TECHNICAL MANUAL

OPERATION, SERVICE AND OVERHAUL INSTRUCTIONS

BEAD BREAKER
AND
PNEUDRAULIC PUMP UNIT

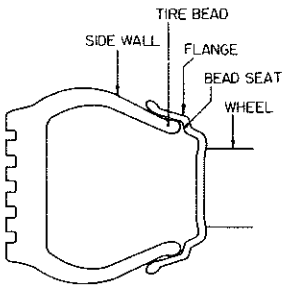
MODEL: 792C1100F
NSN: 4910-01-015-7667
FEDERAL SUPPLY CODE: 00994

96 7U100

COLUMBUS JACK CORPORATION
1000 SOUTH FRONT STREET • COLUMBUS, OHIO 43206 • 614-443-7492/TELEX 24-5472

INSTRUCTIONS FOR BREAKING A TIRE BEAD FROM RIMS – DROP CENTER AND FLAT BASE WITH OR WITHOUT SIDE RINGS

(7.00 X 16 TIRE SHOWN)

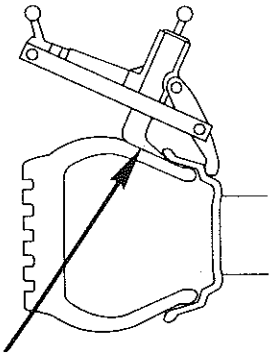


1. Place tire on flat surface.

2. Remove valve core to completely deflate tire.

3. Insert wedge-shaped prongs close to rim flange and exert downward pressure to maintain starting angle. Breaker feet must be flat against sidewall.

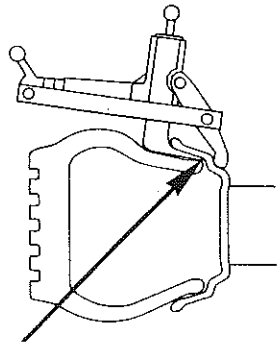
3a. NOTE: Several attempts may be required to make accurate insertion. Do not force the bead breaker.



3b. Wedge-shaped foot and prongs should be flat against sidewall.

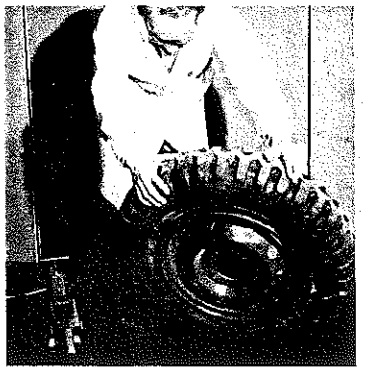
4. Maintain a near horizontal position with bead breaker to assure proper insertion and clamp reaction. Press foot treadle on pump to start breaking action. Use toe to release.

4a. Close-up of photo 4.



4b. Make certain wedge-shaped prongs insert well into bead area and against rim flange.

5. NOTE: Do not attempt to break bead with one insertion. Repeat steps 3 and 4 around tire in as many places as necessary to release bead from rim.



6. Turn wheel and tire over and repeat steps 3 and 4. Make certain wedge-shaped prongs insert deep into bead area and against rim flange.

7. DO NOT DO THIS! Bead breaker must be perpendicular to rim and wedge-shaped prongs inserted evenly under wheel flange.

TABLE OF CONTENTS

SECTION I

1-1 INTRODUCTIN

1-2 This publication is issued as the basic Handbood of Operation Service and Overhaul Instructions for a Bead Breaker, Model 792C1100, manufactured by the Columbus Jack Corporation, Columbus, Ohio 43206.

2-1 DESCRIPTION

2-2 The Bead Breaker is a portable unit, consisting of the Bead Breaking Tool and its Pneudraulic Power Source. The breaker tool has two hydraulic rams which are sequenced to perform the following function. One of the rams serves to provide the required clamping action and the second ram provides the power to perform the actual bead breaking operation. The Pneudraulic Power Source is a separate unit, which is connected to the breaker tool by means of a flexible hose.

3-1 PURPOSE

3-2 This Bead Breaker is intended to be used to faciliate tire removal from military vehicles and commercial light and heavy trucks.

4-1 LEADING PARTICULARS

4-2	CAPACITY & SIZE	7.00 X 16 thru 14.00 X 24
4-3	TIRE TYPES	Tube and Tubeless
4-4	RIMS	Flat base and drop center Passenger car and truck/ bus rims
4-5	WEIGHT	48 Pounds
4-6	OPERATING AIR PRESSURE	95-105 Pounds per Sq inch
4-7	OPERATING FLUID	Lightweight Hydraulic Fluid
4-8	FLUID CAPACITY	123.5 Cu In. (0.52 US Gal)

5-1 OPERATION

5-2 The Bead Breaker performs its function by means of two sequenced operations. The first of the operations serve to clamp the Bead Breaker to the rim of the wheel assembly and the following motion of the second ram will perform the actual bead breaking of the tire from the rim.

6-1 OPERATING INSTRUCTIONS

6-2 WARNING:

a. While operating this unit, keep hands on handles provided. Hands, arms and or legs must be kept well clear of the clamp jaws at all times while the unit is in operation or while it is connected to the air supply line.

b. Because the hydraulic system of this Bead Breaking Unit operates at pressures approaching 10,000 PSIG, be certain to use hoses that are not damaged and are properly installed between the pneudraulic pump and bead breaker.

CAUTION:

a. Never operate the unit at full pressure unless the clamps are in position on a tire rim, or damage may result to the unit.

b. Do not use hydraulic brake fluid or any fluid with an alcohol base. Use only light weight petroleum base hydraulic fluid.

6-3 Connect the pneudraulic power source to an air line having a flow of 5-10 CFM and 95-105 PSIG pressure.

6-4 Grasp the Bead Breaker by the handles provided and position the tool on the tire so that the wedge shaped prongs on the breaker feet are adjacent to or in the gap between the rim and tire. Operate the power source by means of the foot treadle until the clamping arm contacts the inside of the rim and the tool becomes clamped to the rim. This action will force the wedges between the rim and tire to begin the bead breaking operation. Further operation of the power source will cause the breaker foot on the second ram to apply force to the tire along the base of the rim and complete the bead breaking operation.

6-5 Upon completion of the breaking cycle, stop the pumping action by means of the foot treadle and the hydraulic fluid will be released from the Bead Breaker and the two rams will be retracted by spring action and the tool released from the rim.

6-6 This procedure may have to be repeated at other points about the rim of the tire assembly.

7-1 TROUBLE SHOOTING

7-2 Refer to Tables I and II for Trouble Shooting.

TABLE I TROUBLE SHOOTING (Refer to Fig. I)

TROUBLE	PROBABLE CAUSE	REMEDY
Rams fail to extend	Low fluid level	Inspect and fill reservoir to correc level
	Air piston stuck	Refer to Trouble Shooting Chart II
	Insufficient Air or defective pump	Refer to Chart II
Rams extend but will not generate pressure	(1) Check valve not sealing properly (2) Release valve mech-anism not sealing	Refer to Chart II
Rams extend but will not build to maximum pressure with no visible external leakage	Insufficient Air supply	Check air supply and also refer to Chart II
Rams extend but will not build to maximum pressure with visible leakage	(1) Defective packing	Replace Packing (22 Figure 1
	(2) Pressure "leak off" at pump	Refer to Chart II
Rams extend slowly under no load	Air by-passing pump	Refer to Chart II
Clamping action does not take place	Sequence valve leaking	Remove Valve Body (29), Spring (27) & Ball (26). Inspec Ball (26) & Seat. Inspect Spring. Clean Ball Seat, reseat if neces-sary. Replace Ball or Spring if defect ive
Breaker Ram will not retract	Broken Spring	Replace Spring (8)
Clamp will not retract	Broken Spring	Replace Spring (24)
Clamping not maintained	Leaking Check Valve	Remove Air Body Asy (25), and Ball (20) examine Ball Seat. Reseat if necessary Examine Ball & repl ace if defective

TABLE II TROUBLE SHOOTING (Refer to Fig. II)

TROUBLE	PROBABLE CAUSE	REMEDY
Pump does not reciprocate	Air Piston stuck	Check for contamination or lack of lubrication
Pump reciprocates but rams will not extend	Insufficient Air or defective Pump	(a) Check Prime (b) Depress both Air Valve and Release Valve located beneath each end of Treadle (1) at the same time.
Pump extends rams but will not hold	(a) Outlet check ball (13) is not sealing (b) Release Valve not sealing	(a) Correct and replace Check Ball (13) (b) Check and Clean Release Valve (6)
Pump extends rams, but will not build to Max pressure with no visible external leakage	Insufficient Air Supply	(a) Check air supply 95-105 PSIG Required (b) Check for internal leakage (1) Release Valve (6) (2) Low Relief Valve Setting (31) (3) Inlet Check Valve Ball (20) not seating
Pump extends rams, but will not build to Max pressure with visible external leakage out of air exhaust	Pressure "Leak Off"	Check Piston Sub-Asy Replace Hydraulic Cylinder Asy (27)
Pump extends rams slowly under "No Load"	Air By-Passing Pump	(a) Check Air Input 5-10 CFM (b) Check clearance of Inlet Check Ball (20)

TROUBLE SHOOTING CHART
PNEUDRAULIC POWER SOURCE

TROUBLE	PROBABLE CAUSE	REMEDY
Air motor fails to cycle.	1. Air pressure too low.	Check air supply for desired pressure.
	2. Air orifice restricted.	Remove air line fitting and clean orifice. (In Air Body Assembly (25)
	3. Air piston jammed.	Disassemble Air Body Assembly (25) - remove and clean Plunger (24).
	4. Hydraulic cylinder (21) jammed.	Disassemble Air Body Assembly (25) from pump - clean.
	5. Air piston broken.	Replace with new Plunger (24)
	6. Clogged from long storage.	Add small quantity of No. 30 oil through air inlet. Plug exhaust parts with thumb and forefinger, and turn on air. Release ports suddenly after air pressure has built up in Air Body Assembly (25).
Air motor cycles slowly.	1. Air orifice partly restricted.	Remove air line fitting and clean orifice in Air Body Assembly (25).
	2. Gummy valve piston.	Clean and lubricate.
	3. Air pressure too low.	Increase, but do not exceed 180 PSI. 60 to 120 PSI is normal.
	4. Air mufflers plugged.	Remove - clean and replace in Air Body Assembly (25).
Air motor cycles but fails to pump.	1. Relief Valve (31) not closing.	Adjust screw. (See operating instructions.)
	2. Air in Reservoir (37) or in system.	Fill with oil and bleed out all air.
	3. Dirt under valves (31, 12, 21).	Clean and fill with clean oil
Pumps but fails to hold pressure.	1. Leak in system (hose or rams).	Locate and repair.
	2. Relief Valve (31) not closing.	Adjust release screw. (See operating instructions.)
	3. Dirt under valves (31, 12, 21).	Clean and fill with clean oil

TROUBLE SHOOTING CHART
PNEUDRAULIC POWER SOURCE

TROUBLE	PROBABLE CAUSE	REMEDY
Air motor fails.	1. Throttle valve in Air Body Assembly (25).	Remove - clean - reinstal
	2. Washer damaged (23).	Replace.
Oil blowing out air exhaust.	1. Pump plunger seal leaking in Hydraulic Cylinder Assembly (21).	Replace.
	2. Hydraulic Cylinder Assembly (21) loose.	Tighten to 35-45 lb.-ft. torque.
Oil leaking from.	1. Reservoir fill plug loose. (33)	
	2. Reservoir (37) damaged.	Replace with new reservoi
	3. Line fittings loose.	Tighten.
	4. Treadle bearing screw loose in Swivel Coupler (12).	Tighten to 40-50 lb.ft.
t pumps to full pressure but will not hold.	1. Dirt under Relief Valve (31).	Remove - clean and reinst
	2. Bad valve seats in Relief Valve Assembly (31).	Remove all valve seats an reseat with ball seating tool being sure to use a single light tap of hamme
Unit leaks from relief valve.	1. Gasket damaged (28).	Remove - replace and tighten Relief Valve (31) to 40-50 lb.-ft.
	2. Seal damaged in Relief Valve Assembly (31).	Remove - replace and tighten Relief Body (31) to 40-50 lb.-ft.

SECTION II

OVERHAUL INSTRUCTION - BEAD BREAKER

8-1 SPECIAL TOOLS

8-2 There are no special tools required for the overhaul of this equipment.

8-3 Disassemble the unit as follows referring to Figure I and IA.

8-4 PROCEED AS FOLLOWS:

a. Remove hose (12) Reason: Hose needs to be out of the way.

b. Remove Retaining Rings (35) on tie bar pins only and Tiebars (38) Reason: Pins and Clamp need not be removed.

c. Remove Ram Screw (19) securing Rear Handle (20) to Ram (17)

d. Remove Tension Screw (23)

e. Remove Cylinder (18) (right-hand threads) from Body (11), remove Ram (17) from Cylinder (18) and Wiper (21) and Packing (22) from interior of Cylinder (18)

f. Remove Screw (16) from Body (11) thereby removing Spring (24)
Note: Use care not to lose Balls (15) and (25)

g. Remove "O" Ring (13) and Back Up Ring (14)

h. Remove Valve Body (29), Gasket (28), Spring (27) and Ball (26) from Body (11)

i. Loosen Jam Nut (2) and remove Handle (1)

j. Remove Screw (6) and Cap (3) from Body (11)

k. Remove "O" Ring (4) and Back Up Ring (5) from Cap (3)

l. Using a punch, remove Pin (31) and Foot (32) from Piston Rod (10)

m. Remove Screw (30) and Gasket (7)

n. Remove Piston Rod (10) from Body (11) and Spring (8) from cavity in rod

o. Remove Wiper (21) and Packing (22) from interior of Body (11)

NOTE: Disassembly of Spring Retainers (9) from Springs (8) and (24) is Not necessary unless Retainers are damaged.

9-1 CLEANING

9-2 Wash parts with cleaning solvent, Federal Specification Number P-S-661 and dry thoroughly with a lint free cloth.

WARNING: Use solvent in a well ventilated area. Avoid any prolonged contact with skin and inhalation of solvent vapors.

10-1 INSPECTION

10-2 Inspect all parts for damage, corrosion and other faults.

11-1 REPAIR

11-2 The following procedure must be used to repair defective Ball Seats in Body (11).

a. Reface, using a standard valve seat facing tool.

b. Using a brass dowel, a mallet and a ball of the same size as the seat being refaced, form a new seat by tapping lightly on the seated ball until a 1/64 wide seat is formed. Discard ball used for seating operation. Wash refaced seat with solvent. Install a new ball of proper size at each refaced seat area.

12-1 REPLACEMENT

12-2 Damaged or defective parts other than repairable valve seats must be replaced.

13-1 LUBRICATION PRIOR TO REASSEMBLY

13-2 Prior to reassembly, dip all internal parts in hydraulic fluid. Lightly coat Pins (34A) and (34B) with oil, Specication MIL-L-7870. Protect oiled surfaces from dust accumulation pending reassembly.

14-1 REASSEMBLY

14-2 Reassemble the Bead Breaker in reverse order of disassembly.

15-1 PREPARATION FOR USE

15-2 Bleed trapped air from system as follows:

a. Connect to its pneudraulic pump by means of the hose provided.

b. With the pump at an elevation higher than the breaker tool, operate the pump to extend both rams but <u>do not</u> apply full pressure.

c. Release and allow rams to fully retract.

d. Repeat steps (b) and (c) a minimum of four times.

e. The tool is now ready for use.

16-1 SAFETY PRECAUTIONS

16-2 Because the hydraulic system of this Bead Breaking Unit operates at pressures approaching 10,000 PSIG be sure to use hoses that are not damaged and are properly installed between the Pneudraulic Pump and th Bead Breaker Unit.

16-3 While operating this unit, keep hands on handles provided. Hands, arms and or legs must be kept well clear of the clamp jaws at all times while the unit is in operation or while it is connected to the air supply line.

17-1 CAUTION AND WARNING NOTES

17-2 Do not use hydraulic brake fluid or any fluid with alcohol base when refilling. Use only light weight petroleum base hydraulic fluid.

17-3 Never operate the unit at full pressure unless the clamps are in position on a tire rim, or damage may result to the unit.

SECTION III

OVERHAUL INSTRUCTIONS-PNEUDRAULIC PUMP

18-1 SPECIAL TOOLS

18-2 There are no special tools required for the overhaul of this equipment.

18-3 Disassemble the unit as follows, referring to Figure II.

18-4 PROCEED AS FOLLOWS:

a. Remove Connecting Hose (12).

b. Remove Relief Valve Assembly (31) and Swivel Coupler (12) Treadle (1) may now be removed.

c. Remove "V" Retaining Coupling (26). CAUTION: This Unit is under a moderate spring tension.

d. Remove Air Body Assembly (25).

e. Remove Spring (22) and Plunger (24).

f. Remove Plunger (24) from Air Body Assembly (25).

g. Remove Release Valve (6) and Ball (10).

h. Remove Hydraulic Cylinder Assembly (21) from Body (27).

i. Remove three Socket Head Cap Screws (2) and Body (27).

j. Separate Unitized Reservoir Assembly (37) from Body (27).

SECTION III (cont)

19-1 CLEANING

19-2 Wash parts with cleaning solvent, Federal Specification Number P-S-661 and dry thoroughly witha lint free cloth.

WARNING: Use solvent in a well ventilated area. Avoid any prolonged contact with the skin and inhalation of solvent vapors.

20-1 INSPECTION

20-2 Inspect all parts for damage, corrosion, and other faults.

21-1 REPLACEMENT

21-2 Damaged or defective parts must be replaced.

22-1 LUBRICATION PRIOP TO REASSEMBLY

22-2 Prior to reassebly, coat all seals with a light coat of grease or oil.

23-1 REASSEMBLY

23-2 Reassembly Pump Unit in reverse order of disassembly, and observe and torque requirements of components and fasteners. See Page 7

24-1 ADJUSTMENT OF RELIEF VALVE

24-2 Adjust Relief Valve (5) to relieve at 10,000 PSIG prior to placing Pump in service.

NOTE: Relief Valve (5) can only be adjusted upward. To re-adjust for a lower pressure, open Relief Valve and back-off Relief Screw, (not shown) then adjust up to the desired pressure.

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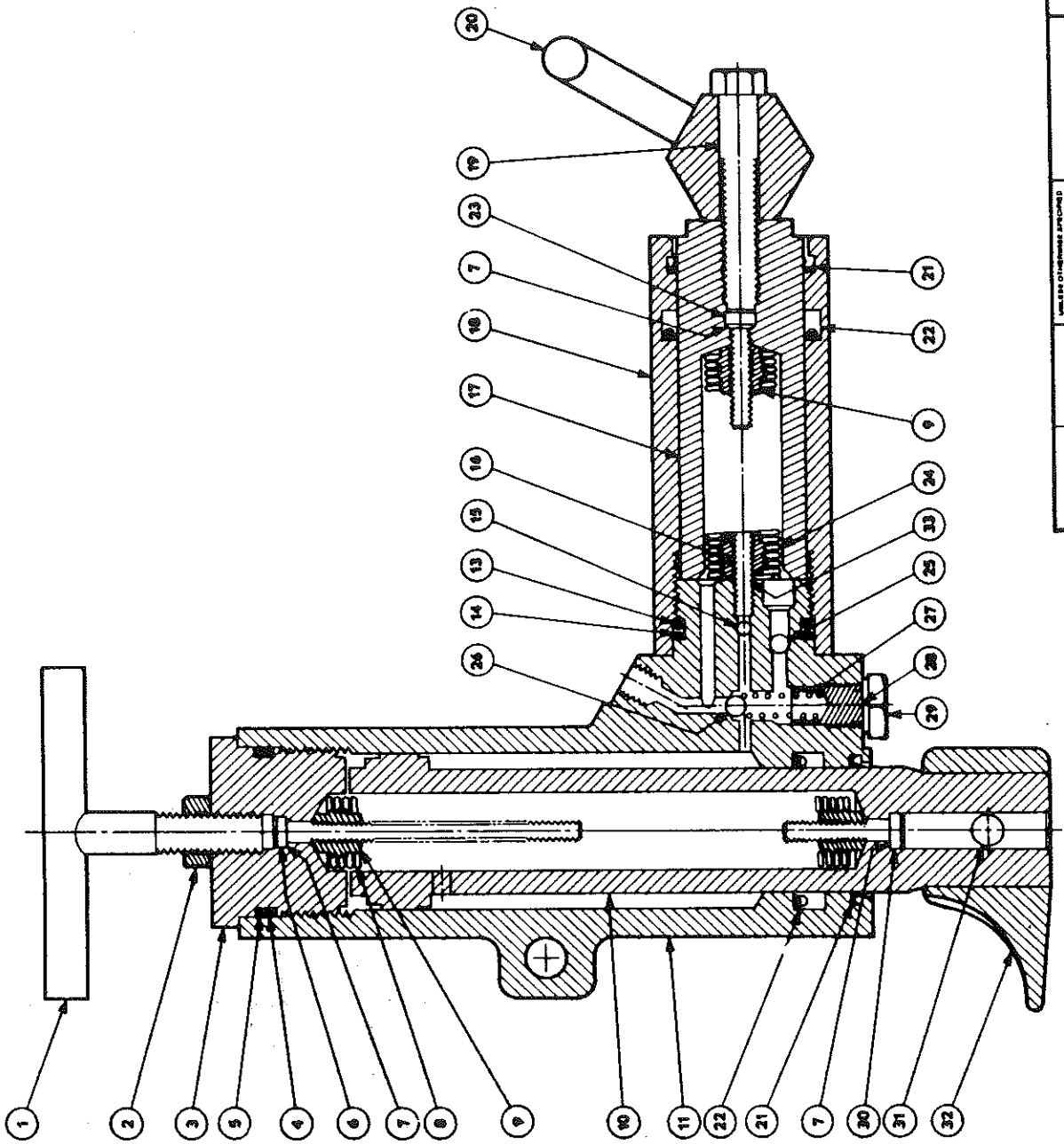
SECTION IV

FIGURE I



COLUMBUS JACK CORPORATION
COLUMBUS, OHIO

BEAD BREAKER

SIZE | CODE IDENT NO 00684 | DRAWING NO 792-C-1100 | SHEET 1 OF 2

SCALE

DRAWN
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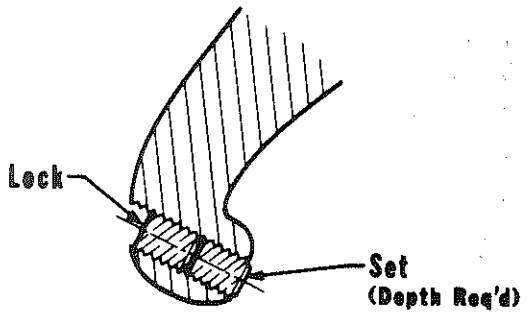


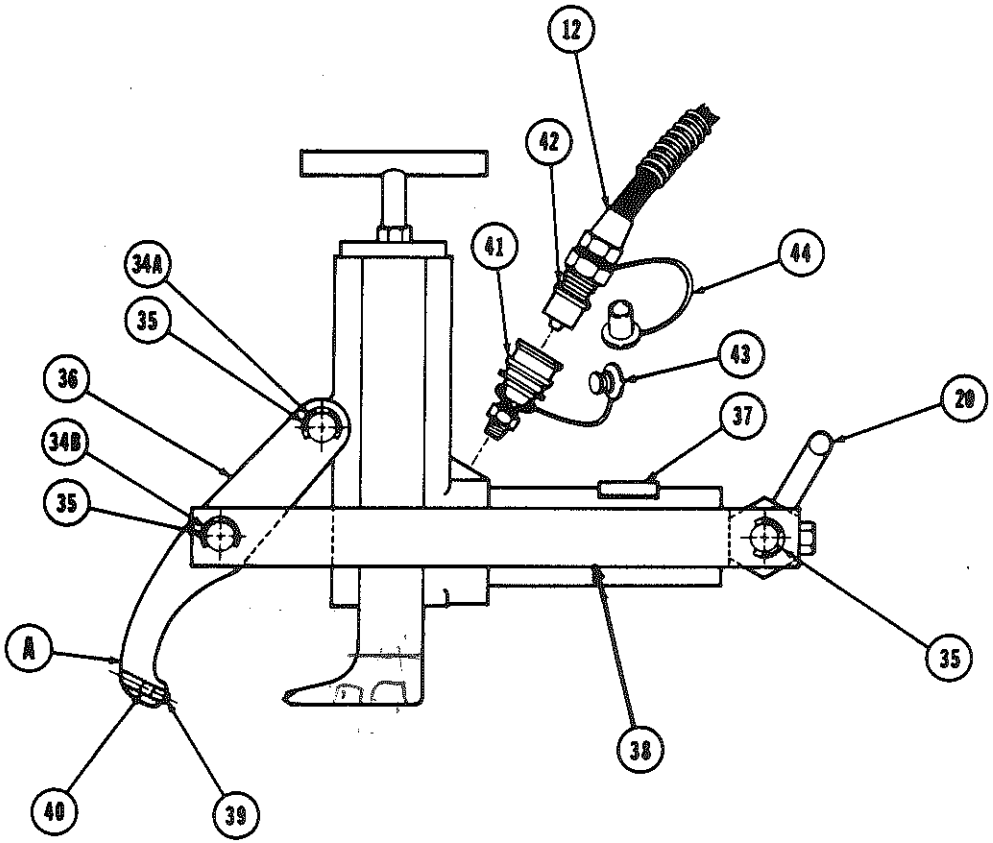
Detail (A)

Notice To User:

THE LENGTH OF SET-SCREW MAY BE ADJUSTED TO SUIT THE RIM CONFIGURATION FOR MAXIMUM GRIP.

WARNING

IF DEPTH OF SET-SCREW IS EXTENDED TOO FAR – DAMAGE TO RIM COULD RESULT.



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± ANGLES ± 3 PLACE DECIMAL ± 2 PLACE DECIMALS ±		COLUMBUS JACK CORPORATION COLUMBUS, OHIO	
				BEAD BREAKER	
NEXT ASSY	USED ON		DRAWN	SIZE	CODE IDENT NO 00994 / DRAWING NO 792-C-1100
APPLICATION			CHECKED	SCALE	SHEET
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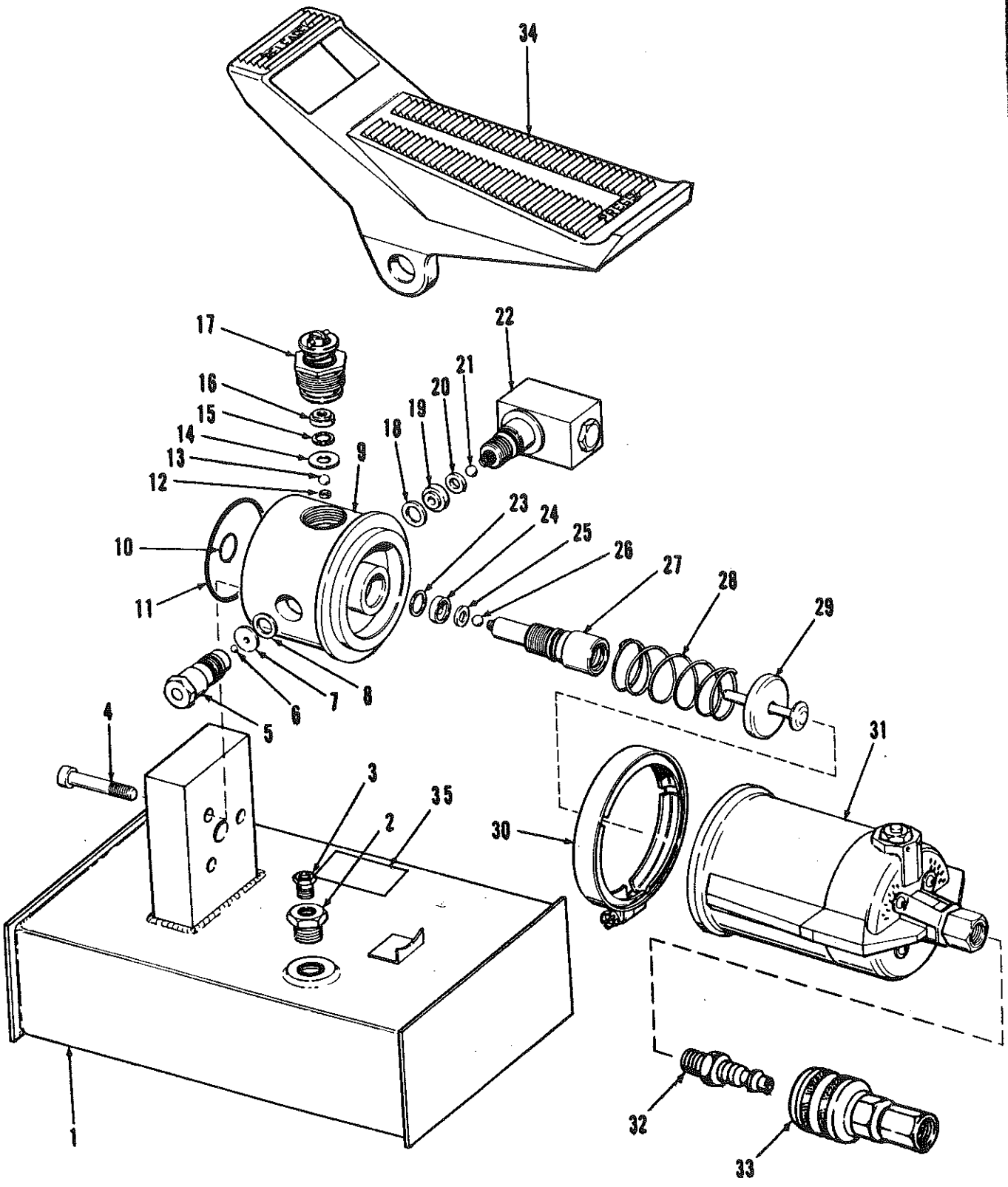
PARTS LIST
792C1100 BEAD BREAKER
(NSN - 4910-01-015-7667)

KEY	PART NUMBER	DESCRIPTION	QUANTITY REQUIRED
1	792A1101	Handle Top	1
2	792A1102	Lock Nut (1/2 - 13 NC)	1
3	792A1103A	Cap	1
4	792A1104	"O" Ring	1
5	792A1105	Back Up Ring	1
6	792A1106	Tension Screw (1/4 - 20 NC x 3 1/2 LG)	1
7	792A1107	Gasket	3
8	792A1108	Spring	1
9	792A1109	Spring Retainer	4
10	792A1110	Piston/Rod	1
11	792C1111	Body	1
12	792A1112A	Hose Assembly (84" LG)	1
13	792A1113	"O" Ring	1
14	792A1114	Back Up Ring	1
15	792A1115	Ball	1
16	792A1116	Tension Screw (1/4 x 20 NC x 1 LG)	1
17	792A1117	Ram	1
18	792A1118	Cylinder	1
19	792A1119	Ram Screw (7/16 - 14 NC x 2)	1
20	792A1120	Handle Rear	1
21	792A1121	Wiper	2
22	792A1122	Packing	2
23	792A1123	Tension Screw (1/4 - 20 NC x 1 3/4 LG)	1
24	792A1124	Spring	1
25	792A1125	Ball	1
26	792A1126	Ball	1
27	792A1127	Spring	1
28	792A1128	Gasket	1
29	792A1129	Valve Body	1
30	792A1130	Tension Screw (1/4 - 20 NC x 1 1/4 LG)	1
31	792A1131	Roll Pin	1
32	792A1132	Foot	1
33	792A1133	Spacer	1
34A	792A1134A	Pin	1
34B	792A1134B	Pin	1
35	792B1135	Retainer Ring	6
36	792B1136	Clamp	1
37	792A1137A	Identification Plate	1
38	792A1138	Tie Bar	2
39	792A1139	Set Screw (3/8 - 18 NC x 3/8)	1
40	792A1140	Set Screw (3/8 - 18 NC x 3/8)	1
41	792A1141	Socket, Quick Disconnect	1
42	792A1142	Plug, Quick Disconnect	1
43	792A1143	Dust Cap, Socket	1
44	792A1144	Dust Cap, Plug	1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SECTION IV

PARTS LIST

792A1801 POWER UNIT

KEY	PART NUMBER	DESCRIPTION	QUANTITY REQUIRED
1	792A1801	Reservoir	1
2	792A1802	Vent Adapter	1
3	792A1803	Vent	1
4	792A1804	Screw	3
5	792A1805	Relief Valve	1
6	792A1806	Ball	1
7	792A1807	Ball Seat	1
8	792A1808	Gasket	1
9	792A1809	Body	1
10	792A1810	"O" Ring	1
11	792A1811	"O" Ring	1
12	792A1812	Spring Pellet	1
13	792A1813	Ball 7/32"	1
14	792A1814	Gasket	1
15	792A1815	Gasket	1
16	792A1816	Ball Seat	1
17	792A1817	Release Valve	1
18	792A1818	Gasket	1
19	792A1819	Ball Seat	1
20	792A1820	Ball Guide	1
21	792A1821	Ball 1/4"	1
22	792A1822	Swivel Coupler	1
23	792A1823	Gasket	1
24	792A1824	Ball Seat	1
25	792A1825	Ball Guide	1
26	792A1826	Ball 7/32"	1
27	792A1827	Hydraulic Cylinder	1
28	792A1828	Spring	1
29	792A1829	Piston & Plunger	1
30	792A1830	Retainer Coupling	1
31	792A1831	Air Body	1
32	792A1832	Air Disconnect Plug	1
33	792A1833	Air Disconnect Coupling	1
34	792A1834	Treadle	1
35	792A1835	Caution Label	1

OIL RECOMMENDATIONS FOR HYDRAULIC BEAD BREAKER P/N 792C1100 (NSN: 4910-01-015-7667)

A. CAUTION: Do not use hydraulic brake fluid.

B. Use only lightweight petroleum base hydraulic fluid.

C. Minimum viscosity index of 90.
Viscosity @ 100°F - 210-300 SSU maximum.

The following is a list of suggested hydraulic fluids of similar viscosities and specifications. We recommend that either of the following fluids be used in our product:

MANUFACTURER	TRADE NAME
Cities-Service Oil Company	Pacemaker T-300
C. H. Clark Oil Company	Seal Gull-HSM-No. 7
Continental Oil Company	Dectol Medium
Continental Oil Company	Turbine Oil Medium
Franklin Oil and Gas Company	Franklin 6X Hydraulic Oil
Gulf Oil Company	Gulf Crest Oil "C"
Gulf Oil Company	Gulf Harmony "C"
E. F. Houghton and Company	Hydro-Drive MIL-20
Kendall Refining Company	Industrial 41-AA
[illegible]briseal Lubricant Specialties	Lubriseal 117-Hydraulic Oil
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Pure Oil Company	Puropale RX Heavy Medium
Pure Oil Company	Puropale Heavy Medium
Shell Oil Company	Tellus 33
Shell Oil Company	Vitrea 33
Sinclair	Rubilene Oil Light Medium
Sinclair	Duro 300
Socony-Vacuum Oil Company	DTE Heavy Medium
Standard Oil Company of California	Calol O C Turbine Oil 15
Standard Oil Company of Indiana	Stanoil 31
Standard Oil Company of New Jersey	Esso Fleet 20-W
Standard Oil Company of New Jersey	Teresso 52 - or Esstex #45
Standard Oil Company of New Jersey	Teresso 56 - or Esstic #5
Standard Oil Company of Ohio	Sohivis-52
Standard Oil Company of Ohio	Sohio Turbine Heavy Medium
Sun Oil Company	Sunvig 931
[illegible] Oil Company	Sunvix 31
[illegible] Finch Company	SAF-Dirve C-20
Texas Company	Texaco Regal Oil PC (R&O)
Texas Company	Texaco Regal Oil PC
Tide Water Associated Oil Company	Tycol Aturbrio 60