from our stock). - All porting should be checked for obstructions at each overhaul. The C1517 (#27) Front Cylinder Liner is a press fit and should be assembled using a Piston for proper alignment. - Check with **CANUN** for details.
13	D1982	Clevis Body Spindle Nut	Replace when worn or damaged.
14	A693A	Clevis Body	- There are two ports through the Clevis Body - one for air to the leg for pushing, the other for leg retraction. - Both ports should be checked with air for obstructions. - Check thread for wear or damage.
15	164231	Clevis Body Spindle "O"Ring	Replace when worn or damaged
16	30066	Clevis Body Locating Pin	- If the parts are not lined up properly during assembly of A693A (#14) and B1182A (#17), the 30066 Pin is sheared off and the leg will not operate correctly. - This Pin is for locating the Clevis only, not to hold it in position.
17	B1182A	Clevis Body Spindle	- Check for "O" Ring wear in Grooves. - Also check slots for D1426 Keys (#23). - Check that ports are not plugged by blowing air through ports. - Normal wear point is thread that accepts the C1527 (#25) Spindle Nut. Replace when worn.
18	D1398	Clevis Body Spindle Cone	- Cone is a press fit on Spindle. - Care should be taken not to shear 30066 (#16) Pin off during assembly. - Check for wear or damage.
19	C1523	Cylinder Lug Bushing	- Press fit into Cylinder Boss. - Care must be taken to line up the flat of the Cylinder with that of the Bushing. The tapered section, which matches the D1398(#18) rarely shows much wear. The major points are the Grooves formed by the 164231 (#15) "O" Ring. - Deep Grooves allow air leakage and the Bushing must be changed Oversized Bushings C1523-3 (+0.003") and C1523-5 (+0.005") are available for use on Cylinders that have oversized Bores in the Boss. - Specify oversize when ordering.
20	NB739	Exhaust Plug	Replace when broken or damaged.
21	D1392	Spindle Thrust Washer	Replace when broken.
22	C1571	Spindle Spring	Replace when broken or restitution is gone.

PARTS LIST #	PART NUMBER	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
23	D1426	Lock Washer Key	- Place in any opposing slots provided in B1182A (#17). - Two required. Replace when worn or broken. - Assembling with grease holds key in place.
24	C1519	Spindle Nut	Replace when broken or keyway is worn, allowing D1426 (#23) Lock Washer Key to roll.
25	C1527	Rubber Ferrule	- Replace when thread is worn or ball bearings are missing. - Nut should be kept tight. - Tighten to the point that the A693A (#14) Clevis Body cannot be moved readily by hand.
26	9001093	Front Cylinder Liner	Replace when worn or damaged.
27	C1517	Piston (8 spline)	- Press into position using a Piston for proper alignment. A handy way to do this is to cut the spline section off an old Piston about 1 1/2" from the head. Put the liner on the shortened Piston and into position in the Cylinder - then using a second Piston, place the head of the Piston in the Cylinder Bore and press on the spline end until the Liner is properly positioned. - Occasionally, after pressing in, the Liner will be tight on the Piston and a T211 Cylinder Bushing reamer should be used to bring it back to size. - Check for damage. Particularly scoring done during Piston and Valve Chest removal. The proper tool (T202 Piston Driver) should be used to prevent such damage. - Check for wear. With dry Cylinder (no oil), check for air cushion by bringing Piston toward the Liner quickly. An air cushion should be felt as one pulls on the Piston. - If little or no cushion is felt, replace the liner and check the Piston for wear. A worn liner causes poor drill performance and is instrumental in Side Rod breakage and damage to the Piston. - Clearance between Liner and the Stem of the Piston should never in any case exceed 0.007".
28	B2334	Lock Washer Key	- The striking face of a Piston should be flat so as to present the largest possible striking surface to the drill steel. When wearing occurs, reface (up to 1mm 0.040" max). - This grinding is critical and should be flat, smooth and square to the longitudinal axis of the Piston. - Care must be taken to have adequate cooling during grinding. Chamfer the Water Tube hole to prevent chipping and peening which will cut off Water Tubes. - Restore the radius on the ends of the splines to prevent damage to the Chuck Nut and Front Cylinder Liner. - Replace Piston when 0.004" wear of the Piston Head occurs (2.996” on 3" Pistons and 3.121" on 3 1/8" Pistons) or if splines are worn. - Check Rifle Nut thread for damage. - Internal bore should be clean. - Check for nicks and scratches and remove with fine hand stone.

28	B2334	Continued Lock Washer Key	- "Scoring" of the Piston is most often caused by a dented Cylinder but it can also be caused by "dieseling". Dieseling occurs when a drill with too much oil in the air is run on cushion (Piston not striking steel). - Solution is to adjust Air Line Lubricator for less oil feed and to keep proper feed on the leg, or push on a Sinker. - Check Piston for discoloration or cracking in Splines due to lack of lubrication.
28A	11116S	Piston (6 spline)	See B2334 (#28) above.
29	C1508	Rifle Nut	- Rotation 1 in 30. This refers to the Piston making one complete rotation for thirty inches of travel. (Approximately 200 RPM on the **CANUN** 260). - Check that nut is seated properly in Piston. Lack of lubrication is the major cause of Rifle Nut failure. - Check for discoloration of Nut and Rifle Bar to pin point this problem. - Replacement should be made when splines are worn to 1/2 the original width. A good system for removing and installing Rifle Nuts, is to weld a chuck to a workbench, with a Chuck Nut in place, and with a plate welded over the Chuck Nut to prevent its movement. - Weld a Rifle Bar to a Handle (Drill Rod for example) and use this to tighten the Rifle Nut in a Piston. For Rifle Nut removal, a good sharp blow with a #8 hammer will loosen the Nut unless the thread of the Piston is damaged; the Rifle Nuts have a left-hand thread. See drawing #2
29A	7599G	7599G Rifle Nut (small) use with 11116S (#28A)	see C1508 (#29) above.
30	A744	Valve Plug	- Make certain all holes and ports are clear. - If necessary, remove sharp edges or corners with extra fine emery cloth. Plug should fit snugly into A745 (#32) Valve Box. - C1648 (#31) Valve should fit freely on the Plug but not be loose enough to allow air leakage. - Complete assembly should be a close fit in the Drill Cylinder to prevent air leakage between ports. Valve parts have very close tolerances. - If more than one part of the valve assembly is to be replaced, contact **CANUN** for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.
31	C1648	Valve	- Valve must fit freely both in the A745 (#34) Valve Box and on the A744 (#32) Valve Plug, but must still maintain an air seal. - Replace when a sloppy fit is apparent. If necessary sharp edges or corners may be smoothed off using extra fine emery cloth. - Complete assembly should be a close fit in the Drill Cylinder to prevent air leakage between ports. - Valve parts have very close tolerances. If more than one part of the valve assembly is to be replaced contact CANUN for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
32	A745	Valve Box	- Make certain all holes and ports are clear. - The Valve Plug A744 (# 30) must fit snugly in the Valve Box. - C1648 (#31) valve must fit snug but be free to move. - Replace when loose in cylinder or when machine performs poorly and air consumption is above normal (175-200 CFM). - Valve parts have extremely close tolerances. - If more than one part of the valve assembly is to be replaced contact **CANUN** for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.
33	D1397	Valve Box Locating Pin	- Be certain pin is in good condition and of proper length. - Pin must be installed with A745 (#34) Valve Chest to maintain correct position of Valve Chest relative to the drill cylinder.
34	B1170	Ratchet Ring	- Check teeth for wear. When rounded and Pawls slip, replace. - Check for tightness in Cylinder. - Always install Ratchet Ring with main Valve Assembly for proper alignment and to prevent damage to Cylinder. See Cylinder E393 (#12). Use CANUN Ratchet Ring Tester T246
35	B1173R	Rifle Bar (Reversible)	- Rotation 1 in 30. See C1508 (#29). - Replace when splines are worn to one-half original size. Check that lubrication holes to Pawl Springs and Plungers are open. - Check for signs of lack of lubrication, discoloration, heat checks and cracking. - Check that Pawls, Springs and Plungers are free to operate. All sharp edges should be smoothed off with a hand stone or fine emery cloth. - Clean out Water Tube Bore. - On rare occasions with worn drills, the Rifle Bar head will jam between the Valve Chest and the Backhead. The Rifle Bar rotates between these two surfaces so some sign of wear is normal. - Grinding a slight amount from the head of the Rifle Bar will solve the problem.
36	D1611	Pawl Spring	- Replace when broken or "set" is gone. - Check for proper action when installed. It is a good idea to replace the pawl springs every time the drill is overhauled.
37 **37A**	NB805 S21-34	Pawl Plunger Steel Pawl Plunger	Check for wear and proper operation when installed. Steel Plungers chip and wear more quickly than the NB805 Plastic Plungers. **CANUN** recommends Plastic Plungers.
38	D1381R	Pawl (Reversible)	Replace or re-face when wear exceeds 1mm (1/32"). Pawls can be ground up to 1mm (1/32") to restore original profile. With Reversible Pawls - reverse so that both sides are worn before grinding. Check for proper operation when installed in Rifle bar.
39	A660	Backhead	- Check that all ports are clear. - Check Main Bore for Throttle Valve - dents, scratches - Check Fit of Throttle Valve 81176 (#54) - Thread for Air Bend and Water Bend Thread for Water Valve - Check Assure "O" Ring 164631(#64) is in proper groove (see drawing #5) taper for A697 (#66) - Check Throttle Valve Stops for wear - Check Thread for Throttle Valve Plunger Plug

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
40	D1383	Throttle Valve Plunger	- Be certain Plunger operates freely in Backhead. - Plunger can be reground when point is worn.
41	D1382	Throttle Valve Spring	- Check for tension. When restitution of Spring is lacking, replace. - Spring can be stretched or a coil ground off to achieve tension desired.
42	2422P	Plug	- Allen Screw type. Clean properly before attempting Plug removal. Depth of Plug affects the tension of the D1382 (#41). - Top of Plug should be approximately flush with or slightly out of the Backhead, and any variation will necessitate adjusting the D1382 spring to make allowances either by stretching the spring or grinding off the coils.
43 **43A**	D1454 D1454D	Adapter Nut Adapter Nut (Domed)	- The most common problem is wear. Usually the Nylock section breaks off and there is some danger that the operator may cut himself. The thread can be chased where practical. - Domed nuts help protect thread on Handle.
44	C1509	Throttle Valve Handle	Check keyway. Replace when worn. Check taper. If Throttle Valve handle goes too far on taper of throttle valve and tightens against Backhead, use a shim or grind Throttle Valve Handle until it no longer binds, or replace with a new handle.
45	D1384	Throttle Valve Key	Replace when worn or damaged
46	149163MT	Disc Spring Washer	Replace when broken or set of spring is gone
47	D1385	Throttle Valve Handle Nut	Check thread - replace when Nylok is damaged or missing.
48	C1272	Water Inlet Screen	Stainless steel. Usually only requires cleaning.
49	D1402	Water Inlet Washer	- May be torn or deformed. Replace. Be certain to use S2487 (#50) Thrust Washer for protection of D1402. - Install with larger side of hole facing C1272 (#48) Water Inlet Screen to allow for more screen surface.
50	S2487	Water Stem Thrust Washer	Necessary to ease turning of C1809 {#51) Water Bend and to keep D1402 {#49) Water Inlet Washer being damaged.
51	C1809	Water Stem	Check "O" Ring grooves for corrosion. Replace when leakage occurs.
51A	C1528	Water Stem {Serrated)	Check "O" Ring grooves for corrosion. Replace when leakage occurs.
52	164811	Water Stem "O" Ring	Two (2) required. Replace when worn or damaged.
53	S2141	Water Stem Nut	Corrosion is the major problem. Wear also occurs in threaded section. Replace when leakage is a problem or nut will not hold Water Stem tight.
54	B1176	Throttle Valve	- Replace when worn so that excessive air leaks out the Backhead relief hole below the C1509 (#44) Throttle Valve Handle and/or water will not shut off. - Stiff Throttle Valve operation can be caused by dirt and burrs on the Throttle Valve or dents in the Backhead. A light rubbing of the Throttle Valve with extra fine {320 grit) emery cloth usually clears up the problem. - Honing of the Backhead or removal of the dents with a small fine-grained stone is necessary to remove dents. - Check keyway and threads. Replace when worn.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
55	D1601	Air Bend Nut Washer	Replace when worn or damaged enough to allow air leakage.
56	12153	Air Bend Nut Lock Washer	- Used to lock C1526 (#59) Air Bend Nut in place. - Replace when tabs are damaged.
57	C1525	Bend	- Check for wear. Replace when damaged, or 164731(#58) "O" Ring wears a groove sufficiently deep to allow air leakage. - Use tool to chase threads.
58	164731	"O" Ring	Replace when worn or damaged.
59	C1526	Air Bend Nut	- Check "O" Ring groove. When groove is worn and the "O" Ring is loose, replace. Check thread for wear or damage.
60	1218UF	Spindle Nut	Replace when worn.
61	300822	Twist Grip Stop Pin	Replace when Pins are worn or loose. Pins should be flush with top of holes in C1518 (#62) Twist Grip for best operation.
62	C1518	Twist Grip	Replace when worn to the point where a new 164631G (#64B) Friction Ring (Green, Oversized) is loose. Make sure 30088 (#63) and 300822 (#61) pins are not broken or worn.
63	30088	Twist Grip Key Pin	Pins should be flush with the top of the holes in C1518 (#62) Twist Grip for best operation. Replace when worn.
64	164631B	Friction Ring (Standard)	There are three sizes. The friction ring has a tendency to wear into the bore of the C1518 (#62) Twist Grip or the groove on the B1180 (#65) Control Body. This then makes the fit loose and there is no friction left to keep the twist grip in place. When this happens, you would have to change the C1518 Twist Grip and or the B1180 Control Body. By making oversize friction rings, you are able to continue to use the twist grip and control body. The problem is that the wear is never the same so the oversized friction rings have to be adjusted to match the wear. - The 164631B is the Black Friction Ring which is used on new drills as well as when there is little or no wear on the internal bore of the C1518 Twist Grip or the groove of the B1180 Control Body. - CANUN supplies 2 different oversized friction rings: - The 164631Y is yellow and is a mid size oversized version. - The 164631G is green, which is larger than the yellow one. - The 164631G also has a smaller ID which helps when the groove on the B1180 Control Body is worn.
64A	164631Y	Friction Ring (Medium)	See 164631B (#64)
64B	164631G	Friction Ring (Large)	See 164631B (#64)
65	B1180	Control Body	- Check internal bore for dirt and rust; - Check large end for scoring, burrs etc... - Check Friction Ring Groove for wear & stop pin seats for wear. - It is extremely important that the Control Body be lined up properly with the A697 (#66) Handle Adapter when pressing the two pieces together. Any scoring or "pickup" will cause the B1180 to close up and the B1183 (#67) Control Spindle will be too tight. The only solution is to hone the Bore of B1180 back to size. Scoring will also cause cross-leaks of air which will affect airleg operation. Excessive air leakage will be from exhaust port in Handle adapter. - It may be necessary to replace the B1180 to stop leakage. - See B1183(#67) Control Spindle and C151415 (#70) Retract Valve Assembly.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
66	A697	Handle Adapter	Check thread on tapered section, chase thread with T213 Chaser. - Check thread in Retract Valve section, if Bore for C1514/15 (#70) Retract Valve Assembly is dented, use T214 Reamer. - Check top section of Retract Valve Hole for wear, if Retract Assembly goes too far in this hole, the leg will not push properly. - Check Control Body hole for scoring which may cause a cross leak of air resulting in improper leg operation. - Check all air passages for dirt and/or obstruction. - Normal replacement is done because of abuse due to hammering when C1574A (#78) Water Tube is changed.
67	B1183	Control Spindle	- Check "O" Ring Groove. - Check for rust and dirt build up in centre section. Not usually changed until air leakage is above normal and leg push is affected. Excessive air leakage will be from exhaust port in Handle adapter. It may be necessary to replace the B1183 to stop leakage. See C1514/15 (#70) Retract Valve Assembly and B1180 (#65) Control Body. - Check Thread for damage. - Check fit of C1518 (#62) Twist Grip and when slot for 30088 (#63) Twist Grip Key Pin is damaged - change part. Note that 1125NF02 (#69) Spindle Plug is supplied with all B1183 Spindles.
68	164811	Control Spindle “O” Ring	Replace when wear is visible.
69	1125NF02	Spindle Plug	Install with Lock tight - normally never need replacing.
70	C151415	Retract Valve Ass'y	If excessive air is coming out of exhaust in Handle adapter it may be necessary to change the Retract valve assembly. Also see B1180 (#65) Control Body and B1183 (#67) Control Spindle The major problem is "cutting" of "O" Ring during installation. - Use plenty of grease to coat "O" Rings when installing. - Use T204 Retract Valve Assembly Tool to install. - Use steady even pressure to avoid cutting "O" Rings. - Replace when Valve is loose in Sleeve or excessive air leakage occurs from bottom of assembly. Top of Valve will eventually wear causing poor push of leg - replace. - These two parts come in "sets" and should be kept together.
71	164811	Retract Valve "O" Ring	Most damage to this part is during installation of C1514/15 (#70) Retract Valve Ass'y. Be certain to use lots of grease and push Retract Valve Ass'y in place with a steady pressure to avoid cutting "O" Rings.
72	D1424	Plunger Spring	Replace when restitution is lacking.
73	D1425	Sleeve Spring	Replace when restitution is lacking.
74	D1427	Retract Plug	- Make certain hole is kept clean. - Replace when threads are worn or Allen Key will not fit.
75	164231	Water Valve Backhead “O” Ring	- Check for cuts and nicks. - Be certain this “O” Ring is in the proper groove, not in the threaded section. See Dwg #5. - This is one of the most common mistakes made in repairing Rock Drills, allowing water to leak into the drill. - Replace when worn or damaged.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
76	D1675	Water Tube Seal	- Seal is tapered on one side and the tapered side should be facing out from the C2144 (#79) Water Valve Seat retainer. - Seal should also be inside C2144 for proper functioning. - Replace when damaged.
77	D1674	Water Tube Spacer	- Place in position with small end toward head of C1574A (#78) - Water Tube and large end against D1675 (#76) Water Tube Seal. - Replace when damaged.
78	C1574A	Water Tube	- Make certain Tube is not plugged. - Check swaged end for wear and splitting. If severely cut, check C1418A (#8) Chuck Bushing Insert and shank of drill steel for wear or damage such as peening of the drill steel. Water Tube must be tight in A660 (#39) Backhead to prevent water leaks. - Check D1675 (#76) Water Tube Seal if leakage is apparent. - Proper length of standard Tube - 17 5/16". - Hole in swaged end 5/64".
78A	C1574B	Water Tube 1/8" hole	See C1574A (#78). Use when more water required.
79	C2144	Water Valve Seat Retainer	- Damage to this part is caused by clamping in vice. Proper method is to put Water Tube in vice and pry D1675 (#76) Water Tube Seal out with pointed tool. - Replace when damaged.
80	D1673	Water Valve Seat	Replace when damaged or hole closes over or is cupped.
81	164231	Water Control Body	Replace when worn.
82	B1181PC4	Water Control Valve Body	- Damage to this part is due to hitting. - Circlip Groove wears eventually and this allows C1521PC1 (#88) - Water Valve Cap to pop out. - Check threads, Circlip Groove, and porting. - Replace when worn or damaged.
83	164301	164301 "O" Ring	Replace when worn or water will not shut off.
84	164521	Water Valve "O" Ring (Large)	Replace when worn, or if water comes out of the small bleed-off hole under the C1509 (#44) Throttle Valve Handle in Backhead.
85	C1522PC1	Water Valve	- This is a pressure reducing Valve. Replace when damaged. - In drilling very soft rock (over 30"/min.) this Valve may not supply enough water to keep the drill hole clean. - To increase water flow, plug the hole in the C1522PC1 Valve with solder (or some other material that will not fall out) and remove the 164231 (#87) Water Valve Spring Cap "O" Ring. - This will supply full line pressure water to the drill. - CAUTION: Increasing water pressure may also cause freezing of Muffled Drills.
86	D1406	Water Valve Spring	- Water to the CANUN drill starts at an air pressure of approximately 45 PSI. The D1406 Spring keeps water shut off until that pressure is reached. - If water will not shut off or Spring is broken, replace it.
87	164231	Water Valve Spring Cap "O" Ring	Replace when worn.
88	20015	Water Valve Spring Cap Circlip	Check for wear. Replace when circlip is not tight in groove of
89	C1521PC1	Water Valve Cap	Replace when worn or damaged. B1181PC4 (#82) Water Control Valve Body.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
90	C1572	Side-Rod	- Replace when worn or broken. - Torque Rods to 90-100 FT/LB Torque. Always assemble drill with either two new or two used Side Rods. Never use a new and a used Side Rod on the same drill.
91	164531	Adapter Seal	Replace when worn or damaged
92	C1520	Adapter Nut	- Replace when worn or damaged. - This Nut should be kept tight to prevent air leakage.
93	1973854	Top Cap Hat Packing	- Two required for Top Cap. - The inside packing forms an air seal and the outside or top one prevents dirt from entering the Airleg. - When air leakage is felt around the Top Cap, replace the inside packing.
93A	1973854A	Top Cap Hat Packing Double Lip	Similar to 1973854 but with extra flange for added strength and better air sealing properties.
93B	1973854B	Top Cap Hat Packing Double Packing	- Similar to 1973854A but with extended cone for increased sealing, and with a short cone facing the other direction. - This style affords double sealing properties and is recommended for outside (top) packing.
94	B1287	Top Cap	- Top Cap must be kept tight on C1788A (#97) Feed Cylinder to form an air-tight connection. - Two 1973854 (#93) Top Hat Cap Packing are positioned in Grooves on either inside end of cap. The D1069 (#95) Top Cap Bushing is pressed in between the two seals. - This part does not normally wear out and replacement, when necessary is usually the result of abuse. Pipe sealant can be applied to the threads to help seal any air leaks.
95	D1069	Top Cap Bushing	- The Top Cap Bushing is located inside the Top Cap between the two packings. It is a press fit and must be tight to stay in position. - The Bushing acts as a guide and bearing for the B1851A (#96) Piston Rod and should be a snug fit; 0.020" clearance should be the maximum allowed.
96	B1851A	Airleg Piston Rod - 51" Stroke	- Check for damage: dents, bends and wear. Chipped chrome will damage 1973854 (#93) Top Hat Cap Packing. - The Piston Rod comes complete with a plastic inner tube. To check inner tube, assemble complete airleg, and with a hand over the end of the Piston Rod, to prevent air escaping, push the Piston Rod into the Cylinder. - One should not be able to push the Piston Rod down more than 12" to 18". If no resistance is felt, or there is a slow leak, the inner tube must be changed. A B1851RK Piston Rod plastic repair kit is available. - Care must be taken to obtain a good seal at each end with ferrules provided. In extreme cases the ferrule and the ends of the plastic tubing may be heated in hot oil to affect a better seal. - It is advisable to contact a **CANUN** representative for instructions should this be necessary.
96A	B1849	Airleg Piston Rod - 39"	See B1851A
96B	B3004	Airleg Piston Rod - 30" Stroke	See B1851A

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
97	C1788A	Airleg Feed Cylinder- 51" Stroke	- Dents can normally be removed using a T224 Mandril. - Cylinder wear will occur mainly in the center section and the Cylinder is worn out when the leg does not push properly. - Using the Mandril is a quick way to test wear. - If the Mandril is very loose or if the clearance between a new D1515A (#102) Bucket Spacer and the worn Cylinder is 1/1611 the Cylinder should be changed. Note: **CANUN** supplies 1796740M (#103A) soft Piston Rod bucket for use in worn cylinders or in low air pressure applications.
98	B1308	Carrying Handle	- Replace when worn or broken. - The Handle should slide easily over the C1788A (#97) Feed Cylinder. - Position the Handle 1/3 of the length of the Cylinder from the top end and tighten. Over-tightening will cause the aluminum cylinder to collapse causing the piston to jam.
99	1026W12	Carrying Handle Bolt	Replace when worn or damaged.
100	1436	Carrying Handle Washer	Replace when worn or broken.
101	1206W	Carrying Handle Bolt Nut	Replace when worn.
102	D1515A	Bucket Spacer - Upper	- This part acts as a holder for one Bucket and also as a bearing surface for proper alignment of the B1851A (#96) Piston Rod and 1796740 (#103) Buckets in the C1788A (#97) Feed Cylinder. - Replace when the clearance between a new C1788A and the worn D1515A Bucket Spacer is 1/16" or more.
103	1796740	Piston Rod Bucket	- There are two Buckets facing in opposite directions. - Check for wear or damage. A thin or badly worn Bucket will tend to turn over causing air leakage and insufficient push. Any air leakage will escape through the A697 (#66) Handle Adapter, and such a leak is an indicator of leg problems. - Generally, there is some air leakage and this should not cause any concern until it becomes very noticeable.
103A	1796740M	Piston Rod Bucket Soft	- There are two Buckets facing in opposite directions. - Check for wear or damage. - Use this Bucket for low air pressure applications or to help get extra life from worn leg tubes. A thin or badly worn Bucket will tend to turn over causing air leakage and insufficient push. Any air leakage will escape through the A697 (#66) Handle Adapter, and such a leak is an indicator of leg problems. Generally, there is some air leakage and this should not cause any concern until it becomes very noticeable.
104	D1438A	Piston Rod Spacer	Replace when worn. This is a stiffener between the two 1796740 (#103) Buckets and rarely needs changing.
105	D1439A	Bucket Spacer	Replace when worn.
106	D2038	Piston Rod Nut Lock Washer	Replace when worn.
107	D1073A	Piston Rod Locknut	Replace when worn or damaged.
108	C1791	Bottom Cap - 4 Prong	- Cap must be kept tight on C1788A (#97) Air Leg Cylinder to prevent air leakage. Replace when worn or broken. - Pipe sealant can be applied to the threads to help seal any air leaks.
108A	C2646	Bottom Cap - 2 Prong	See C1791.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
109	C1672	Bottom Cap Spike	Spike must be kept tight. Replace when worn.
110	B3352	Tee Handle	Check for wear, breakage and thread damage.
111	S21-20	Sinker Tee Handle Grip	- Replace when worn. - Use a solution of soap and water to assist in putting grips on. - Use oil only if soap is not available.
112	D2584	Ressort de poignée en té	- For maximum performance keep well greased. - Adjust tension so that there is approximately 3" between Backhead and Tee Handle. - Replace when weak or broken.
113	C1582	Side-Rod	- Replace when worn or broken. - Torque rods to 90 - 100 FT/LB. - Experience has shown that better results are achieved when one uses either two new or two used rods on a machine, not one new and one used. - This side rod is also used on **CANUN** Sinkers.
114	C3844	Tee Handle Guide	Check for wear or breakage.
115	12812UF	Tee Handle Nylock Nut	Replace when damaged or nylock is worn
116	B1729	Stirrup Handle	- Can be positioned either to face the back or front of the Sinker as operator desires. - Generally positioned on the same side as the A699 (#1) Steel Retainer.
117	D2154	Side Rod Nut Washer	Replace when worn or broken.
118	D1388D	Side Rod Nut	- Torque to 90-100 FT/LB. - Replace when worn or damaged.
119	C1939	Backhead Lug Bushing	For Sinkers only. Used to prevent dirt from entering ports, air leaking from Backhead porting, and to prevent abuse. The Sinker cannot be used without this piece.
120	D1454	Backhead Lug Bushing Nut	- Most common problem is wear. Usually the Nylock section breaks off and there is some danger that the operator may cut himself. The thread can be chased where practical. - See also D1454D (#43)
121	C1940	Cylinder Lug Bushing	For Sinkers and Wagon Drills only. The purpose of this piece is to block dirt from entering the Drill, and to prevent the operator from using Drill Steel in the Drill Cylinder Boss which damages the Cylinder beyond repair. - This part should always be in place when drilling. I.D. is made to accept a 1” bolt. - Used on Quarry and Wagon drills as mounting bushing.

SECTION 3

CANUN 260 STOPER

ALL NUMBERS REFER TO STOPER PARTS LIST

PARTS LIST #	PART NUMBER	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
1	A699	Steel Retainer Hex 7/8" - 22 mm	- Check that retainer will still hold drill steel collar. - Check alignment of flats between Steel Retainer and Retainer Pin matching faces. (Part Number #3 - C6908) - If not matching, any movement will allow Retainer to bounce off of the drill steel while drilling. Replace worn parts. - Check wear on stop and on front end of Retainer.
2 **2A**	1358164 D6205M	Buffer Buffer c/w spacers	Replace when worn or broken.
3	C6908	Steel Retainer Pin	Replace when flats are worn or thread is damaged.
4	12812UF	Nylock Nut	Replace when damaged or nylock is worn
5	A2598A	Fronthead	Check the following items : - Steel Retainer Stop. If worn, it can be built up with weld - Square bore for buffers. If worn, insert shims between buffers and bore to increase tension. If badly worn, replace fronthead. - Side Rod lugs - use D2154 washers to take up space if required - Faces that match cylinder - Use NBS00C or NB500P gaskets to seal faces. If gaskets do not stop leak replace fronthead. - Check for cracks. If cracks exist replace fronthead. - Check for scores or dents on inside bore. - Check all ports to make sure they are not plugged.
5A	A1034	Standard Fronthead	- Check for cracks or dents in internal bore. - Check for C1582 (#89) Side Rod lug wear, always use D2154 (#7) Side Rod Nut Washer to prevent wear on Fronthead. - Check all ports for dirt or obstructions. - Check for wear on faces matching Cylinder, remove all high spots with pencil grinder. - Use NBS00C or NBS00P (#8) Fronthead Gasket to help prevent wear and air leakage.
6	D1388D	Side Rod Nut	- Tighten nuts to torque of 90-100 FT/LB. - Tighten both nuts evenly to ensure proper alignment of drill. - Replace when worn or threads are damaged. - Damaged threads can give a false torque reading.
7	D2154	Side Rod Washer	Replace when worn or broken
8 **8A**	NB500C NB500P	Copper Gasket Plastic Gasket	- Use when air leaks are detected between the fronthead and the cylinder. In some cases, more than one gasket can be installed but if leaks persist replace fronthead or reface cylinder
9	C1418A	Chuck Bushing Hex 7/8" x 4 1/4" shank	- Check for wear by using NB787 Chuck Gauge. Worn Bushings cause Water Tube breakage and Piston striking face cupping. - Never hammer Bushing into Chuck. - Use a press and proper tools to avoid breakage. - Press bushing in using T219 or T221. - Press bushing out with T218 removal support and T217 punch. - The T217 punch has splines cut into it which fit the chuck nut so it is not necessary to remove Chuck Nut unless it is worn.

9	C1418A	Continued Chuck Bushing Hex 7/8" x 4 1/4" shank	- Chuck Bushing must be a tight fit in Chuck to prevent breakage. (8-ton minimum press fit on installation) - see drawing #3. - Chuck bushings are very hard but brittle, and must be well supported. - Always keep tools for pressing in good condition - A worn punch can cause chuck bushing to split or chip.
10	B1178	Chuck Includes: - C1516 (#10) Chuck Washer	- Clearance between Chuck and Fronthead should not exceed 1.0mm (0.040"). - When pressing C1418A (#8) bushing into Chuck, use **CANUN** T219 Assembly Guide or T221 Punch. - Press bushing out using T218 Removal Support and T217 Punch. Note that it is not necessary to remove the Chuck Nut when using these tools. See Drawing #3. - Chuck Nut is a left-hand thread and should be tightened into position firmly. A handy set-up can be made for this purpose by welding the spline section of a piston to a bench or stand. - The chuck with the C1418A bushing in position is placed on this splined section. - A tool is made by welding an appropriate Drill Steel to a handle. The steel is placed in the insert and tapped, tightening the chuck nut. To loosen, strike with a sharp blow in the opposite direction. See Drawing #1. - The C1516 Chuck Washer comes with the Chuck and usually does not require replacing. The Washer is a snug fit in the Chuck Nut Bore and is tapped into position with a small hammer and appropriate tool.
11	C1516	Chuck Washer	- Comes installed in the B1178 Chuck. Replace when broken. - Tap into place with an appropriate tool.
12 **12A**	C1512 12146	Chuck Nut Chuck Nut (6 spline)	- C1512 Chuck Nut is used with the B2334 Piston. - 12146 Chuck Nut is used with the 11116S Six Spline Piston. - Replace when wear exceeds one half the original spline width. See B1178 for installation and removal of Chuck Nut.
13 **13A**	E394 E394M	Cylinder Cylinder (Muffled)	- When a 0.006" Feeler Gauge can be inserted between a new Piston and the Cylinder wall near the exhaust ports, the Cylinder is worn out. The mating face with the A2598A Fronthead should be kept flat and any bumps or ridges taken off. - This can be done in a machine shop or manually by standing the Cylinder on a large grindstone and moving the Cylinder in a circular motion, keeping the area to be ground flat on the stone. - The addition of oil will help. - Check the outside Cylinder for wear, dents, cracks, loose welds. - Check the main bore for dents or cracks. Dents can be taken out with a proper hone or where a hone is not available. - Ground out with a pencil grinder and fine stone. - The Valve Chest Bore should be checked for wear, scoring etc. A proper fit for a Valve Chest is such that it must be tapped or pressed into position. - One should not be able to easily push it in by hand nor on the other hand should it be necessary to pound it in. Too tight a fit creates distortion - too loose a fit allows air leakage.

13 **13A**	Continued E394 E394M	Continued Cylinder Cylinder (Muffled)	- The Valve Chest Bore should be honed, when necessary, with a hone for honing over keyways. - The Ratchet Ring should be positioned on the Valve Chest and put into the Cylinder Bore with it. This prevents misalignment, scoring and distortion of the Ratchet Ring and Cylinder. - The Ratchet Ring should also be snug in the Cylinder. - A loose Ratchet Ring can cause misalignment of air passages and also damage D1397 (#33) Valve Box Locating Pin. - The Cylinder Boss should be checked for wear and scoring. - The C1523 (#19) Cylinder Lug Bushing must be a tight fit to prevent air leakage. (Oversize bushings are available - See C1523) - When installing the C1523 (#19) align the flat on the Bushing with the one on the Cylinder. Cylinders can be rebuilt and re-chromed if they are sound otherwise. - **CANUN** Cylinders are fitted with Nylon Plugs for all ports. To clean porting, drill out Nylon Plug (spare plugs are available from our stock). - All porting should be checked for obstructions at each overhaul. The C1517 (#27) Front Cylinder Liner is a press fit and should be assembled using a Piston for proper alignment. - Check with **CANUN** for details.
14	B1194	Operating Handle Adapter	- Check threads for 01454 (#26) Adapter Nut - Use T213 thread chaser when required. - Make certain all ports are clear. - Check thread for 01433 (#17) Feed Release Valve Assembly. - Groove for 164311 (#15) “O” Ring should be checked. This "O" Ring is often left out and the handle will not operate properly without it. - Check thread for B1193A (#18) Operating handle Control Body. - This adapter allows the Stoper to feed the airleg See dwg #6 for “O” Ring position.
15	164311	"O" Ring	- This “O” Ring is in a groove up inside the B1194 (#14) Handle Adapter and fits over the Air Stem of the B1193A (#18) Operating Handle when assembled. - One of the most common problems of Stoper Feed is forgetting to put this 11011 Ring in or putting it in the wrong place. - **CANUN** supplies B1194 (#14) handle with the "O" Ring installed.
16	164221	"O" Ring	Replace when worn. This ""“O” Ring seats in the B1194 (#14) Operating Handle Adapter and seals against air leaks of the D1433 (#17) Feed Release Valve.
17	D1433	Feed Release Valve	This is manufactured as a one-piece unit and is difficult to repair. Normally, the assembly is replaced due to breakage rather than wear.
18	B1193A	Operating Handle Control Body	- For use only with B1194. - Check threads and check Air Stem for proper length. - Be certain that 164311 (#15) “O” Ring seats properly over the Air Stem. - Check stop for C1570 (#20) Twist Grip Check “O” Ring grooves for wear and damage.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
19	164921	"O" Ring	Check for wear and damage
20	C1570	Operating Handle Twist Grip	Replace when worn to the point that Twist Grip is loose with new 164921 (#19) "O" Rings, or air leaks occur and Stoper Leg does not operate properly. Three "O" Rings required.
21	D1989	Operating Handle Washer	Check for wear or damage.
22	D2014	Operating Handle Lockwasher	Replace when worn or damaged.
23	D1990	Operating Handle Lock Nut	Check for wear and damage
24	C2549	Cylinder Lug Bushing	Assure the proper alignment of holes with Cylinder holes during assembly.
24A	C2549A3	Cylinder Lug Bushing - oversize .003	- Oversized bushings C2549A3 (+0.003'') are available in cases where the Cylinder Bore is worn or expanded. - If bushing C2549A3 is too loose, use C2549A5
24B	C2549A5	Cylinder Lug Bushing - oversize .005	- Oversized bushings C2549A5 (+0.005'') are available in cases where the Cylinder Bore is worn or expanded. - If bushing C2549A5 is too loose, Cylinder Lug needs to be chromed.
25	D1453	Adapter Nut Washer	- When assembling, match flat on Washer with flat on Drill Cylinder. - Replace when damaged.
26 **26A**	D1454 D1454D	Adapter Nut Adapter Nut (Domed)	- The most common problem is wear. Usually the Nylock section breaks off and there is some danger that the operator may cut himself. - The thread can be chased where practical. D1454D Domed Nut can be used to protect thread on B1194 (#14).
27	NB739	Exhaust Plug	Replace when worn or damaged.
28	D2105	Cylinder Plug	Replace if damaged.
29	C1517	Front Cylinder Liner	- Press into position using a Piston for proper alignment. - A handy way to do this is to cut the spline section off an old Piston about 1 1/2" from the head. - Put the liner on the shortened Piston and into position in the Cylinder - then using a second Piston, place the head of the Piston in the Cylinder Bore and press on the spline end until the Liner is properly positioned. - Occasionally, after pressing in, the Liner will be tight on the Piston and a T211 Cylinder Bushing reamer should be used to bring it back to size. - Check also the damage. Particularly scoring done during Piston and Valve Cast removal. The proper tool, T202 Piston Driver, should be used to prevent such damage. - Check for wear. - With dry Cylinder (no oil) check for air cushion by bringing Piston toward the Liner quickly. An air cushion should be felt as one pulls on the Piston. If little or no cushion is felt, replace the liner and check the Piston for wear. - A worn liner causes poor drill performance and is instrumental in Side Rod breakage and damage to the Piston. - Clearance between Liner and the Stem of the Piston should never in any case exceed 0.007".

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
30	B2334	Piston (8 spline)	- The striking face of a Piston should be flat so as to present the largest possible striking surface to the drill steel. - When wearing occurs, reface up to 1mm (0.040") max. - This grinding is critical and should be flat, smooth and square to the longitudinal axis of the Piston. Care must be taken to have adequate cooling during grinding. - Chamfer the Water Tube hole to prevent chipping and peening which will cut off Water Tubes. - Restore the radius on the ends of the splines to prevent damage to the Chuck Nut and Front Cylinder Liner. - Replace Piston when 0.004" wear of the Piston Head occurs (3.121" on B2334) - Replace Piston if splines are worn to half of the original width. - Check Rifle Nut thread for damage. - Internal bore should be clean. - Check for nicks and scratches and remove with fine hand stone. - "Scoring" of the Piston is most often caused by a dented Cylinder but it can also be caused by "dieseling". Dieseling occurs when a drill with too much oil in the air is run on cushion (Piston not striking steel). - Solution is to adjust Air Line Lubricator for less oil feed and to keep proper feed on the leg, or push on a Sinker. - Check Piston for discoloration or cracking in Splines due to lack of lubrication.
30A	11116S	Piston (6 spline)	- The striking face of a Piston should be flat so as to present the largest possible striking surface to the drill steel. When wearing, reface, up to 1mm (0.040" max). - This grinding is critical and should be flat, smooth and square to the longitudinal axis of the Piston. Care must be taken to have adequate cooling during grinding. - Chamfer the Water Tube hole to prevent chipping and peening which will cut off Water Tubes. Restore the radius on the ends of the splines to prevent damage to the Chuck Nut and C1517 (#29) Front Cylinder Liner. - Replace Piston when 0.004" wear of the Piston head occurs or if splines are worn to 3/4 the original width. - Check 7599G (#31A) Rifle Nut thread for damage. - Internal bore should be clean. - Check for nicks and scratches and remove with fine hand stone. - "Scoring" of the Piston is most often caused by lack of lubrication or a dented Cylinder but it can also be caused by "dieseling". Dieseling occurs when a drill with too much oil in the air is run on cushion (Piston not striking steel). - Solution is to adjust Air Line Lubricator and to keep proper feed on the leg, or push on a Sinker. - Check piston for discoloration or cracking in splines due to lack of lubrication.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
31	C1508	Rifle Nut	- Rotation 1 in 30. This refers to the Piston making one complete rotation for thirty inches of travel. Approximately 200 RPM on the CANUN 260. - Check that nut is seated properly in Piston. Lack of lubrication is the major cause of Rifle Nut failure. - Check for discoloration of Nut and Rifle Bar to pin point this problem. - Replacement should be made when splines are worn to half of the original width. A good system for removing and installing Rifle Nuts, is to weld a chuck to a workbench, with a C1512 (#12) Chuck Nut in place, and with a plate welded over the Chuck Nut to prevent its movement. - Weld a Rifle Bar to a Handle (Drill Rod for example) and use this to tighten the Rifle Nut in a Piston. For Rifle Nut removal, a good sharp blow with a #8 hammer will loosen the Nut unless the thread of the Piston is damaged; the Rifle Nuts have a left hand thread. - See drawing #2
31A	7599G	Rifle Nut (small) use with 11116S (#30A)	See C1508 (#31) above
32	A744	Valve Plug	- Make certain all holes and ports are clear. - If necessary, remove sharp edges or corners with extra fine emery cloth. Plug should fit snugly into A745 (#32) Valve Box. - C1648 (#31) Valve should fit freely on the Plug but not be loose enough to allow air leakage. - Complete assembly should be a close fit in the Drill Cylinder to prevent air leakage between ports. Valve parts have very close tolerances. - If more than one part of the valve assembly is to be replaced, contact **CANUN** for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.
33	C1648	Valve	- Valve must fit freely both in the A745 (#34) Valve Box and on the A744 (#32) Valve Plug, but must still maintain an air seal. - Replace when a sloppy fit is apparent. If necessary sharp edges or corners may be smoothed off using extra fine emery cloth. - Complete assembly should be a close fit in the Drill Cylinder to prevent air leakage between ports. - Valve parts have very close tolerances. If more than one part of the valve assembly is to be replaced contact CANUN for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.
34	A745	Valve Box	- Make certain all holes and ports are clear. - The Valve Plug A744 (# 30) must fit snugly in the Valve Box. - C1648 (#31) valve must fit snug but be free to move. - Replace when loose in cylinder or when machine performs poorly and air consumption is above normal (175-200 CFM). - Valve parts have extremely close tolerances. - If more than one part of the valve assembly is to be replaced contact **CANUN** for assembled and tested valve assemblies. - Part number for complete assembly is A745AS.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
35	D1397	Valve Box Locating Pin	- Be certain pin is in good condition and of proper length. - Pin must be installed with A745 (#34) Valve Chest to maintain correct position of Valve Chest relative to the drill cylinder.
36	B1170	Ratchet Ring	- Check teeth for wear. When rounded and Pawls slip, replace. - Check for tightness in Cylinder. - Always install Ratchet Ring with main Valve Assembly for proper alignment and to prevent damage to Cylinder. See Cylinder E393 (#12). Use CANUN Ratchet Ring Tester T246
37	B1173R	Rifle Bar (Reversible)	- Rotation 1 in 30. See C1508 (#29). - Replace when splines are worn to one-half original size. - Check to ensure that lubrication holes to Pawl Springs and Plungers are open. - Check for signs of lack of lubrication, discoloration, heat checks and cracking. - Check that Pawls, Springs and Plungers are free to operate. - All sharp edges should be smoothed off with a hand stone or fine emery cloth. - Clean out Water Tube Bore. On rare occasions with worn drills, the Rifle Bar head will jam between the Valve Chest and the Backhead. The Rifle Bar rotates between these two surfaces, so some sign of wear is normal. Grinding a slight amount from the head of the Rifle Bar will solve the problem.
38	D1611	Pawl Spring	- Replace when broken or "set" is gone. - Check for proper action when installed. It is a good idea to replace the pawl springs every time the drill is overhauled.
39 **39A**	NB805 S21-34	Pawl Plunger Steel Pawl Plunger	Check for wear and proper operation when installed. Steel Plungers chip and wear more quickly than the N8805 Plastic Plungers. CANUN recommends Plastic Plungers.
40	D1381R	Pawl (Reversible)	- Replace or re-face when wear exceeds 1mm (1/32"). - Pawls can be ground up to 1mm (1/32") to restore original profile. - With Reversible Pawls, reverse so that both sides are worn before grinding. - Check for proper operation when installed in Rifle bar.
41	A705	Backhead	- Check that all ports are clear, using air for testing. - Main bore of Throttle Valve, check for dents or scratches. - Check fit of B1176S (#48) Throttle Valve. Check all threads. - Assure that "O" Ring, 164231 is in proper groove. - Check Throttle Valve stop for wear See dwg #5.
42	C1272	Water Inlet Screen	Stainless steel. Usually only requires cleaning.
43	D1402	Water Inlet Washer	- May be torn or deformed. Replace. - Be certain to use S2487 (#44) - Thrust Washer for protection of D1402.
44	S2487	Water Stem Thrust Washer	- Necessary to ease turning of C1809 (#45) Water Bend and to keep D1402 (#43) Water Inlet Washer from being damaged. - Install with larger side of hole facing C1272(#42) Water Inlet Screen to allow for more screen surface.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
45	C1809	Water Stem	- Replace when thread is worn or damaged. - Check "O" Ring grooves for corrosion. - Replace when leakage occurs.
45A	C1528	Water Stem (Serrated)	- Replace when worn or damaged. - Check "O" Ring grooves for corrosion. - Replace when leakage occurs.
46	164811	Water Stem "O" Ring	Two (2) required. Replace when worn or damaged.
47	S2141	Water Stem Nut	- Corrosion is the major problem. - Wear also occurs in threaded section. - Replace when leakage is a problem or nut will not hold C1809 (#45) Water Stem tight.
48	B1176S	Throttle Valve	- Replace when worn so that excessive air leaks out the backhead relief hole below the C1509S (#54) Throttle Valve Handle and/or water will not shut off. - Stiff Throttle Valve operation can be caused by dirt and burrs on the Throttle Valve or dents in the Backhead. - A light rubbing of the Throttle Valve with extra fine (320 grit) emery cloth usually clears up the problem. - Honing of the Backhead or removal of the dents with a small fine-grained stone is necessary to remove dents. - Check keyway and threads. Replace when worn.
49	D1601	Air bend Nut Washer	Replace when worn or damaged enough to allow air leakage.
50	12153	Airbend Nut Lock Washer	- Used to lock C1526 (#53) Air Bend Nut in place. - Replace when tabs are damaged.
51	C1525	Air Bend	Check for wear. Replace when damaged or 164731 (#52) "O" Ring wears a groove sufficiently deep to allow air leakage. - Use tool to chase threads.
52	164731	"O" Ring	Replace when worn or damaged.
53	C1526	Air Bend Nut	- Check "O" Ring groove. When "O" Ring groove is worn and the "O" Ring is loose, replace. Check thread for wear or damage.
54	C1509S	Throttle Valve Handle	- Check keyway and taper. If Throttle Valve Handle goes too far on Throttle Valve, taper and tightens against the Backhead, grind Throttle Valve Handle until it no longer binds. - Replace when problem is severe. The wear is generally caused by running the drill with a loose Throttle Valve Handle.
55	D1384	Throttle Valve Key	Replace when worn or damaged
56	149163MT	Disc Spring Washer	Replace when broken or set of spring is gone
57	D1385	Throttle Valve Handle Nut	Check thread. Replace when Nylok is damaged or missing.
58	D1383	Throttle Valve Plunger	Be certain Plunger operates freely in Backhead. Plunger can be reground when point is worn.
59	D1382	Throttle Valve Spring	Check for tension. When restitution of Spring is lacking, replace. - Spring can be stretched or a coil ground off to achieve tension desired.
60	2422P	Plug	- Allen Screw type. Clean properly before attempting Plug removal. Depth of Plug affects the tension of the D1382 (#41). - - Top of Plug should be approximately flush with or slightly out of the Backhead, and any variation will necessitate adjusting the D1382 spring to make allowances either by stretching the spring or grinding off the coils.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
61	164231	Water Valve Backhead "O" Ring	- Check for cuts and nicks. - Be certain this "O" Ring is in the proper groove, not in the threaded section. See Drawing #5. - This is one of the most common mistakes made in repairing Rock Drills; allowing water to leak into the drill. - Replace when worn.
62	164701	Backhead Cap Seal	- Two "O" Rings are required for each drill. - Replace when worn or damaged. The major problem is loss during assembly. The "O" Rings can be held in place with grease for assembling.
63	D1675	Water Tube Seal	- Seal is tapered on one side and the tapered side should be facing out from the C2144 (#66) Water Valve Seat retainer. - Seal should also be inside C2144 for proper functioning. - Replace when damaged
64	D1674	Water Tube Spacer	- Place in position with small end toward head of C1574A (#65) Water Tube and large end against D1675 (#63) Water Tube Seal. - Replace when damaged.
65	C1574A	Water Tube	- Make certain Tube is not plugged. - Check swaged end for wear and splitting. If severely cut, check C1418A (#9) Chuck Bushing Insert and shank of drill steel for wear or damage such as peening of the drill steel. - Water Tube must be tight in A705 (#41) Backhead to prevent water leaks. Check D1675 (#63) Water Tube Seal if leakage is apparent. - Proper length of standard Tube - 17 5/16". - Hole in swaged end 5/64".
65A	C1574B	Water Tube 1/8" hole	See C1574A (#65). Use when more water required.
66	C2144	Water Valve Seat Retainer	- Damage to this part is caused by clamping in vice. - Proper method is to put Water Tube in vice and pry D1675 (#63) Water Tube Seal out with pointed tool. - Replace when damaged
67	D1673	Water Valve Seat	Replace when damaged or hole closes over or is cupped.
68	164231	Water Control Body	Replace when worn.
69	B1181PC4	Water Control Valev Body	- Damage to this part is due to hitting. - Circlip Groove wears eventually and this allows C1521PC1 (#75) Water Valve Cap to pop out. - Check threads, Circlip Groove, and porting. - Replace when worn or damaged.
70	164301	"O" Ring	Replace when worn or water will not shut off.
71	C1522PC1	Water Valve	- This is a pressure reducing Valve, replace when damaged. - In drilling very soft rock (over 30"/min.) this Valve may not supply enough water to keep the drill hole clean. To increase water flow, plug the hole in the C1522 PC1 Valve with solder, or some other material that will not fall out, and remove the 164231 (#74) Water Valve Spring Cap "O" Ring. This will supply full line pressure water to the drill. - CAUTION: Increasing water pressure may also cause freezing of Muffled Drills.
72	164521	Water Valve "O" Ring (Large)	Replace when worn, or if water comes out of the small bleed-off hole under the C1509S (#54) Throttle Valve Handle in Backhead

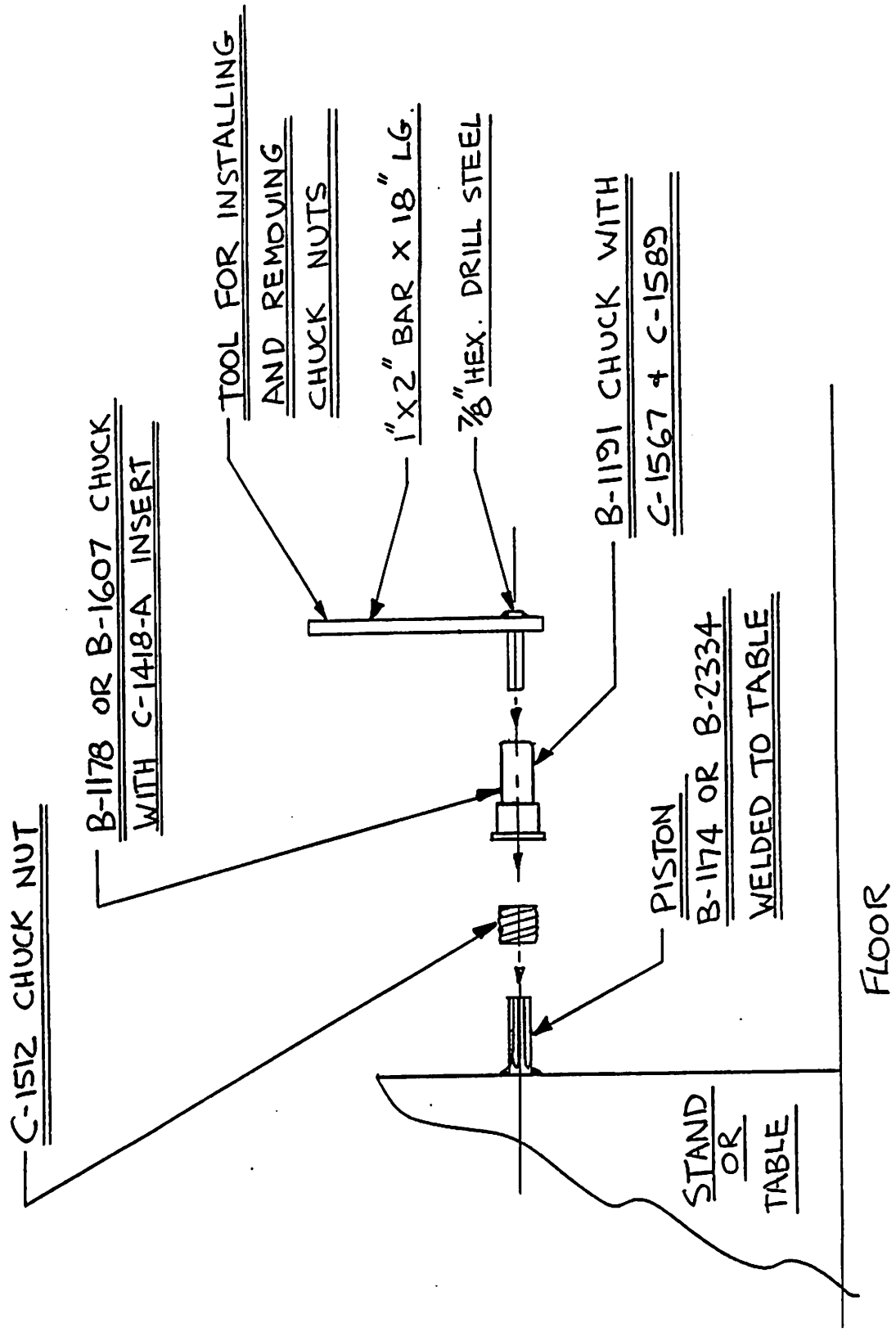
LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
73	D1406	Water Valve Spring	- Water to the CANUN drill starts at an air pressure of approximately 45 PSI. The D1406 Spring keeps water shut off until that pressure is reached. - If water will not shut off or Spring is broken, replace it.
74	164231	Water Valve Spring Cap "O" Ring	Replace when worn.
75	C1521PC1	Water Valve Cap	Replace when worn or damaged.
76	20015	Water Valve Spring Cap Circlip	Check for wear. Replace when circlip is not tight in groove of 81181PC4 (#69) Water Control Valve Body.
77	300M620	Pin	- The purpose of this pin is to properly locate the A705 (#41) Backhead and the B1583 (#78) Backhead Cap. - The Pin should stay in the 81583 Cap and can easily be removed with a punch. The Pin is usually damaged when a drill is assembled with the Pin out of alignment with the Backhead.
78	B1583	Backhead cap	- Because a Rock Drill has only two Side Rods, the components move and wear between the backhead and cap causing a high spot to form adjacent to the Side Rods. The high spots must be ground off or eventually the backhead cap will break. - Other problems caused by these high spots are tightness in the 81176S (#48) Throttle Valve, and in severe cases, backhead distortion will be such that the automatic water will not shut off because of air leakage between the Throttle Valve and A705 (#41) Backhead. - Also, if a new D1664 (#82) Piston Rod Spring Clip is loose in the B1583, replace the backhead cap.
79	164671	"O" Ring	Replace when worn or damaged.
80	225414	Split Pin	- This pin is used to assure that the D1665 (#81) Piston Rod Locknut and the C2213 (#83) Bucket Spacer do not come off. - Replace when broken.
81	D1665	Piston Rod Lock Nut	Check thread and assure that D1664 (#82) Piston Rod Spring Clip moves freely over round section. The locknut must be kept tight.
82	D1664	Piston Rod Spring Clip	- The Spring Clip must move freely over D1665 (#81) Piston Rod Locknut and lock securely in 81583 (#78) Backhead Cap. - The D1664 should be replaced when B1656 (#86) Piston Rod will not stay in the fully retracted position
83	C2213	Bucket Spacer	- Check threads for wear. - Check outside diameter. The maximum allowable wear between the Spacer and a new Feed Cylinder is 5/64" overall.
84	17970385	Bucket	- Bucket will eventually wear thin and not seal. - Check for wear when leg does not push but air flow is noticed from bleed holes at the bottom of the Feed Cylinder.
84A	17970385M	Bucket (Soft)	- Use this Bucket for low air pressure applications or to help get extra life from worn leg tubes. Bucket will eventually wear thin and not seal. - Check for wear when leg does not push but air flow is noticed from bleed holes at the bottom of the Feed Cylinder.
85	C2214	Piston Rod Spacer	- The Piston Rod Spacer acts as an alignment for the Sloper Feed and excess wear can affect performance. The maximum allowable wear between the Spacer and a new Feed Cylinder is 5/64" overall.

LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
86	B1656	Piston Rod 30" Stroke	- 24" steel change requires 30" stroke. - Piston Rods normally are bent due to blasting or dropping machines. Rods can usually be straightened with a press. - If Piston Rod cannot be straightened or chrome is chipped, replace.
86A	B1659	Piston Rod 24" Stroke	- 18" steel change requires 24" stroke. - Piston Rods normally are bent due to blasting or dropping machines. Rods can usually be straightened with a press. - If Piston Rod cannot be straightened or chrome is chipped, replace.
87	D1707	End Cap Bushing	- The D1707 is designed to keep the 81656 (#86) Piston Rod centered in the 81654 (#88) Feed Cylinder thus allowing the buckets to operate properly. - The End Cap Bushing is subjected to extremely abrasive conditions because of its position on the drill. - The Bushing should be changed when worn or damaged. This part is tapered and fits snugly in position at the bottom of the Feed Cylinder. - To remove, using T201 Bushing Extractor, tap the D1707 up inside the Feed Cylinder. - To replace, guide into position using the Piston Rod and then seat firmly into position using the T223 Stoper Cylinder Mandril.
88	B1654	Feed Cylinder 30" Stroke	- 24" steel change requires 30" stroke. Check for wear. - When airleg does not push or push is erratic, replace Cylinder. - The major problem with Feed Cylinders is denting. These are easily located by holding the Cylinder up to the light and looking for high (shiny) spots. Once dent is located, use T-223 Stoper Cylinder Mandrill and a small hammer to remove them. - The top of the Feed Cylinder that mates with the B1583 (#78) Backhead Cap, can develop high spots (see 81583) that should be removed.
88A	B1657	Feed Cylinder 24" Stroke	- 18" steel change requires 24" stroke. Check for wear. - When airleg does not push or push is erratic, replace Cylinder. - The major problem with Feed Cylinders is denting. These are easily located by holding the Cylinder up to the light and looking for high (shiny) spots. Once dent is located, use T-223 Stoper Cylinder Mandrill and a small hammer to remove them. - The top of the Feed Cylinder that mates with the 81583 (#78) backhead cap, can develop high spots (see 81583) that should be removed
89	C1582	Side Rod	- Replace when worn or broken. - Torque rods to 90 - 100 FT/LB. - Experience has shown that better results are achieved when one uses either two new or two used rods on a machine, not one new and one used. This side rod is also used on **CANUN** Sinkers.
90	1973854	Hat Packing	The packing is designed to keep the 81656 (#88) Piston Rod clean the outside or top one prevents dirt from entering the Airleg. When air leakage is felt around the Top Cap, replace the inside packing.

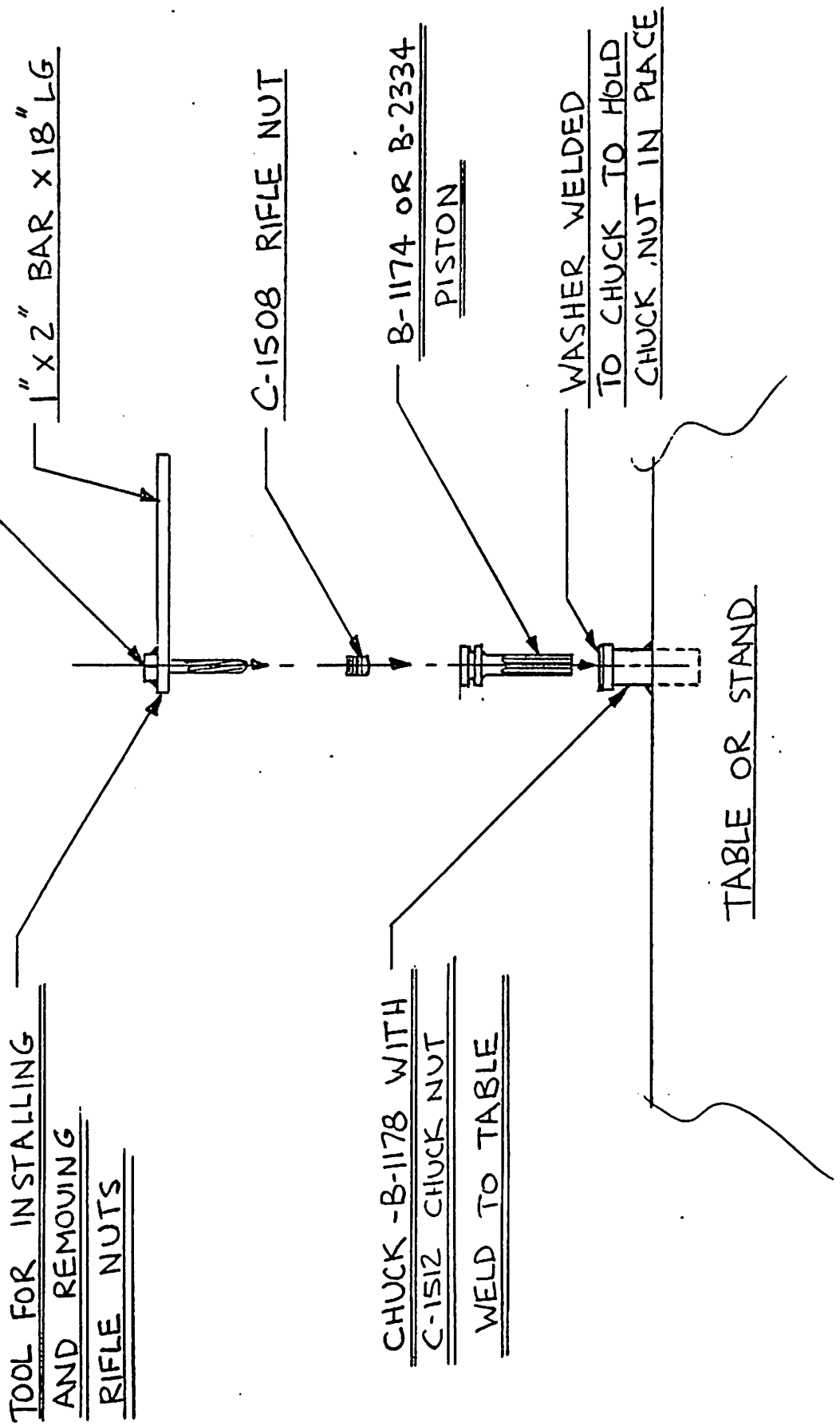
LIST #	PART #	DESCRIPTION	IDENTIFICATION OF PROBLEM AND SOLUTION
90A	1973854A	Top Cap Hat Packing Double Lip	Similar to 1973854 but with extra flange for added strength and better air sealing properties.
90B	1973854B	Top Cap Hat Packing Double Packing	Similar to 1973854A but with extended cone for increased sealing, and with a short cone facing the other direction. This style affords double sealing properties and is recommended for outside (top) packing.
91	D2547	Spike (Long)	The D2547 is a large diameter and longer Spike than the D1641 (#91A) Short Spike. This spike is designed to fit in a roof bolt plate with a 7/8" diameter hole, and is used primarily where the Stoper is moved a considerable distance between holes, such as roof bolting, and a plank is not used. This spike should also be kept sharp. Replace when too short or thread is damaged.
91A	D1641	Spike (Short)	This is the short spike, generally used in raise work wherever a good support is available (such as a plank or plate). The spike should be kept sharp and can be ground to recondition.

SECTION 4

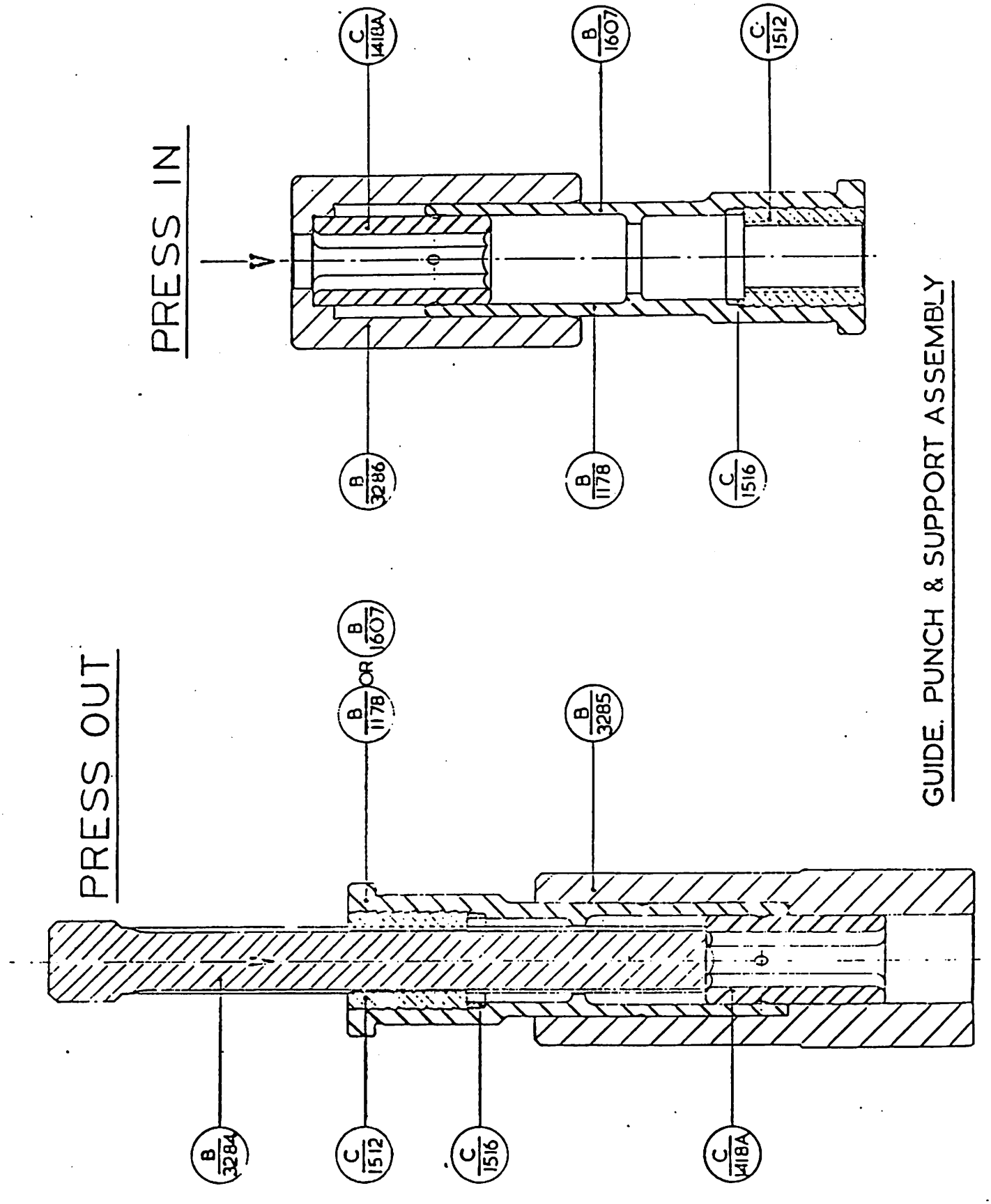
DRAWING #1


C-1512 CHUCK NUT
B-1178 OR B-1607 CHUCK WITH C-1418-A INSERT
TOOL FOR INSTALLING AND REMOVING CHUCK NUTS
1"X2" BAR X 18" LG.
7/8" HEX. DRILL STEEL
B-1191 CHUCK WITH C-1567 + C-1589
PISTON B-1174 OR B-2334 WELDED TO TABLE
STAND OR TABLE
FLOOR

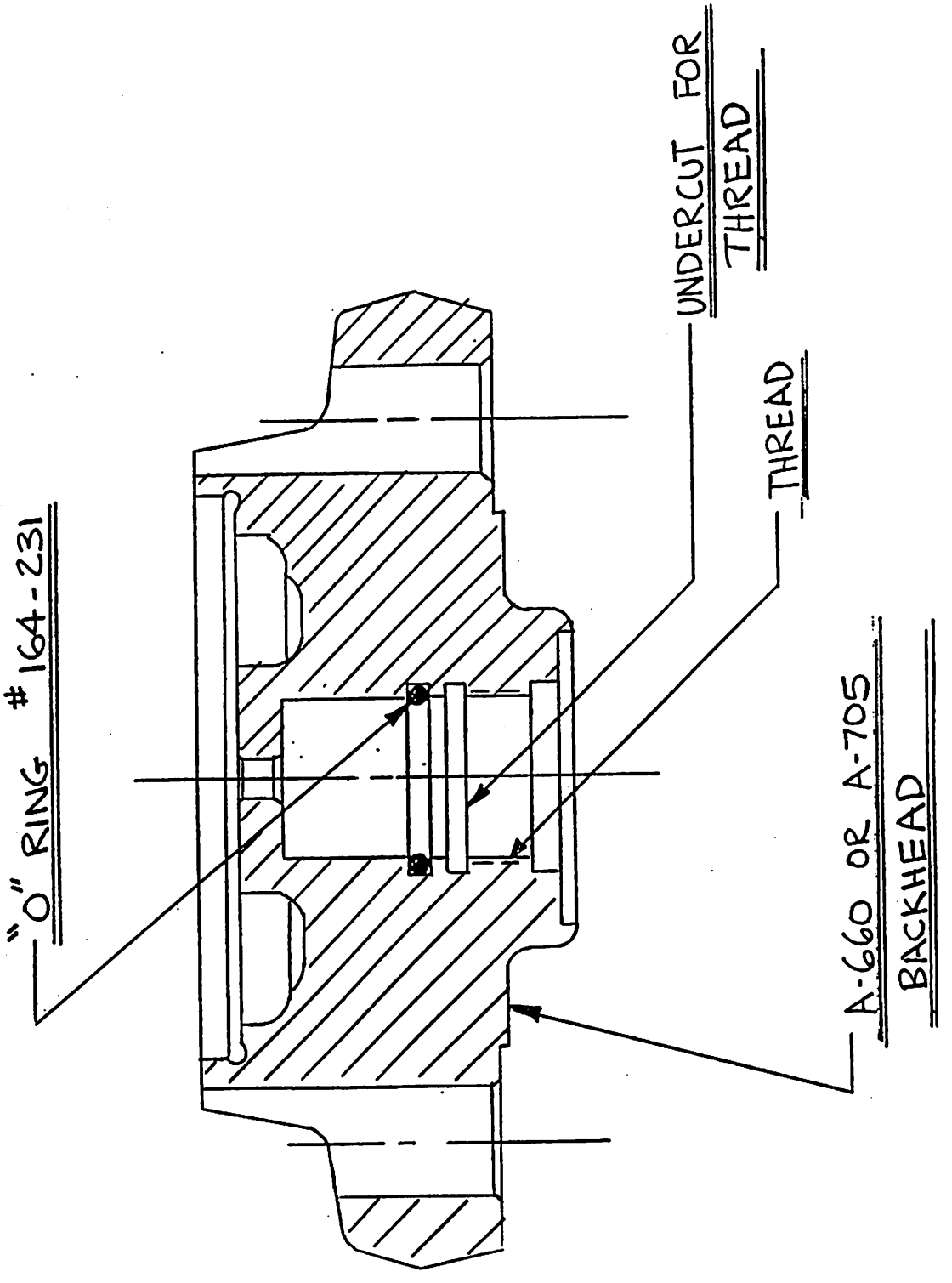
DRAWING #2


B-1173 RIFLE BAR
1" x 2" BAR x 18" LG
C-1508 RIFLE NUT
B-1174 OR B-2334
PISTON
WASHER WELDED
TO CHUCK TO HOLD
CHUCK NUT IN PLACE
TABLE OR STAND
TOOL FOR INSTALLING
AND REMOVING
RIFLE NUTS
CHUCK - B-1178 WITH
C-1512 CHUCK NUT
WELD TO TABLE

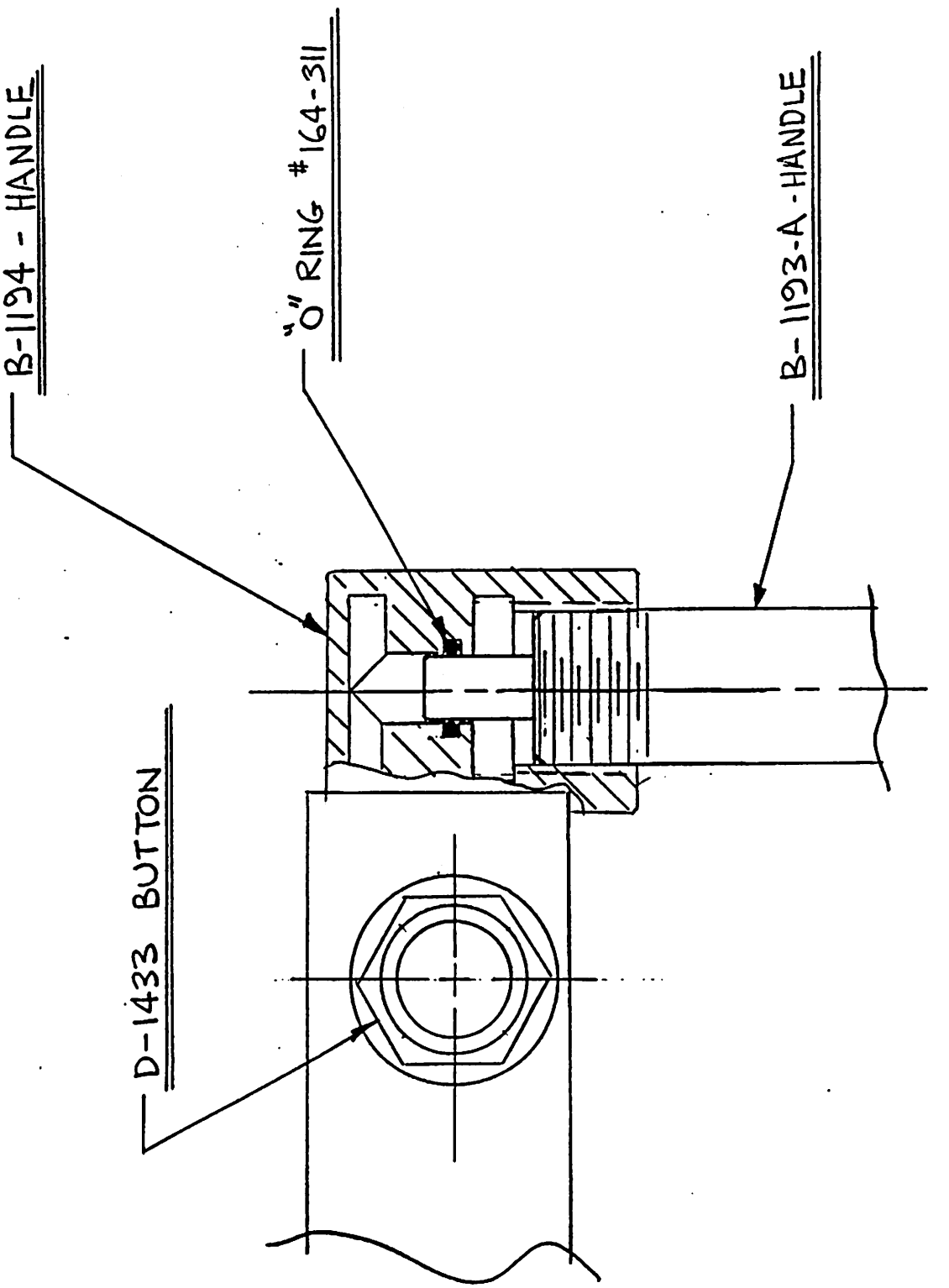
DRAWING #3


PRESS IN
C/1418A
B/1607
C/1512
B/3286
B/1178
C/1516
PRESS OUT
B/1607
OR
B/1178
B/3285
B/3284
C/1512
C/1516
C/1418A
GUIDE, PUNCH & SUPPORT ASSEMBLY

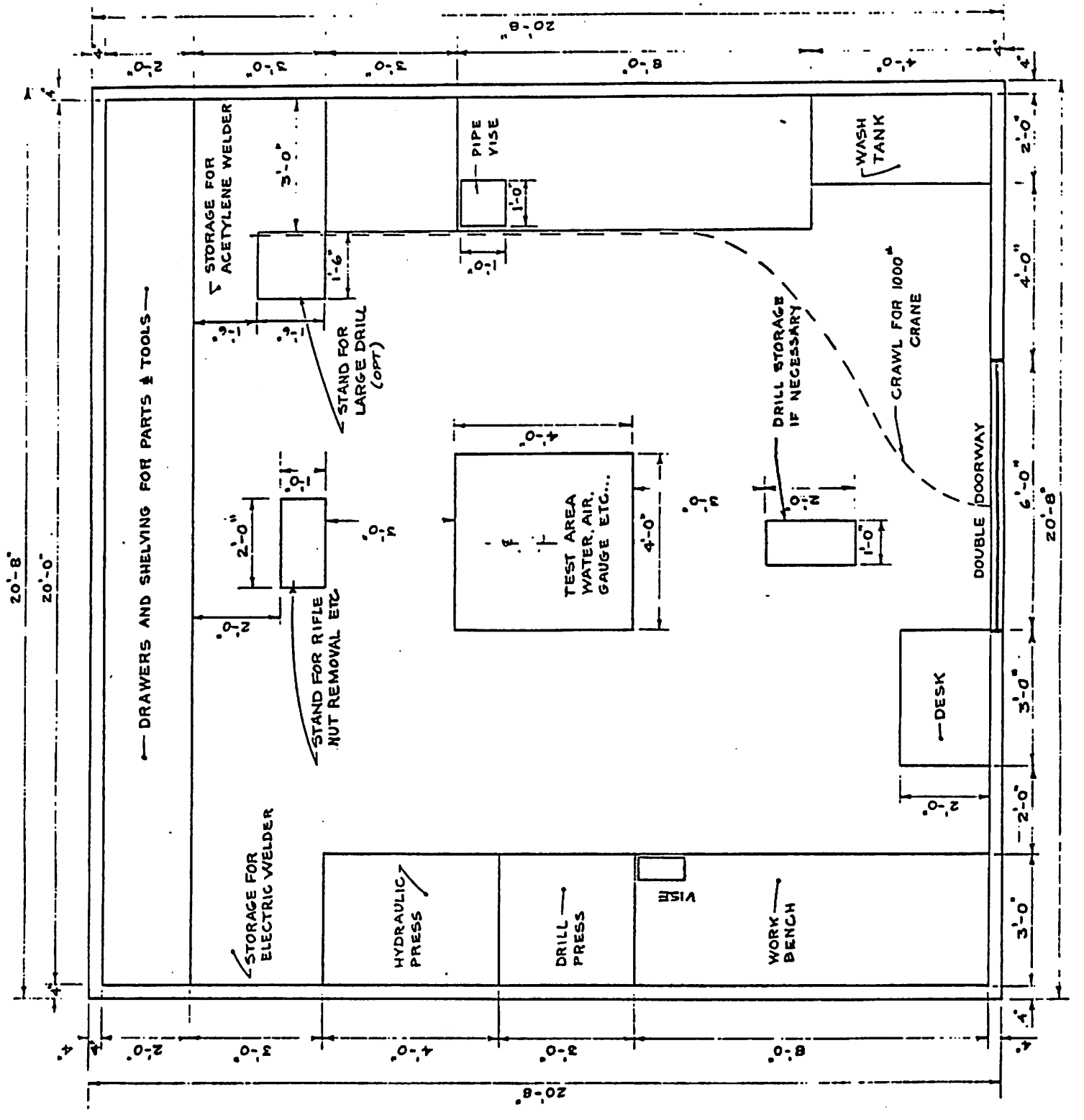
DRAWING #5


"O" RING #164-231
UNDERCUT FOR THREAD
THREAD
A-660 OR A-705 BACKHEAD

DRAWING #6



DRAWING #7


20'-8"
20'-0"
DRAWERS AND SHELVING FOR PARTS & TOOLS
STORAGE FOR ACETYLENE WELDER
3'-0"
1'-6"
PIPE VISE
1'-0"
WASH TANK
STAND FOR LARGE DRILL (OPT)
DRILL STORAGE IF NECESSARY
CRAWL FOR 1000# CRANE
TEST AREA WATER, AIR, GAUGE ETC...
4'-0"
2'-0"
STAND FOR RIFLE NUT REMOVAL ETC
DOUBLE DOORWAY
6'-0"
DESK
STORAGE FOR ELECTRIC WELDER
HYDRAULIC PRESS
DRILL PRESS
VISE
WORK BENCH