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Spokane Washington

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600 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 600-05

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PARTS, OPERATION AND MAINTENANCE
MODEL NUMBER BOW 600-05

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1.0 INTRODUCTION

- 1.1 To obtain optimum benefit from your fuel bowser unit, it is recommended that all personnel operating it read and understand this manual prior to operation.
- 1.2 Upon receipt of the Bowser unit, a visual inspection should be made to determine that it is complete and has not sustained any damage during transportation.

1.3 Leading Particulars
Table 1.3

Volume	660 Gallons
Length (Tow bar extended)	199.5 Inches
(Tow bar raised)	139.5 Inches
Width	79.5 Inches
Height	55 Inches
Weight empty	1735 LBS.
Environmental conditions	
Operating temperature range	-40 F to +125 F
Vacuum pump capability (suction inlet blocked) . 16 in. Hg.	
Flow (no restriction)	120 scfm
Compressed air required	60cfm at 100psi
Vacuum chamber capacity	25 gallons
Vacuum hose	
Length	50 Feet
Inside diameter	1-1/4 Inches
Telescoping funnel	
Maximum height	16 Feet
Minimum height	55 Inches
Remote drain funnel	
Maximum height	49 Inches
Minimum height	20 Inches
Tire size 20.5x8.00-10	
Inflation pressure	65 PSI cold
Maximum towing speed (forward only)	15 mph
Note: do not back bowser using tow vehicle	

2.0 SAFETY

General Precautions

The following are general safety precautions that are not necessarily related to a specific procedure and therefore may not appear elsewhere in this manual. These are general safety precautions and instructions that personnel must understand and apply during many phases of operation and maintenance to ensure personal safety and health and the protection of Air Force property

2.1 Potential Fire Or Explosion

2.1.1 Due to the nature of fuel, care should be exercised to eliminate all sparks and open flame in the area of the fuel bowser.

2.1.2 A 50 foot radius area around the fuel bowser for no smoking, sparks, or open flames is usually a good practice. It is strongly recommended all local or other regulations such as Military T.O 00-25-172 be consulted for further restrictions.

2.1.3 Bowser should be drained prior to performing any maintenance to the tank.

2.2 Telescoping Drain

2.2.1 Care should be exercised in using the telescope to prevent injury to fingers, by pinching them between clamps and dropping sections.

2.2.2 If high wind conditions exist, do not extend telescoping funnel.

2.3 Grounding

2.3.1 To eliminate static sparks, the bowser unit is equipped with two grounding reels which should be connected prior to draining or filling operations.

2.4 Towing

2.4.1 Make sure the tow bar is securely attached to the towing vehicle.

2.4.2 Before moving the bowser unit, check to assure the parking brake is released.

2.4.3 Maximum allowable towing speed is 15 MPH.

Finger rings have caused many serious injuries. Remove rings, watches and other metallic objects which may cause shock or burn hazards. Unless specifically allowed by shop safety procedures, remove finger rings during all maintenance activity.

2.7 other safety 2.7.1 Finger rings/jewelry

Personnel Protective Equipment (PPE) If unique local conditions make compliance with the protective clothing or other occupational health requirements specified in this manual unnecessary or impractical, obtain an evaluation of the operation from the bioenvironmental engineer. The environmental engineer and the base safety officer will determine the required precautions.

2.6.4

Confined space/crawlspace Personnel that work within a confined space that by design has limited openings for entry and exit, has unfavorable natural ventilation, not intended primarily for human occupancy, or contains other recognized safety hazards shall comply with the requirements of AFOSH Std 127-25 "Confined spaces". An AF form 1024, "Confined spaces entry permit" will be processed with the local safety, health, and fire prevention offices prior to entering the space.

2.6.3

Internal inspection will be necessary to insure structural integrity and cleanliness. Inspection of tires, undercarriage, tow bar, vent, valves, hoses, sump strainer, sight gauge, reflectors, safety labels, etc., should be carried out in accordance with local maintenance policies and or applicable Air Force directives.

2.6.1

2.6 Inspections

Parking brake must be applied when filling and draining or when left unattended.

2.5.1

2.5 Parking

- 2.7.2 Cleaners/chemicals/paints/primers
Some cleaners, chemicals, paints and primers have adverse effects on skin, eyes, and the respiratory tract. Observe manufacturer's warning labels. Material Safety Data Sheets (MSDS) instructions for proper handling, storage, and disposal, and current safety directives. Use only in authorized areas. Unless otherwise indicates in the text, use as described in this manual should not result in any immediate health concerns. Consult the local bioenvironmental engineer and base safety officer for specific protection equipment and ventilation requirements.
- 2.7.3 Do not service or adjust alone
Do not attempt internal service or adjustment of equipment unless another person capable of rendering air and resuscitation is present.
- 2.7.4 Lifting/handling
Use adequate number of personnel or appropriately rated lifting and handling devices to move equipment.

3.0 OPERATION

3.1 Intended Use

- 3.1.1 The fuel bowser unit is intended for use in draining and collection of fuel from aircraft and the transportation to a disposal site. Any other use is prohibited and may void any and all warranties.

3.2 Parking Brake

- 3.2.1 The bowser unit is equipped with a mechanically operated parking brake. The brake should be applied prior to disengaging tow bar. The brake should be applied when filling, or draining tank, or whenever the unit is left unattended.

3.3 Towing

- 3.3.1 The bowser unit is equipped with steerable front wheels controlled by the tow bar.

3.3.2 Caution

Do not back bowser using a tow vehicle because it can jackknife causing damage to towbar and or undercarriage.

3.3.3 Tire inflation should be checked and maintained as described in the maintenance section.

3.3.4 Before towing, check to see the brake is disengaged, grounding reel and hoses are disconnected, valves are closed, tow bar is securely attached to the towing vehicle, telescoping drain is collapsed, and all manways and covers are closed and latched.

3.3.5 The bowser unit is equipped with a tow bar latch to hold it in the upright position.

3.4 Telescoping Drain Assembly (See section 5.5)

3.4.1 Intended use

The fuel bowser is equipped with a telescoping drain assembly, which is used to drain fuel from low point fuel ports. Funnel is equipped with a nitrile rubber seal (#2) around the top edge to allow placement against the underside of a wing.

3.4.2 To Raise:

- (1) Open protective cover (See section 5.3)
- (2) Loosen top clamp if necessary.(See section-5.5 item #7)
- (3) Grasp top section (#1) with one hand and lift until the top clamp (#3) raises approximately six inches.
- (4) Tighten clamp securely with the other hand.
- (5) Reposition lifting hand by grasping tube below tightened clamp and lift until next clamp is raised approximately 6 inches.
- (6) Repeat steps 1-4 until desired height is obtained or assembly is fully extended.

3.4.3 To Lower:

- (1) Tightly grasp bottom extended tube(#13) with one hand and loosen the securing clamp(#23).
- (2) Slowly lower tube, hand over hand, until the following clamp is resting on the loosed clamp.
- (3) Repeat steps 1 and 2 until all sections are lowered

3.4.4 When not in use, telescope should be collapsed and the protective cover closed to eliminate contamination

3.5 Vacuum Assembly (See section 5.6)

3.5.1 This assembly is equipped with an air powered vacuum generator (#14 thru 21)

3.5.2 It is intended for vacuum draining or depuddling fuel and condensation. Caution! If other objects such as rock or metallic pieces are vacuumed into the vacuum chamber, they may create a hazard due to sparks.

3.5.3 Vacuum is started by attaching a air hose (recommended air supply of 60CFM at 100 PSI) to the quick disconnect (#38) and turning on the air supply valve.(#19) Position vacuum hose (#30) for depuddeling operation and open valve (#26)

3.5.4 The vacuum chamber is equipped with an automatic drain valve (#12) that opens whenever vacuum is eliminated in the chamber. This valve opens directly into the main tank.

3.5.5 The vacuum generator is equipped with an automatic overflow protector (#36) When the level of product is full, the overflow protector shuts off and eliminates the vacuum. The vacuum chamber will then automatically drain. The air supply valve (#19) must be shut off to reset the overflow protector Vacuuming may then continue.

- 3.5.6 The vacuum assembly is supplied with 50 feet of vacuum hose (#30) and a ball valve (#26) on the vacuum suction.
- 3.6 Grounding Reels (See section 5.7)
 - 3.6.1 The bowser unit is supplied with two grounding reels.
 - 3.6.2 Before filling, draining, or vacuuming, the grounding reels must be attached to the aircraft or object being serviced and an appropriate ground.
- 3.7 Drain Valves (See section 5.7)
 - 3.7.1 The bowser unit is equipped with a 1-1/2" NPT ball valve(#15) with a camlock connector(#16).
- 3.8 Sample Port (See section 5.7)
 - 3.8.1 The bowser unit is equipped with a 1/2" NPT valve for use as a sample port(#7).
- 3.9 Sump Drain Strainer (See section 5.5.1)
 - 3.9.1 The bowser unit is equipped with a sump with removable bottom to allow cleaning of the drain strainer(#14).
- 3.10 Vent Overflow Preventor (See section 5.8)
 - 3.10.1 The bowser unit is equipped with a float(#1) actuated seal(#2) to prevent fuel from flowing out the vent in the event the bowser is overfilled.
- 3.11 Remote drain funnel (See section 5.9)
 - 3.11.1 The bowser unit is equipped with a remote drain funnel that is intended to be used to collect fuel from low point fuel ports that are too low to use the standard telescoping drain.

3.11.2 To Raise:

- (1) Open protective cover(#11)
- (2) Loosen top clamp if necessary(#9)
- (3) Grasp top section(#7) with one hand and lift until the top clamp(#9) raises approximately six inches.
- (4) Reposition lifting hand by grasping tube section below the tightened clamp and lift until the next clamp is raised approximately six inches.
- (5) Repeat steps 1-4 until desired height is obtained or assembly is fully extended.

3.11.3 To Lower:

- (1) Tightly grasp bottom extended tube(#6) with one hand and loosen the securing clamp(#9).
- (2) Slowly lower tube(#6), hand over hand, until the following clamp is resting on the loosed clamp.
- (3) Repeat steps 1 and 2 until all sections are lowered.

3.11.4 When not in use, telescope should be collapsed and the cover closed to eliminate contamination

4.0 MAINTENANCE

4.1 Parking Brake (see section 5.2.3)

4.1.1 The bowser unit is equipped with a parking brake assembly consisting of a 7" diameter brake drum with 2-1/4" wide brake shoes.

4.1.2 The shoes are activated via a mechanical linkage, eccentric and lever.

4.1.3 Adjustment may be necessary as the shoes wear.

- (1) Tightening is accomplished by removing the bolt through one yoke and screwing yoke in to shorten connecting rod.
- (2) Do not over tighten or brakes may drag when released.

4.1.4 Replacement of shoes.

- (1) Remove wheel.
- (2) Remove nut retaining hub and drum assembly.
- (3) Disconnect actuating rod.
- (4) Remove shoe retainers.
- (5) Install new shoes.
- (6) Replace shoe retainers.
- (7) Adjust actuator rod length.
- (8) Replace wheel.

4.2 Under Carriage and Tow Bar (see section 5.2.1)

4.2.1 The bowser unit is equipped with steerable front wheels, fixed rear wheels, and a tow bar.

4.2.2 Maintenance should consist of the following:
Note:(King pin bushing, turning bushings and tie rod ends are self lubricating and need no additional maintenance).
Inspect entire unit in accordance with
35-1-226 WC-1

4.2.3 If excessive front tire wear or poor steering response is noticed, the front end probably needs a alignment.
The proper tow setting is 1/8" in toward the front of the unit.

4.3 Telescoping Drain Assembly (see section 5.5)

4.3.1 The telescoping Drain Assembly consists of stainless steel housing 4 1/2" in diameter permanently attached to the tank and five aluminum tube sections.

4.3.2 The stainless tube and four largest aluminum tubes are equipped with a clamp assembly.

4.3.4 Each aluminum tube is crimped on the lower end which acts as a stop to prevent the tube from sliding through the clamp.

4.3.5 Disassembling of the telescope assembly is accomplished by rotating the four sections 180 degrees from normal position and gently lifting each section so that the crimped edge on the tube is aligned with the slot on the clamp.

4.4 Vacuum Assembly (see section 5.6)

4.4.1 The vacuum assembly consists of a vacuum chamber with an air powered vacuum generator mounted on a removable cover. The cover is held in place by three latches.

4.4.2 The vacuum chamber is equipped with an automatic drain valve (12) located at the bottom of the vacuum chamber underneath. This valve is preset at the factory and should not need further adjustment, however the gasket (2) may be replaced if needed.

4.4.2.1 Gasket replacement:

Removal:

- 1) Drain bowser.
- 2) Remove bolt (3) and nut (6) by reaching down thru the manway.
- 3) Remove drain valve (12) from tank.
- 4) Replace gasket as needed.
- 5) Reinstall in the reverse of the above steps.

4.4.3 The vacuum cover is equipped with an overflow valve (36) which should require no maintenance. However the gasket (8) may be replaced if needed

4.4.3.1 Gasket replacement:

Removal:

- 1) Drain bowser.
- 2) Release the three latches holding vacuum cover down.
- 3) Remove vacuum cover off the bowser.
- 4) Replace gasket as needed.
- 5) Reinstall in the reverse of the above steps.

4.4.4 The vacuum generator is attached to the chamber cover. It is equipped with an exhaust silencer (14) which should be cleaned at six (6) month intervals or more often depending on the amount of use and conditions. Clean silencer in mild soap and water solution and let air dry prior to reinstallation.

4.4.5 The vacuum hose (30) should be replaced if any sudden loss of vacuum suction occurs and or any cracks, leaks are visible.

4.4.6 The cover gasket (13) should be replaced if deterioration has occurred, by removing cover (32) replacing gasket and reinstalling cover.

4.5 Grounding Reels

4.5.1 Grounding reel should be maintained in accordance to 35-1-266WC-1 and local procedures.

4.7 Sump Drain Strainer (see section 5.5.1)

4.7.1 Sump drain strainer is located on the bottom of the stainless steel drain housing.

4.7.2 Removal:

- (1) Removal is accomplished by loosening the wing nut on the clamp holding the base of the sump. WARNING! Check interior to assure fuel has been thoroughly drained before loosening wing nut.
- (2) Remove clamp and cover (1)
- (3) Loosen clamp holding screen(14) to stainless steel drain housing and pull screen down.
- (4) Reinstall in reverse order of above steps.

4.8 Vent Overflow Preventor (see section 5.8)

4.8.1 The vent overflow preventor is located inside the tank directly under the vent, and has a replaceable float and gasket.

4.8.2 Removal:

- (1) Drain bowser
- (2) Reach inside of manway and locate vent overflow directly under the exterior of the vent.
- (3) Compress cage (5) until it disengages from mounting tabs and remove from tank.
- (4) Remove float and gasket and replace as needed.
- (5) Reinstall in the reverse order of the above steps.

4.10 TROUBLE SHOOTING

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>PROBABLE CORRECTIONS</u>
Bowser does not track or steer correctly or steers loosely	Bent King Pin housing see section 5.2.1 Item #6	Replace King Pin housing
	Defective Tie Rod End see section 5.2.1 Item #12	Replace Tie Rod End
	Loose or worn out Bushings, see section 5.2.1 Items #11,16 or 18	Replace as needed
	Alignment incorrect See section 4.2.3	Adjust as needed
Toe Bar does not stay in the upright position	Broken or stretched spring see section 5.2.1 Item #26	Replace as needed
Parking Brake does not work	Need adjustment	Adjust as per instructions in section 4.1.3
	Needs repairing see section 5.2.3	Replace as needed
Vacuum System will not depuddle	Defective lower drain stop gasket, see section 4.4.2.1 Item #2	Replace as needed
	Not enough air pressure to operate vacuum generator, see section 3.5.3	Increase air pressure and volume
	Plugged outlet Filter see section 4.4.4	Replace or clean as required
	Defective lid gasket See section 4.4.6 Suction hose leaking See section 4.4.5	
Fuel misting is occurring through vacuum generator	Bowser tank is too full	Empty main Bowser tank
	Overflow stop gasket needs replacing See section 4.4.3	Replace or adjust as needed

<u>SYMPTOM</u>	<u>PROBABLE CAUSE</u>	<u>PROBABLE CORRECTIONS</u>
Telescoping Drain won,t stay up	Loose clamp handles	Retighten handles
Telescoping Drain is over flowing	Bowser tank is full	Empty main Bowser tank
	Clogged sump screen or strainer, see section 4.7.	Remove and clean as required
Fuel will not drain	Cloged screen	Remove and clean as required
	Cloged overflow vent	

5.0 REPLACEMENT PARTS

This section provides information for identification of parts for ordering. To order, it is important to have the Model Number, Subassembly Number, Part Number and Description. Parts may be ordered by calling or writing to:

SPOKANE METAL PRODUCTS
P.O. Box 3303
Spokane, WA 99220-3303
Telephone: (509)928-0720
Tele Fax:(509)927-0826

MANUFACTURE DIRECTORY

COAST IND.
15959 PLUMA AVE.
CERRITOS, CA. 90701
FSCM 1N109

SCHRADER AUTOMOTIVE INC.
566 MAINSTREAM DRIVE
P.O. BOX 675
NASHVILLE, TENNESSEE 37202-0675
FSCM 27783

ALINABAL
28 WOODMONT ROAD
MILFORD, CONNECTICUT 06460
FSCM 31633

LINCOLN, A PENTAIR CO.
ONE LINCOLN WAY
ST. LOUIS, MO 63120
FSCM 36251

PT COUPLING COMPANY INC.
P.O. BOX 3909
ENID, OK. 73702-3909
FSCM 33813

McMASTER CARR
P.O. BOX 54960
LOS ANGELES, CA 90054
FSCM 3A054

CARDINAL INDUSTRIAL PRODUCTS
3873 W. QUENDO
LOS VEGAS, NV. 89118
FSCM 57454

APOLLO BALL VALVE DIVISION
CONBRACO INDUSTRIES, INC.
P.O. BOX 125
PAGELAND, SC 29728
FSCM 57661

AMETEK
U.S. GAUGE DIVISION/
HUNTER SPRING PRODUCTS
SELLERSVILLE, PA 18960
FSCM 61349

SPOKANE METAL PRODUCTS
P.O. BOX 3303
BLD. 4 SPOKANE INDUSTRIAL PARK
SPOKANE, WA 99220
FSCM 66144

BUNTING BEARINGS CORP.
1001 HOLLAND PARK BLVD
P.O. DRAWER 729
HOLLAND, OH 43528
FSCM 71366

CHICAGO HD
9100 PARK AVE.
FRANKLIN PARK, IL. 60131
FSCM 71747

DIXON VALVE AND COUPLING CO.
800 HIGH ST.
CHESTERTOWN, MD. 21620
FSCM 76621

A F C
COSGROVE INDUSTRIAL PARK
BRANFORD, CT. 06405
FSCM 7R846

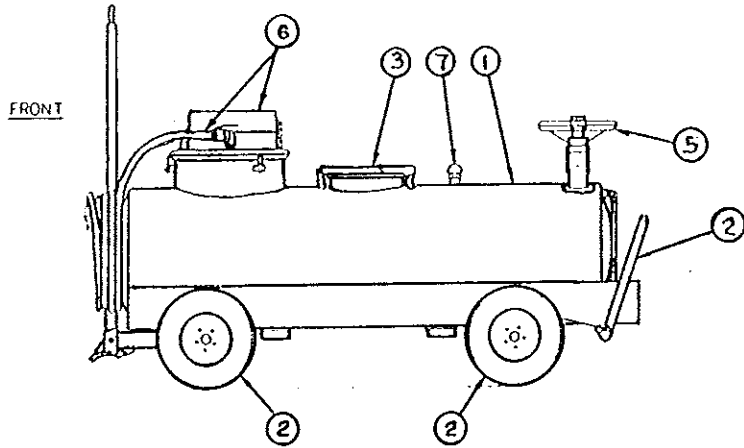
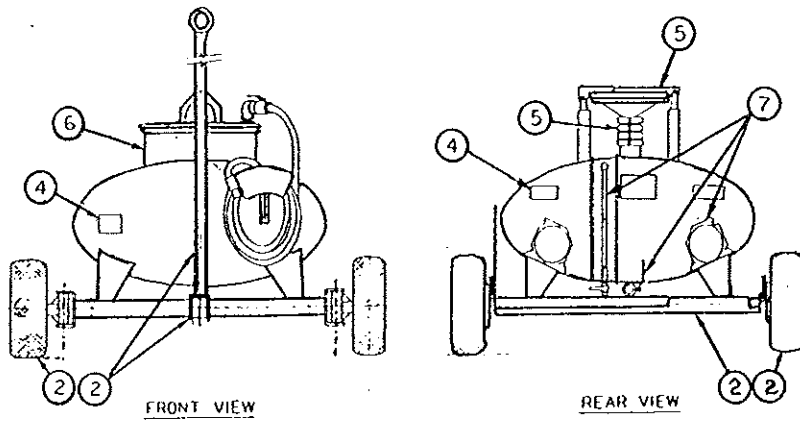
MAC LEAN/FOGG CO.
P.O. BOX 91396
CHICAGO, IL. 60693
FSCM 82465

KNAPPCO
9304 MATTOX RD.
KANSAS CITY, MISSOURI 64150
FSCM 91840

COOPER INDUSTRIES
COOPER HAND TOOL DIVISION
1000 LULKIN RD.
P.O. BOX 728
APEX, NC. 27502-0728
FSCM 96508

BINDER METAL
P.O. BOX 2306
GARDENA, CA. 90248
FSCM 0BJ40

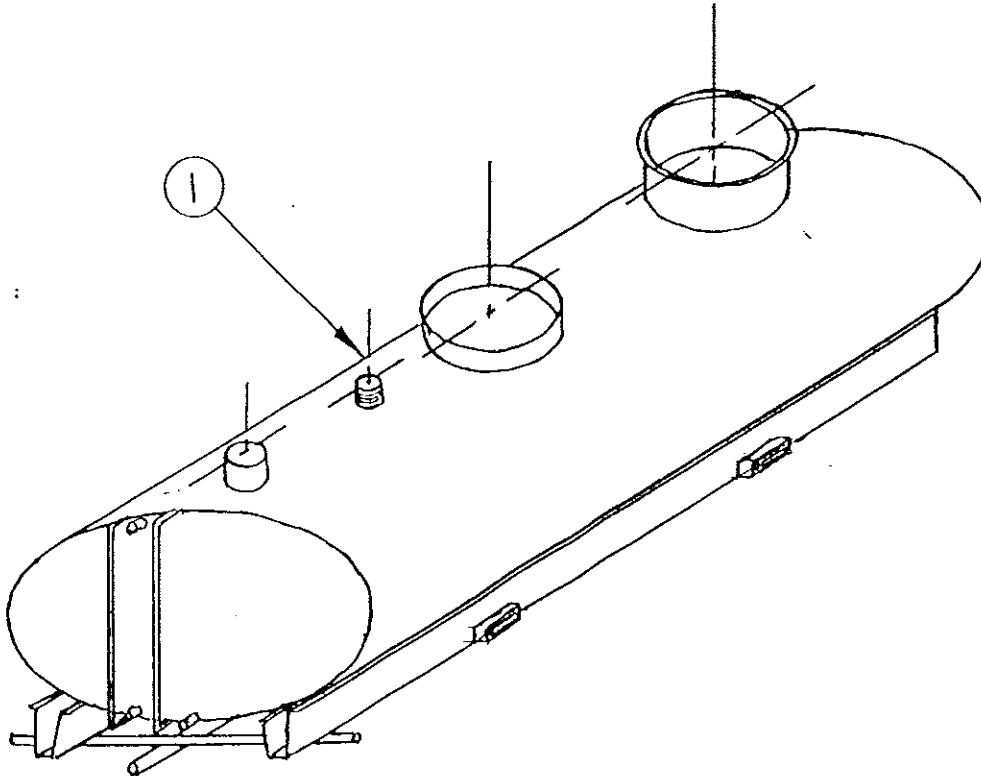
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<u>Item No.</u>		<u>Section</u>
1	Main Tank	5.1
2	Axle, Front	5.2.1
2	Axle, Rear	5.2.2
2	Brake, Parking	5.2.3
2	Wheel Assembly, Front	5.2.4
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SECTION 5.1



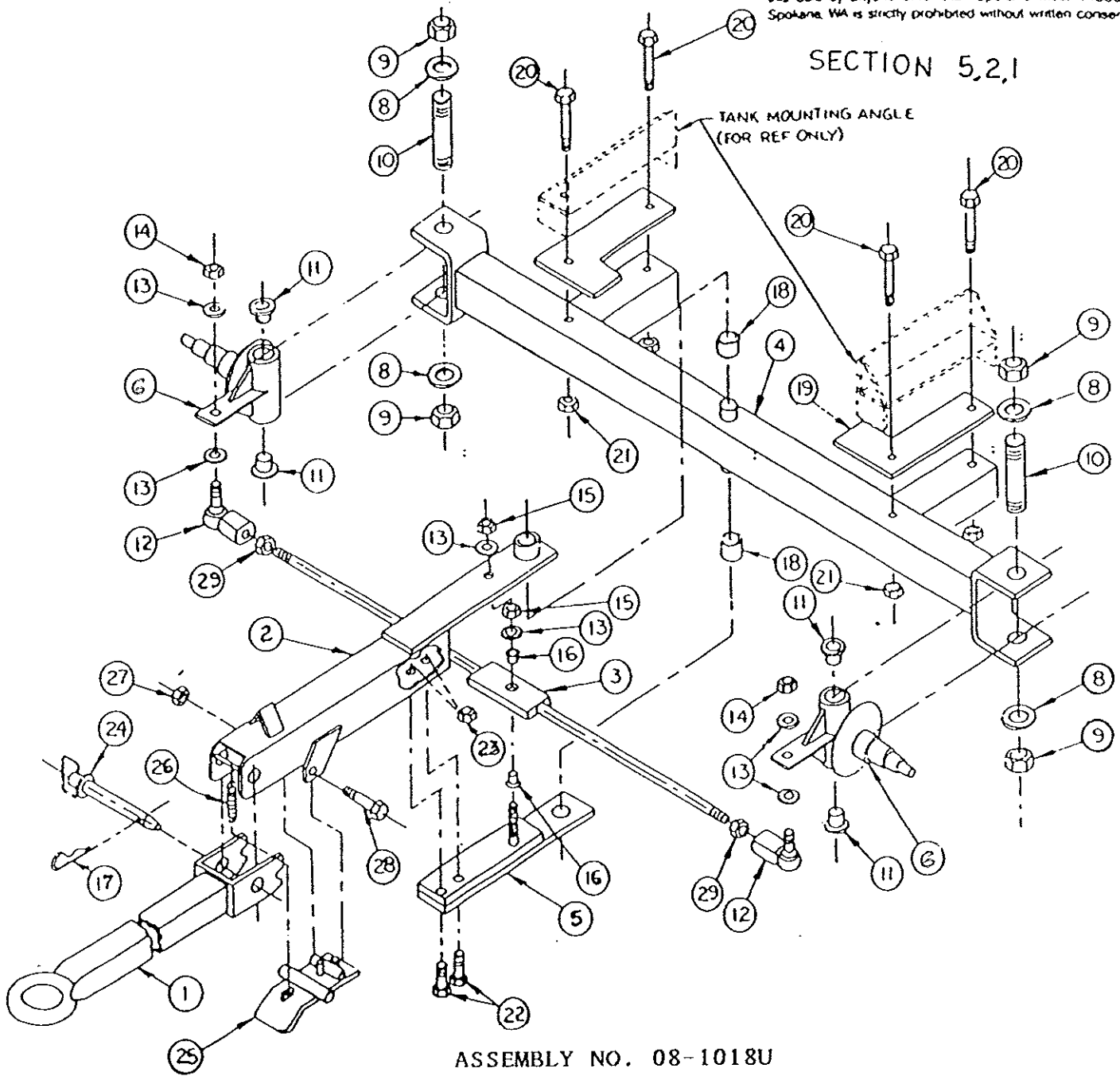
ASSEMBLY NO. 08-11009

MAJOR ASSEMBLY - TANK WELDMENT

Item No.	Part No.	Cage code	Description	Qty per Assy	Usable on code	SMR code
1	08-11009	66144	Tank weldment	1		XB

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SECTION 5,2,1



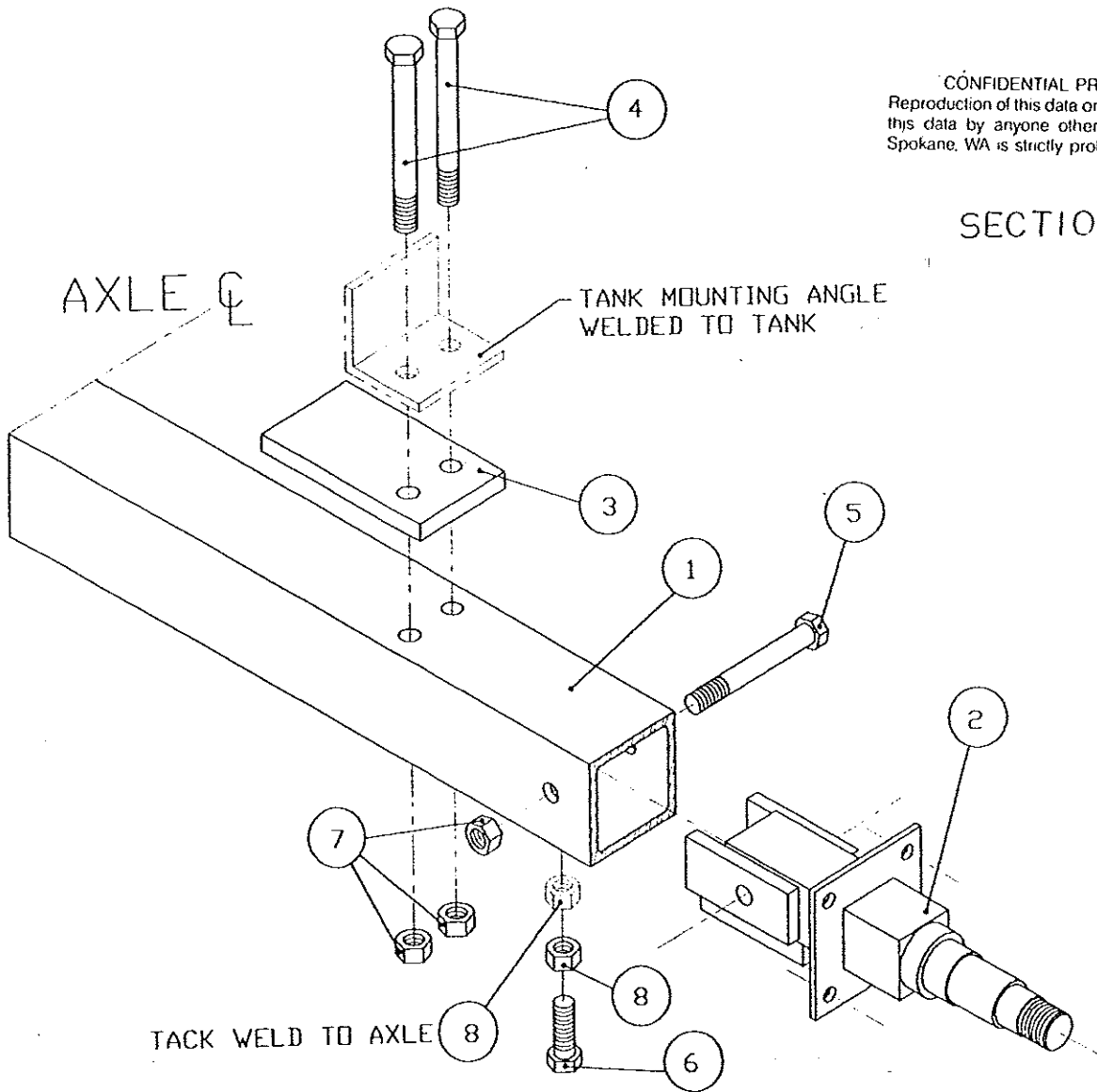
ASSEMBLY NO. 08-1018U

MAJOR ASSEMBLY - AXLE ASSEMBLY

Item No.	Part No.	Cage code	Description 1234	Qty per Assy	Usable on code	SMR code
0	08-1018U	66144	.Undercarriage,front	1		XB
1	07-1103	66144	..Bar,Tow	1		PAFZZN
2	07-1104	66144	..Arm,Steering	1		XB
3	07-1005	66144	..Rod,Tie	1		PAFZZN
4	07-1107	66144	..Axle,Front	1		PAFZZN
5	07-1016	66144	..Plate, Lower	1		XB
6	07-1009	66144	..Housing,King Pin	2		XB
7						
8	MS27183-31	96906	...Washer, Flat	4		PAFZZN
9	MS51922-86	96906	...Nut, Self Locking	4		PAFZZN
10	05-1010	66144	...Pin, King	2		XB
11	FFB242812	71366	...Flange Bearing	4		PAFZZN
12	VF-12-G	31633	...Ball Joint	2		PAFZZN
13	3/4Flat,ZP	OBJ40	...Washer, Flat, 3/4	5		PAFZZN
14	MS51943-46	96906	...Nut, 3/4 UNF,lock	3		PAFZZN
15						
16	FF101102	71366	...Flange Bearing	2		PAFZZN
17	3/16Cotter	57454	...Pin, Cotter,3/16ZP	1		PAFZZN
18	AA1704-15	70417	...Bearing, Sleeve	2		PAFZZN
19	06-1023	66144	...Pad,Mounting,Front	2		PAFZZN
20	1/2UNCx5	57454	...Bolt,1/2x5,ZP,CS	4		PAFZZN
21	1/2UNC,NUT	57454	...Nut,1/2UNC,Nylock	4		PAFZZN
22	1/2UNCx1.75	57454	...Bolt,1/2x1.75ZP,CS	2		PAFZZN
23	1/2UNC,NUT	57454	...Nut,1/2UNC,Nylock	2		PAFZZN
24	1x4.5,ZP	57454	...Pin,Hitch,1x4.5,ZP	1		PAFZZN
25	07-1020	66144	..Latch,Tow	1		XB
26	9628K5	3A054	...Spring,Helical,Ext	1		PAFZZN
27	5/16UNC,NUT	82465	...Nut,5/16UNC,Nylock	1		PAFZZN
28	5/16UNCx4.5	57454	...Bolt,5/16UNCx4.5,ZP	1		PAFZZN
29	MS51922-61	96906	...Nut,selflocking,Hex	2		PAFZZN

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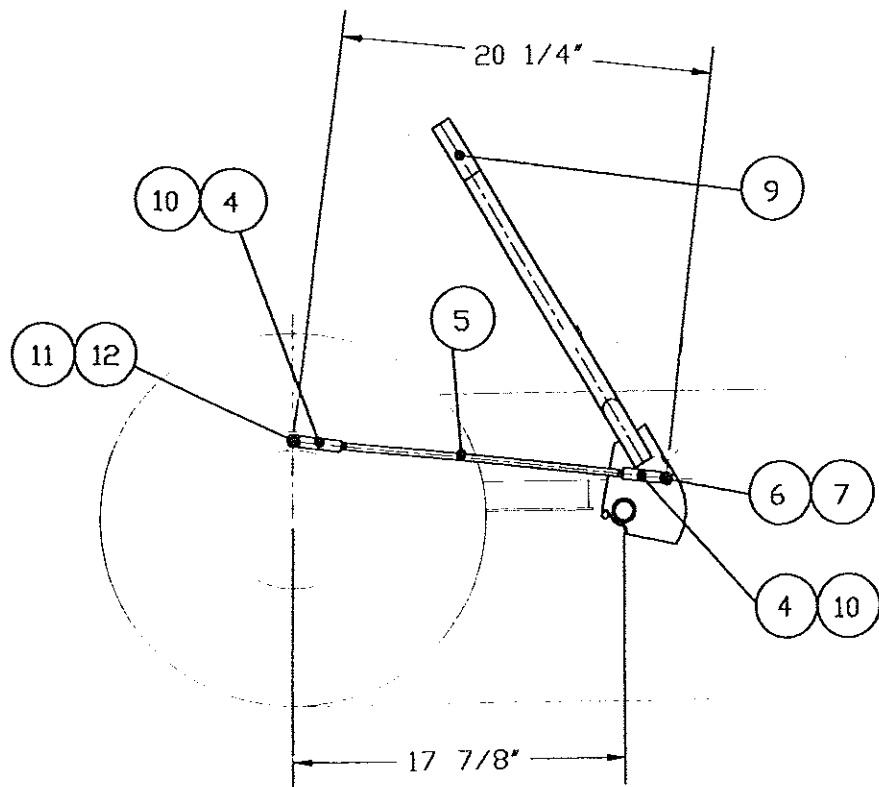
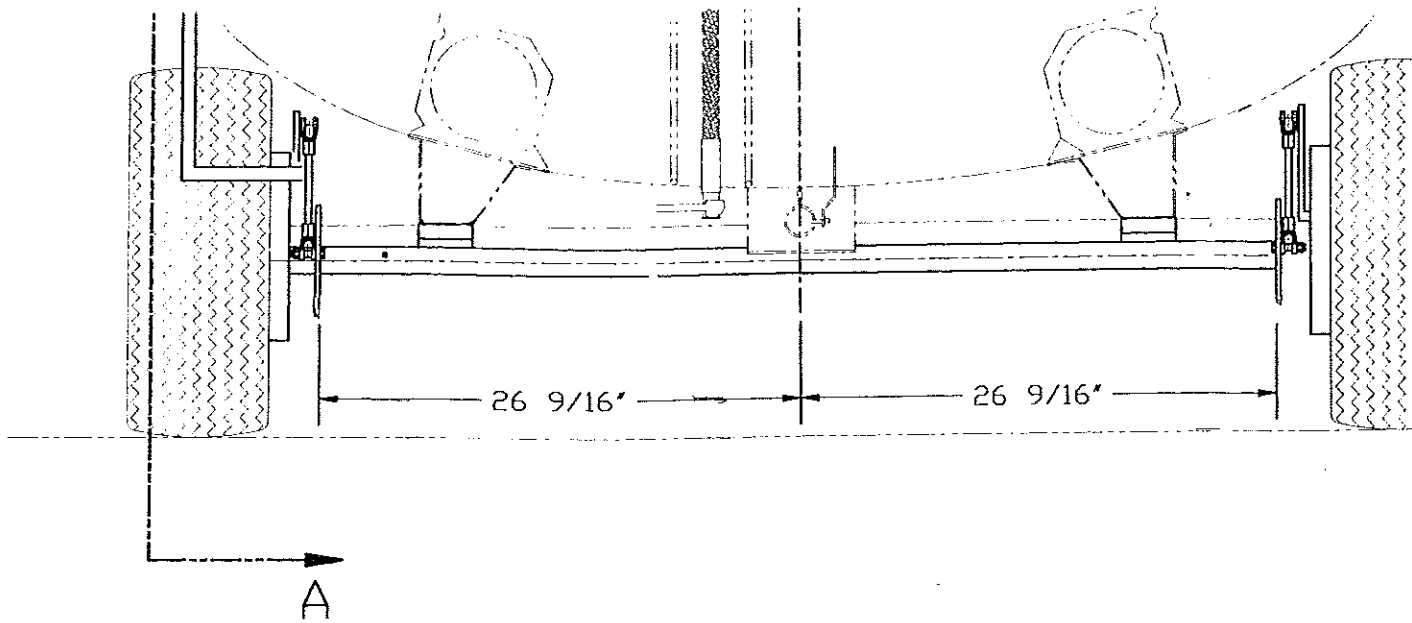
SECTION 5.2.2



ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	08-1010U	66144	.UNDERCARRIAGE ,REAR	1		XB
1	05-1023U	66144	..AXLE ,REAR	1		XB
2	07-1010	66144	..SPINDLE ,REAR	2		XB
3	06-1012	66144	...PAD,MOUNTING,REAR	2		PAFZZN
4	1/2"UNCX5,C/S	57454	...BOLT,1/2-UNCX5	4		PAFZZN
5	1/2-UNCX4.C/S	57454	...BOLT,1/2-UNCX4	2		PAFZZN
6	1/2"-UNCX1-1/2	57454	...SCREW	2		PAFZZN
7	MS51943-39	96906	...NUT,SELF LOCKING,HE	6		PAFZZN
8	1/2-UNC ,ASTMA3082465		...NUT,1/2-UNC	4		PAFZZN

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	08-1007	66144	...BRAKE, ASSY	2		XB
1	04-1064	66144	...PLATE, BACK	2		XB
2						
3						
4	04-1065	66144	...SHOE, BRAKE, ASSY	4		PAFZZN
5	04-1066	66144	...PIN, ANCHOR	4		PAFZZN
6	02-1400	66144	...RING, RETAINING	4		PAFZZN
7						
8	04-1025	66144	...LEVER, SHOE, BRAKE	4		PAFZZN
9	04-1026	66144	...SPRING, LEVER, BRAKE	4		PAFZZN
10						
11						
12	04-1027	66144	...SCREW, ADJUST, BRAKE	4		PAFZZN
13						
14	7/16"-UNFX1",C	57454	...BOLT, SHOULDER 7/16"	8		PAFZZN
15	MS35338-47	96906	...WASHER, LOCK	8		PAFZZN
16	MS1922-29	96906	...NUT, SELF-LOCKING	8		PAFZZN
17	04-1028	66144	...CAM, CONTROL	2		PAFZZN
18	04-1030	66144	...LEVER, REMOTE CONTROL	2		PAFZZN
19						
20	1/4X 1 1/2"C/S	57454	...BOLT, LEVER, CAM	2		PAFZZN
21	1/4-UNC, C/S ZIN	57454	...NUT, LEVER, CAM	2		PAFZZN

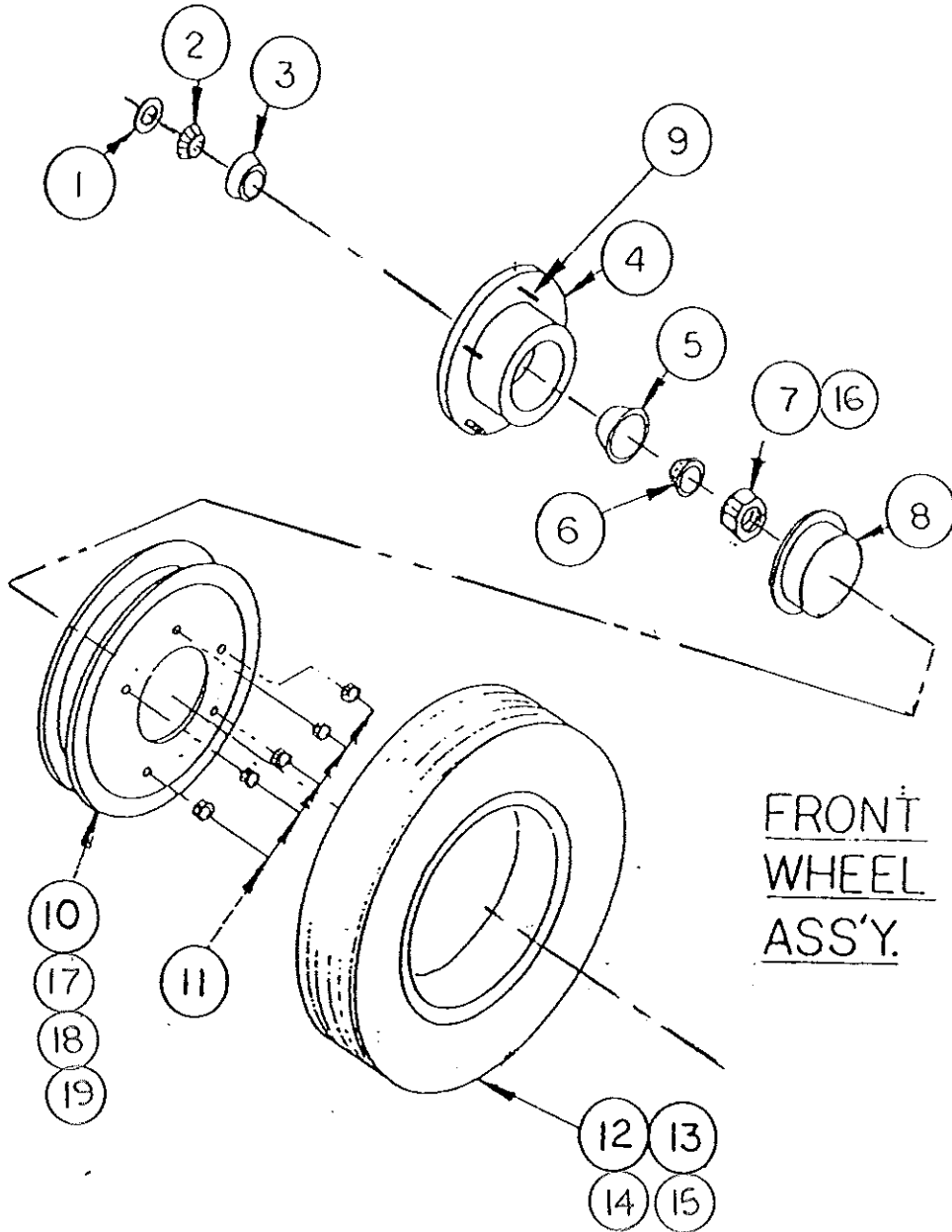
CONT.
SECTION 5.2,3



ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	08-1008	66144	..BRAKE, LINKAGE	1		PAFZZN
1						
2						
3						
4	53, 3/8"-UNF	71747	...YOKE, REAR	4		PAFZZN
5	05-1026	66144	...ROD, BRAKE	2		MFF
6	S ZINC PLATED	57454	...BOLT, 3/8-UNCX2	2		PAFZZN
7	MS51922-17	96906	...NUT, SELF-LOCKING, HE	2		PAFZZN
8	63120	36251	...FITTING LUBRICATION	2		PAFZZN
9	9729K73	3A054	...GRIP, HANDLE	1		XB
10	3/8-UNF, JAM, C/S	57454	...NUT, JAM, 3/8-UNF	4		PAFZZN
11	02-1302	66144	...PIN, STRAIGHT, HEADED	2		PAFZZN
12	MS24665-437	96906	...PIN, COTTER	2		PAFZZN

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SECTION 5,2.4.

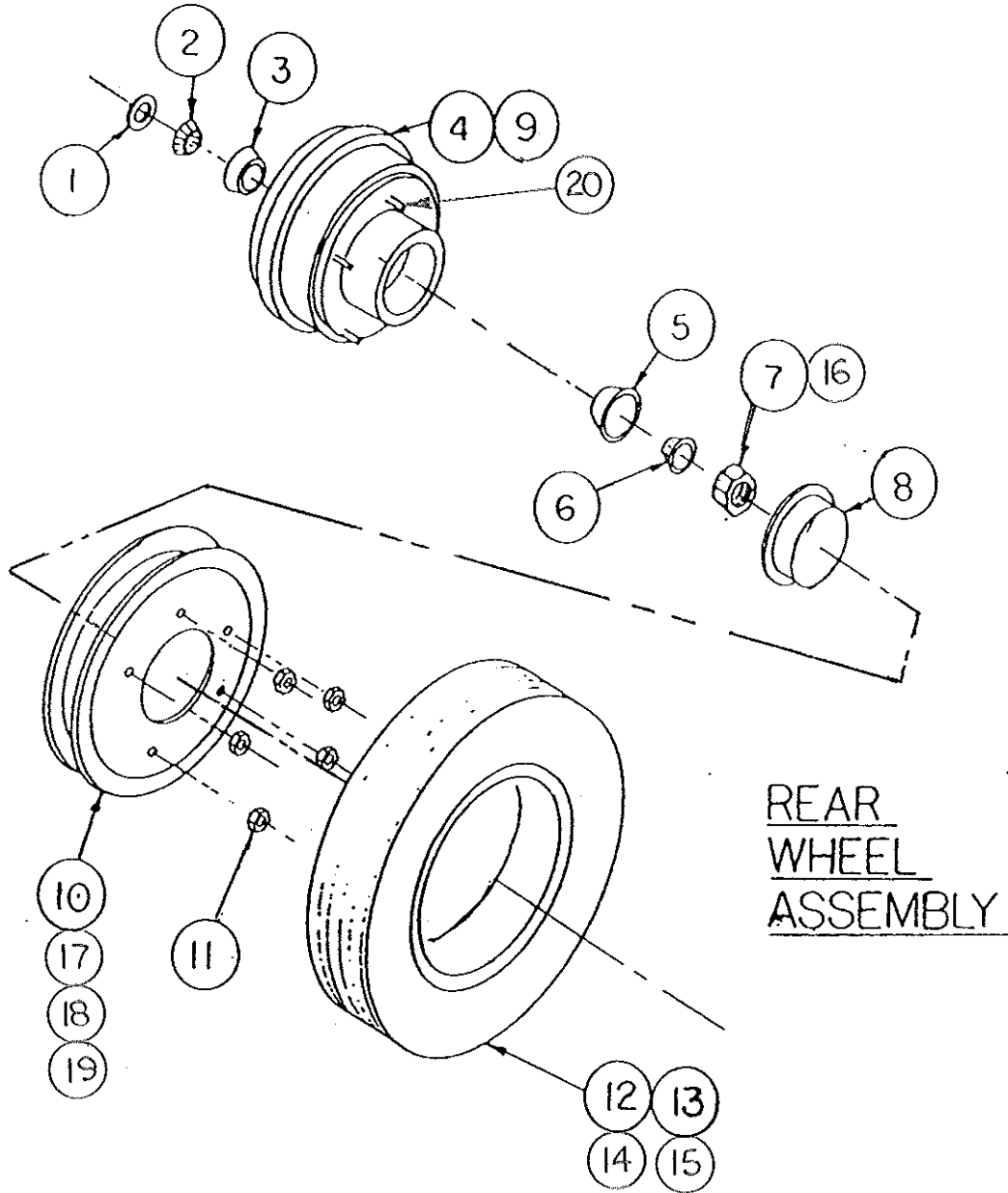


FRONT U-CARRIAGE

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0						
1	04-1012	66144	....SEAL	2		PAFZZN
2	017271	1FP59	....CONE AND ROLLERS	2		PAFZZN
3	L68111	60038	....CUP,TAPERED ROLLER	2		PAFZZN
4	04-1017	66144	....HUB,FRONT	2		XB
5	L44610	60038	....CUP,TAPERED ROLLER	2		PAFZZN
6	L44649	61220	....CONE AND ROLLERS,TA	2		PAFZZN
7	1"-UNF,C/S ZINC	57454	....NUT,SPINDLE	2		PAFZZN
8	04-1019	66144	....CAP,DUST	2		PAFZZN
9	02-1017	66144	....STUD	10		PAFZZN
10	04-10202	66144	....RIM	2		XB
11	04-1021	66144	...NUTS,LUG	10		PAFZZN
12	04-1020	66144	....TIRE	2		PAFZZN
13	04-10221	66144	....TUBE,TIRE	2		PAFZZN
14	8500TV	53477	.....VALVE CHECK	2		PAFZZN
15	660V	27783	.....CAP,PNEUMATIC VALVE	2		PAFZZN
16	02-1303	66144	....PIN,COTTER	2		PAFZZN
17	1/2-UNFX1",C/S	57454	....BOLT,RIM,1/2"-UNF	20		PAFZZN
18	1/2UNFX1",C/S	57454BOLT,RIM 1/2"-UNF	20		PAFZZN
19	1/2" LOCK,C/SZ1	57454WASHER,LOCK,1/2"	20		PAFZZN

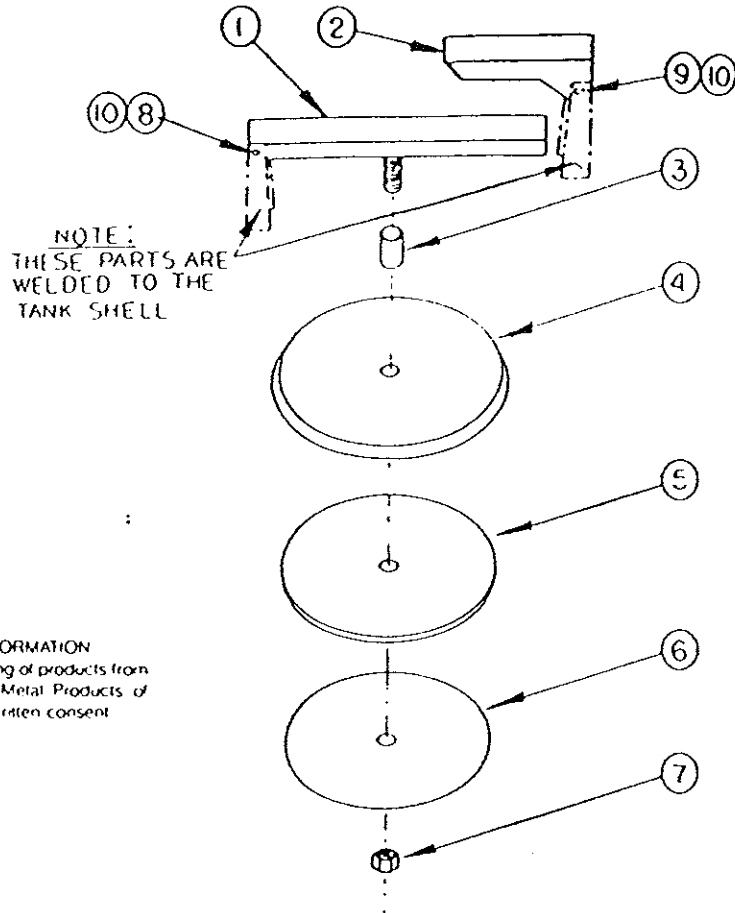
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SECTION 5,2,5.



REAR U-CARRIAGE

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0						
1	04-1012	66144	....SEAL	2		PAFZZN
2	017271	1FP59	....CONE AND ROLLERS,TA	2		PAFZZN
3	L68111	60038	....CUP,TAPERED ROLLER	2		PAFZZN
4	05-1020	66144	....HUB,REAR	2		XB
5	L44610	60038	....CUP,TAPERED ROLLER	2		PAFZZN
6	L44649	61220	....CONE AND ROLLERS,TA	2		PAFZZN
7	1"UNF,C/S ZINC	57454	....NUT,SPINDLE	2		PAFZZN
8	04-1019	66144	....CAP,DUST	2		PAFZZN
9	05-1021	66144	....DRUM,BRAKE,REAR	2		XB
10	04-10202	66144	....RIM	2		XB
11	04-1021	66144	...NUTS,LUG	10		PAFZZN
12	04-1020	66144	....TIRE	2		PAFZZN
13	04-10221	66144	....TUBE,TIRE	2		PAFZZN
14	8500TV	53477	.....VALVE CHECK	2		PAFZZN
15	660V	27783	.....CAP,PNEUMATIC VALVE	2		PAFZZN
16	02-1303	66144	....PIN,COTTER	2		PAFZZN
17	1/2-UNFX1",C/S	57454	....BOLT,RIM,1/2"-UNF	20		PAFZZN
18	1/2-UNFX1",C/S	57454	....BOLT,RIM,1/2"-UNF	20		PAFZZN
19	1/2"LOCK,C/S Z1	57454WASHER,LOCK,1/2"	20		PAFZZN
20	02-1017	66144	...STUD	10		PAFZZN



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SECTION 5,3

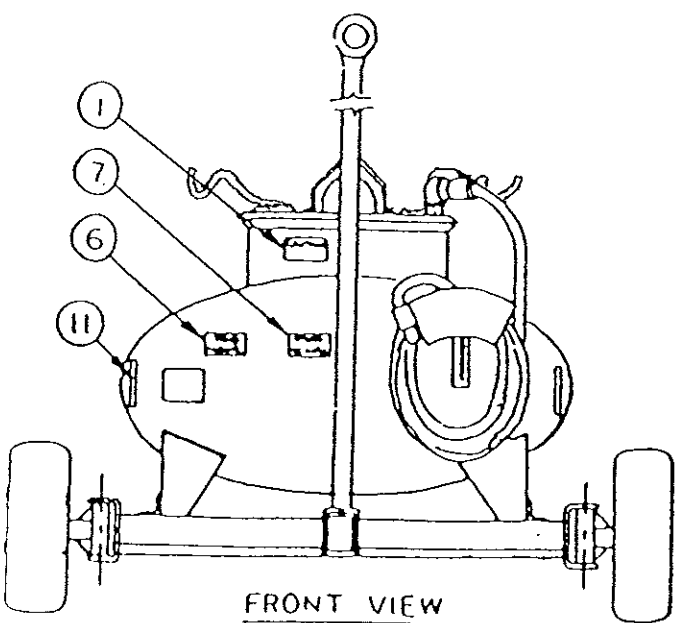
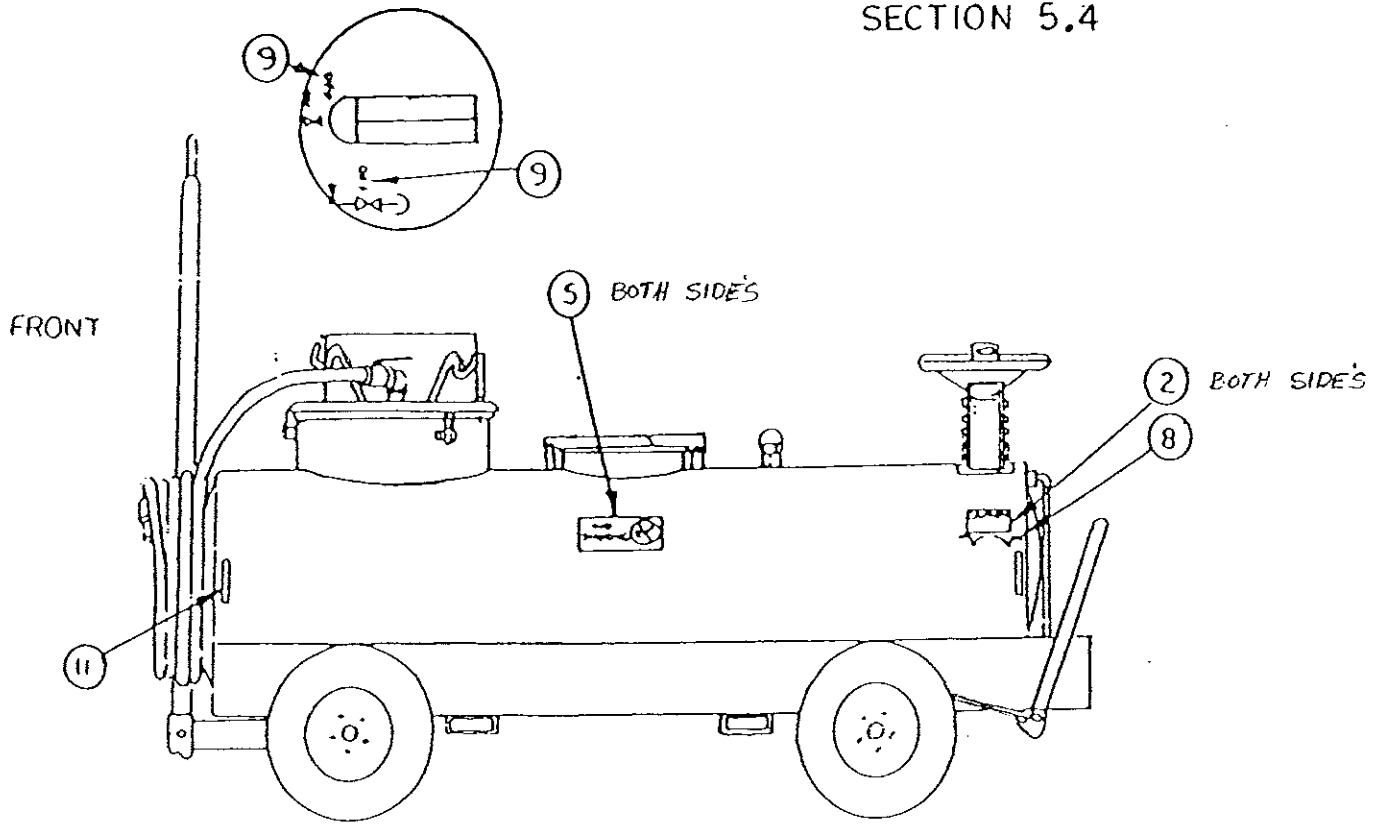
ASSEMBLY NO. 08-1025

MAJOR ASSEMBLY - MANWAY ASSEMBLY

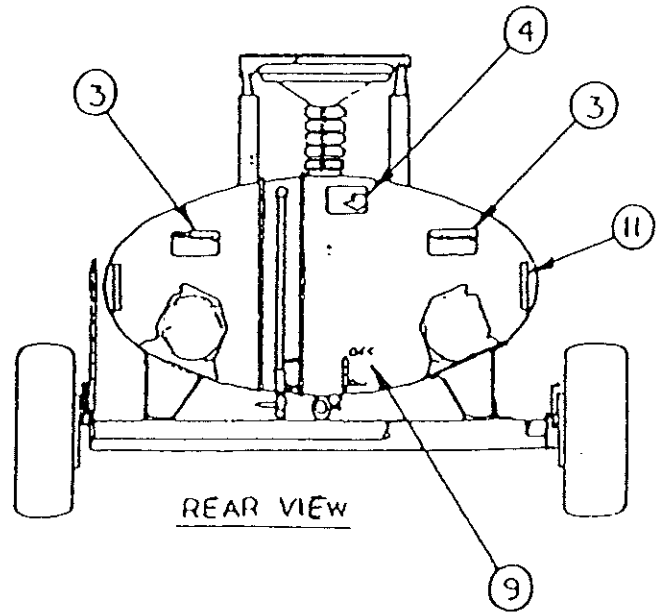
ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	08-1025	66144	..COVER,MANWAY ASSY.	1		XB
1	07-1039S	66144	...CROSSARM,19 1/2"	2		PAFZZN
2	01-8222S	66144	..CROSSARM,7"	2		PAFZZN
3						
4	01-86001	66144	...COVER,17"	2		XB
5	06-25025	66144	...GASKET,MANWAY	1		PAFZZN
6	07-2303	66144	...RETAINER,GASKET,MAN	1		XB
7	MS51922	96906	...NUT,5/8-UNF,NYLOC	2		PAFZZN
8	3/8-UNCX3",18	1N109	...BOLT,3/8-UNCX3	2		PAFZZN
9	3/8-UNCX3 1/2"	1N109	...BOLT,3/8-UNCX3 1/2	2		PAFZZN
10	MS51922	96906	...NUT,3/8-UNC,NYLOC	4		PAFZZN

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SECTION 5.4



FRONT VIEW

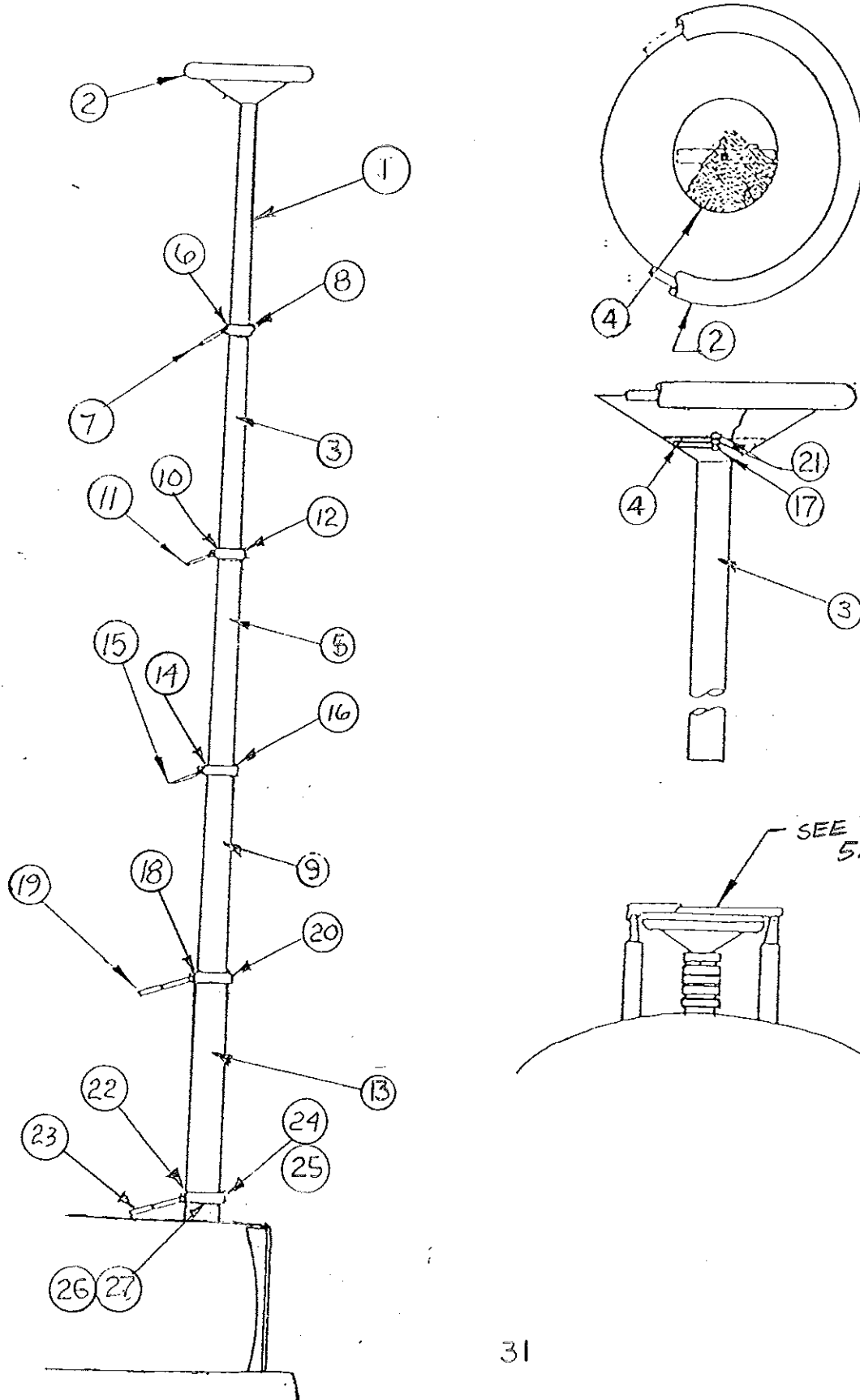


REAR VIEW

ASSEMBLY NO 10-100070
 MAJOR ASSEMBLY - DECAL PACKAGE

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	10-100070	66144	..MARKER,IDENTIFI	1		PAFFFFP
1	06-1002	66144	...DECAL	1		MFF
2	06-1003	66144	...DECAL,CAUTION,BRAKE	1		MFF
3	06-1004	66144	...MARKER,IDENTIFI	1		MFF
4	08-1005	66144	...DECAL(- OPTIONAL T.D.UNITS)	1		MFF
5	06-1006	66144	...DECAL,NO-SMOKING	2		MFF
6	06-1007	66144	...MARKER,IDENTIFI	1		MFF
7	08-1008	66144	...DECAL	1		MFF
8	06-1009	66144	...DECAL,ON/OFF BRAKE	1		MFF
9	06-1011	66144	...MARKER,IDENTIFI	2		MFF
10	06-1020U	66144	...DECAL (NOT SHOWN)	2		MFF

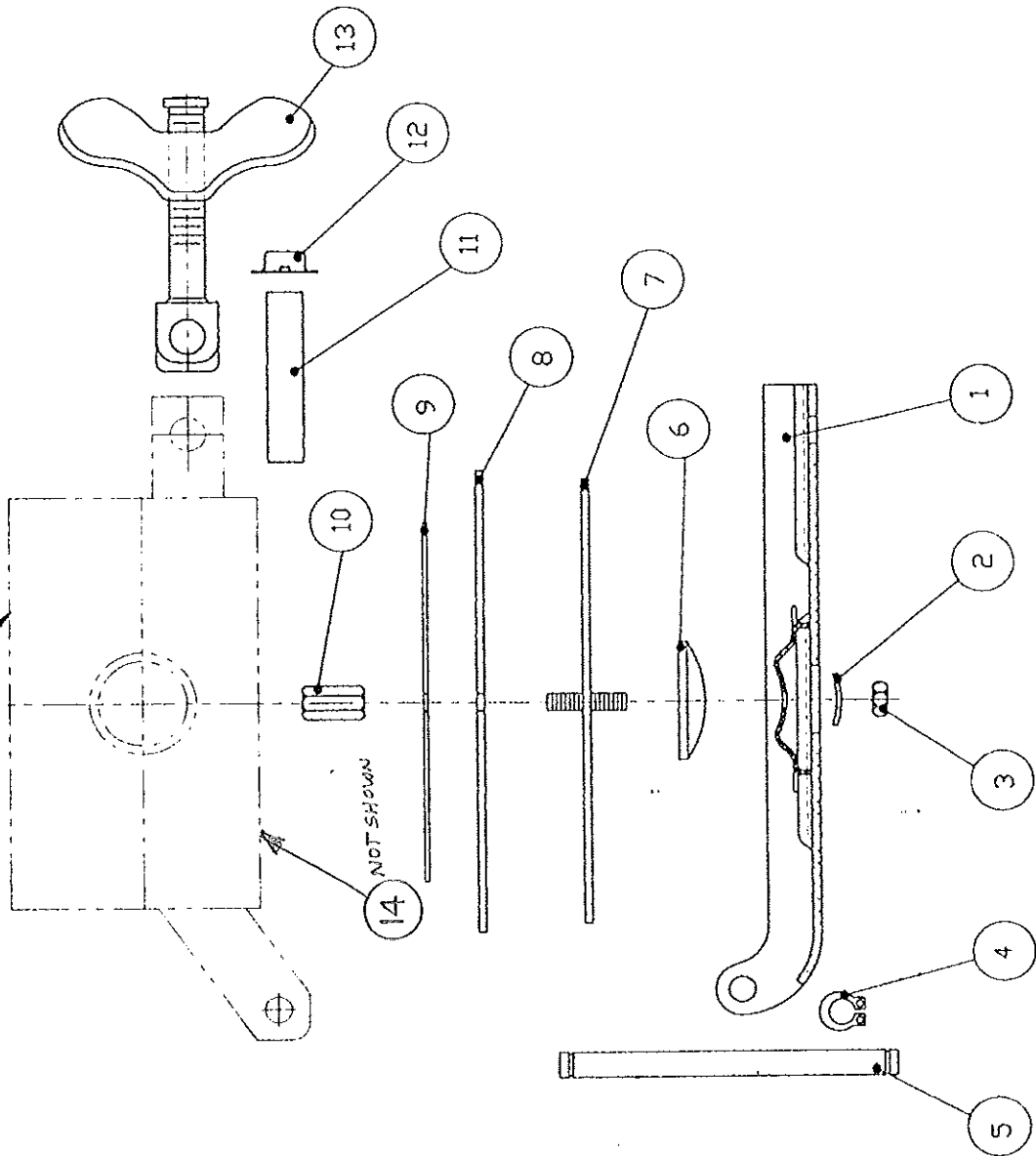
SECTION 5.5



SECTION 5.5.1

CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY

RING WELDED TO TANK WELDMENT



REVISIONS	
SYMB	DESCRIPTION

DATE	BY	APP.

PURCHASE FROM:
 KNAPPCO
 9304 MATTOX RD.
 KANSAS CITY, MISSOURI 64150
 FSCM 91840

NO.	PART NO.	DESCRIPTION	QTY.
13	2627	STUD,ASSY.	1
12	1020	NUT,PAL	2
11	3952	PIN,STUD ASSY.	1
10	4988	NUT,CAP,HEX,SUMP	1
9	3765	RETAINER,GASKET	1
8	2526	GASKET,SUMP	1
7	2652	COVER,GASKET	1
6	1101	SPACER,COVER,GASKET	1
5	5045	PIN,HINGE	1
4	4096	RING,SNAP,HINGE PIN	2
3	1104	NUT,HEX,SUMP	1
2	1117	WASHER,RETAINER	1
1	2655	LID,SUMP	1
	04-10581	KIT,REPAIR,SUMP (INCLUDES ITEMS 1 THRU 5)	1

MATERIAL LIST

SPOKANE METAL PRODUCTS
 P.O. BOX 3303, SPOKANE WA 99220 (509) 928 0720

TITLE: KIT,REPAIR,SUMP

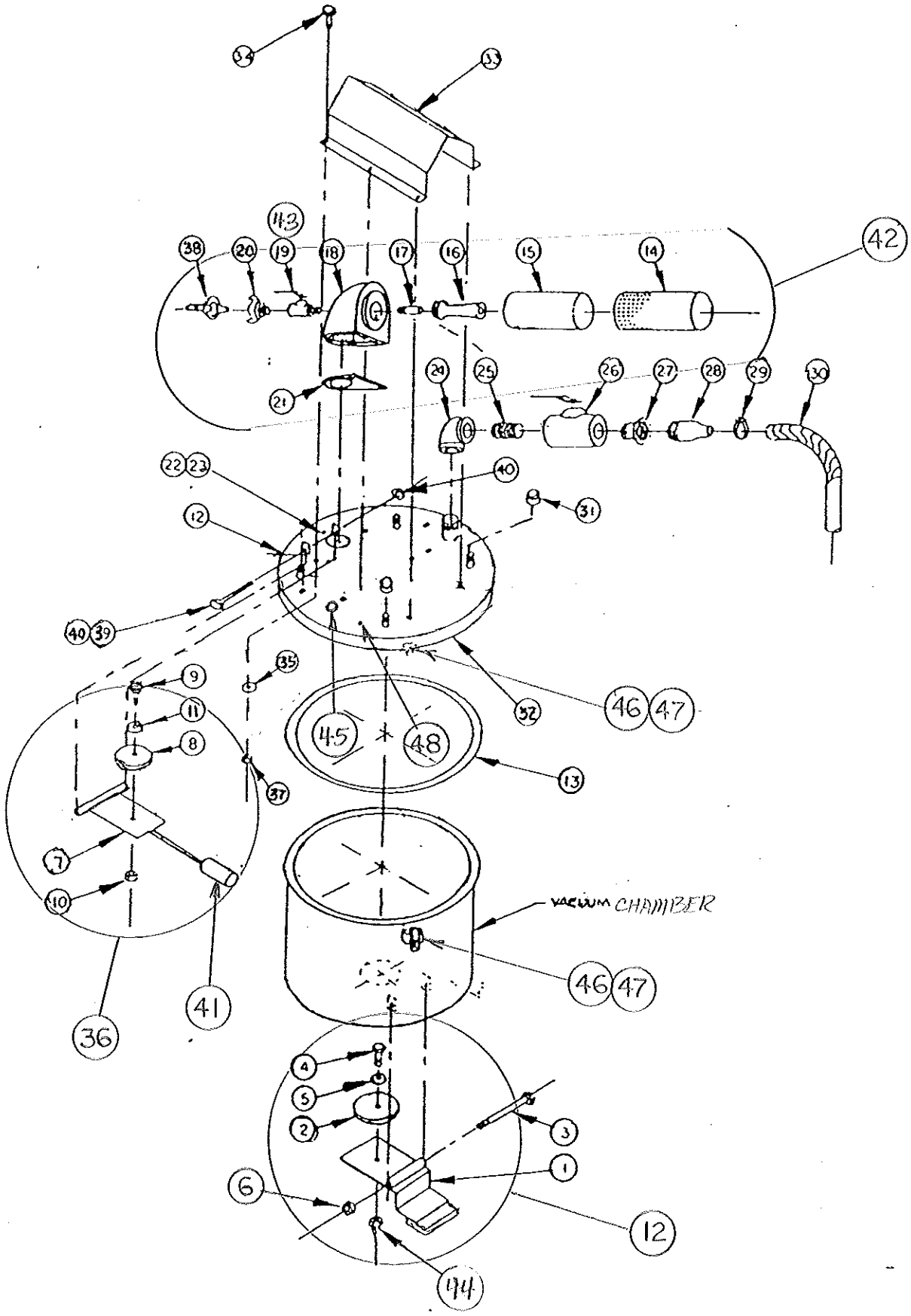
NAME	TTSJ	SIZE:	CAGE CODE#:	DWG. NO.:
DATE	93-03-17	B	91840	04-10581
CHECK			SCALE: 1/2	SHT 1 OF 1

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MAJOR ASSEMBLY - DRAIN SUMP ASSEMBLY

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	04-10581	91840	..SUMP, REPAIR KIT	1		PAFFFFP
1	2655	91840	...LID, SUMP	1		PAFZZN
2	1117	91840	...WASHER, RETAINER	1		XB
3	1104	91840	...NUT, HEX, SUMP	1		PAFZZN
4	4096	91840	...RING, SNAP	2		PAFZZN
5	5045	91840	...PIN, HINGE, SUMP	1		PAFZZN
6	1101	91840	...SPACER, COVER, GASKET	1		XB
7	2652	91840	...COVER, GASKET	1		PAFZZN
8	2526	91840	...GASKET, SUMP	1		PAFZZN
9	3765	91840	...RETAINER, GASKET	1		XB
10	4988	91840	...NUT, CAP, HEX, SUMP	1		PAFZZN
11	3952	91840	...PIN, STUD ASSY	1		XB
12	1020	91840	...NUT, PAL	2		PAFZZN
13	2827	91840	...STUD, ASSY	1		PAFZZN
14	01-8223	66144	..STRAINER, SUMP	1		PAFZZN

SECTION 5.6

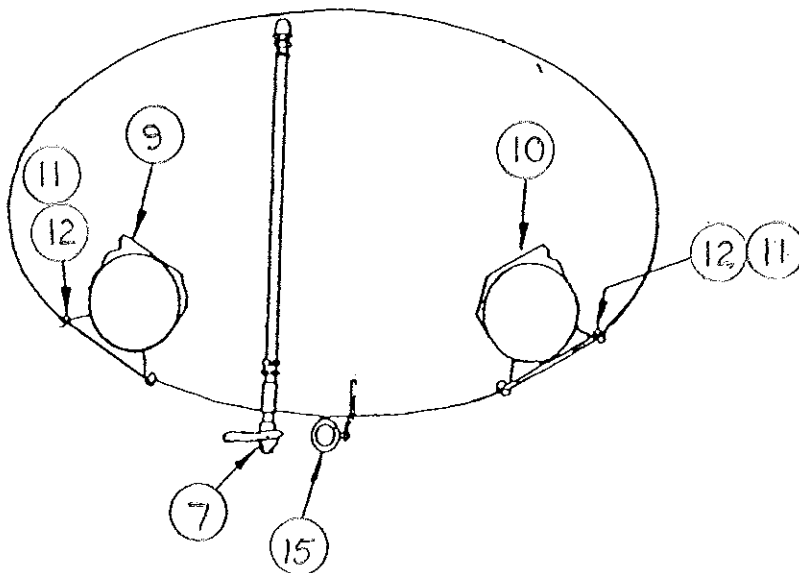
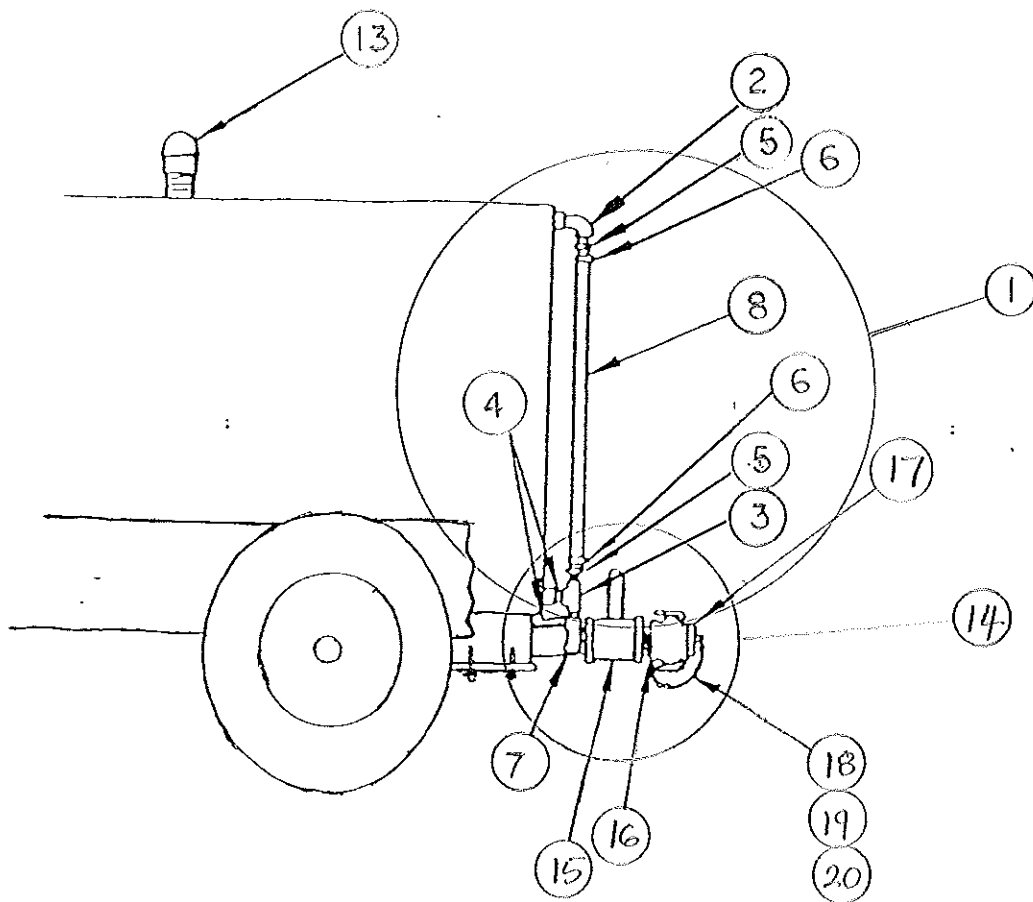


ASSEMBLY NO. 08-0001U (CONTINUED)
VACUUM SYSTEM ASSEMBLY

Item No.	Part No.	Cage code	Description 1234	Qty per Assy	Usable on code	SMR code
0	08-0001U	66144	.Vacuum Pot, Assy.	1		XB
1	07-1000	66144	...Arm, Drain	1		XB
2	04-1000	66144	...Gasket, Drain	1		PAFZZN
3	5/16-UNCx6	1N109	...Bolt,5/16-UNC x 6	1		PAFZZN
4	1/4UNCx1.25	1N109	...Bolt,1/4-UNC x 1.25	1		PAFZZN
5	90313A106	3A054	...Washer,Flat	1		PAFZZN
6	79NTE058	72963	...Nut, Self locking	1		PAFZZN
7	07-1001	66144	...Arm,Float,Overflow	1		XB
8	04-1001	66144	...Gasket,Overflow	1		PAFZZN
9	1/4UNCx1.25	1N109	...Bolt,1/4UNCx1.25	1		PAFZZN
10	MS51922-2	96906	...Nut,1/4 Nylock	2		PAFZZN
11	S8157N9303259364		...Washer, Flat	1		PAFZZN
12	08-1000	66144	..Stop, Drain	1		XB
13	06-1022V	66144	..Gasket,Pot,Vacuum	1		PAFZZN
14	04-1004	66144	...Housing, Exhaust	1		XB
15	04-1005	66144	...Pneumatic Muffler	1		PAFZZN
16	04-1006	66144	...Venturi	1		XB
17	04-1007	66144	...Jet,Air,Venturi	1		XB
18	04-1008	66144	...Box,Venturi	1		XB
19	07-003-27	57661	...Valve,Ball	1		PAFZZN
20	STYLEAKMPT	72661	...Coupling Half,Quick	1		PAFZZN
21	04-1010	66144	...Gasket,Venturi	1		PAFZZN
22	1/4UNFx3/4	57454	...Bolt,1/4UNFx3/4	3		PAFZZN
23	MS35333-40	96906	...Washer,Lock	3		PAFZZN
24	03-1021	66144	...Elbow,90,1-1/2-NPT	1		PAFZZN
25	03-02922S	66144	...Nipple,Close, 1-1/2"	1		PAFZZN
26	70-107-27	57661	...Valve, Ball	1		PAFZZN
27	03-1002	66144	...Bushing,Hex	1		XB
28	AST-15,1.25	76621	...Nipple,King,1-1/4	1		PAFZZN
29	03-10101	66144	...Clamp,Hose	1		PAFZZN
30	06-10161	66144	...Hose,Nonmetallic	1		PAFZZN
31	03-1021	66144	...Cap,Pipe	4		PAFFZN
32	08-1002	66144	..Lid,Pot,Vacuum	1		PAFZZN
33	07-1034U	66144	..Cover,Generator,Vac	1		XB
34	1/4UNCx5/8	1N109	...Bolt,1/4UNCx5/8	6		PAFZZN
35	1/4Flat18/81	1N109	...Washer,Flat,1/4	6		PAFZZN
36	08-1001	66144	..Stop,Valve	1		PAFFFP
37	MS51922-2	96906	...Nut,1/4UNC Nylock	6		PAFZZN
38	AM-2	72661	...Coupling Half,Quick	1		PAFZZN
39	5/16UNCx6	1N109	...Bolt,5/16UNCx6 ss	1		PAFZZN
40	79NTE058	72962	...Nut,5/16UNC,Nylock	1		PAFZZN
41	9775K12	39428	...Float,Valve	1		PAFZZN
42	08-1003	66144	..Head,Vacuum Assy.	1		PAFFFP
43	03-11135	66144	...Reducer,Air Jet	1		XB
44	1/4UNC,NYLK1	1N109	...Nut,1/4UNC,Nylock	1		PAFZZN
45	07-10341	66144	..Valve,Check	1		PAFZZN
46	04-1062	66144	...Latch Lid Vacuum	3		PAFZZN
47	SSD64SSBS	07707	...Rivit,Nail	18		PAFZZN
48	9688K22	3A045	...Plug,Button,Nylon	4		PAFZZN

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SECTION 5.7



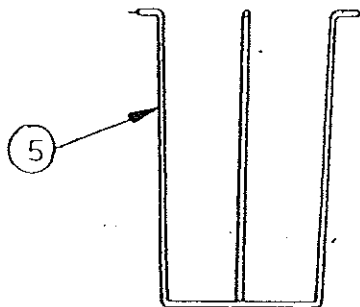
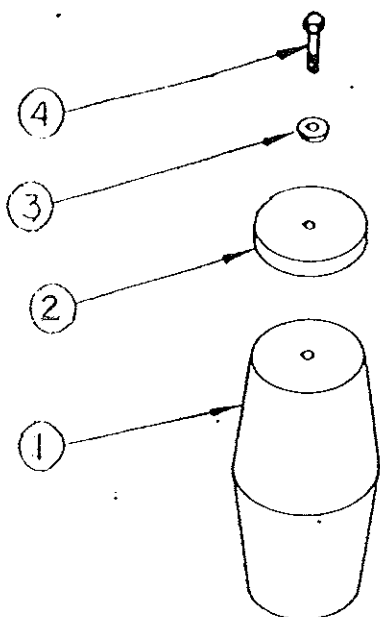
REAR VIEW

MISC. FIXTURES

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0						
1	08-1014	66144	..INDICATOR, SIGHT LIQ	1		XB
2	03-0017S	66144	...ELBOW, TUBE	1		PAFZZN
3	03-1007	66144	...TEE	1		PAFZZN
4	03-1008	66144	...NIPPLE, HOSE	2		PAFZZN
5	03-11130	66144	...COUPLING HOSE	2		PAFZZN
6	03-1010	66144	...CLAMP, HOSE, 3/4"	2		PAFZZN
7	70-103-27	66144	...VALVE, BALL, APOLLO	1		PAFZZN
8	06-2527	66144	...TUBING, NONMETALLIC	1		PAFZZN
9	2930-43	66144	..REEL, GROUNDING	1		PAFZZN
10	CS-4930SV-0712	16236	..REEL, STATIC	1		PAFZZN
11	1/2-UNCX1,18-8	1N109	...BOLT, 1/2-UNC X 1	4		PAFZZN
12	MS51922-33	96906	...NUT, SELF-LOCKING, HE	4		PAFZZN
13	04-1037	66144	..VENT, 1 1/2"	1		XB
14	08-1012	66144	..DRAIN ASSY.	1		PAFFFFP
15	70-107-27	57661	... VALVE, BALL, APOLLO	1		PAFZZN
16	15-B	33813	... CAMLOCK, 1 1/2"	1		PAFZZN
17	12-W	33813	... PLUG, CAMLOCK, 1 1/2"	1		PAFZZN
18	089-3524	96508	... CHAIN, SAFETY	1		XB
19	04-1035	66144	... HOOK, S	1		XB
20	04-10351	66144	... HOOK, S	1		XB

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SECTION 5,8



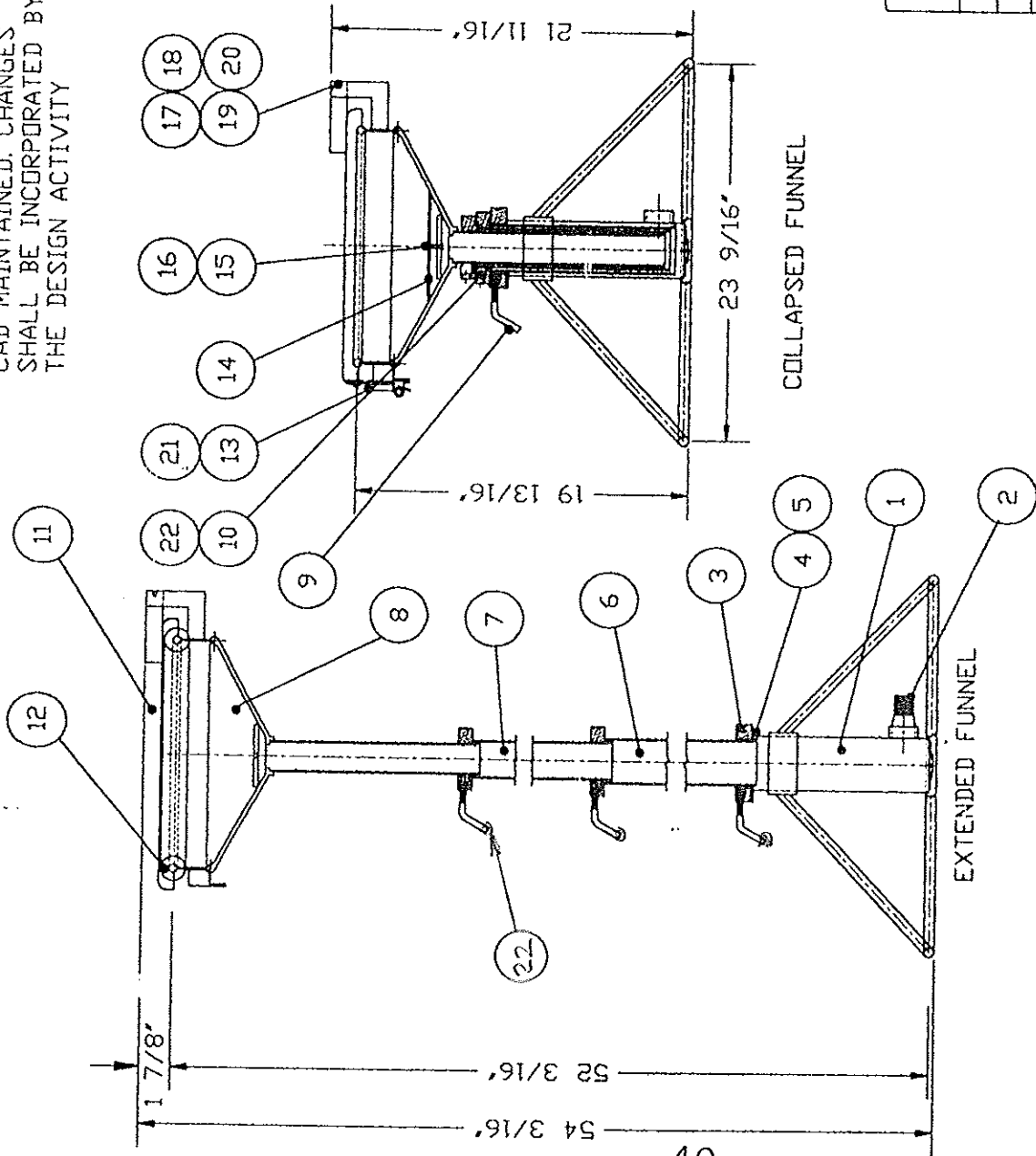
ASSEMBLY NO. 08-10011

MAJOR ASSEMBLY - VENT, OVERFLOW PREVENTOR

ITEM NO.	PART NO.	CAGE CODE	DESCRIPTION	QTY. PER ASSY.	USEABLE ON CODE	SMR CODE
0	08-10011	66144	..VENT, OVERFLOW, ASSY	1		AFF
1	9775K21	39428	....FLOAT, VALVE	1		PAFZZN
2	04-1047	66144	....GASKET	1		PAFZZN
3	1/4,18-8STAINLE	1N109	....WASHER, FLAT, 1/4"	9		PAFZZN
4	1/4-UNCX 1 1/2	1N109	....BOLT, 1/4-UNC, 1 1/2"	1		PAFZZN
5	08-1023	66144	...CAGE, VENT OVERFLOW	1		XB

SECTION 5.9

CAD MAINTAINED. CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY



NO.	PART NO.	DESCRIPTION	QTY.
21	CCP64-	RIVET, NAIL	4
20	01-8407	SPACER, HINGE	1
19	02-1100	WASHER, FLAT, 1/4"	2
18	01-8406	PIN, HINGE	1
17	02-1200	NUT, 1/4-UNC, NYLDC	2
16	02-10001	BOLT, CARRIAGE, 1/4"	1
15	02-1200	NUT, 1/4-UNC, NYLDC	1
14	04-1039	STRAINER, FUNNEL	1
13	04-1053	LATCH, PULL DOWN	1
12	06-1022T	SEAL, LID, FUNNEL	1
11	07-11107	COVER, FUNNEL	1
10	05-0037	WEDGE, CLAMP	3
9	05-10181	HANDLE, CLAMP	3
8	07-11106	STEM, FUNNEL SECTION	1
7	07-11105	STEM, UPPER, FUNNEL	1
6	07-11104	STEM, LOWER, FUNNEL	1
5	02-11001	WASHER, LOCK, 1/4"	4
4	02-10010	BOLT, 1/4-UNC X 5/8"	4
3	05-10012	CLAMP, FUNNEL BASE	1
2	AST-15	NIPPLE, KINGALUM.	1
1	07-11103	BASE SECTION, FUNNEL	1
	07-1110U	DRAIN, REMOTE, FUNNEL	1
NO.	PART NO.	DESCRIPTION	QTY.

MATERIAL LIST

SPOKANE METAL PRODUCTS
 P.O. BOX 3303, SPOKANE WA 99220 (509) 928 0720

TITLE: DRAIN, REMOTE, FUNNEL

NAME	TTSJ	SIZE:	CAGE CODE #:	DWG. NO.:
DATE	93-03-01	B	66144	07-1110U
CHECK			SCALE: 1/8"	SHT 1 OF 1

CONFIDENTIAL PROPRIETARY INFORMATION
 REPRODUCTION OF THESE DRAWINGS OR THE MANUFACTURE OF PRODUCTS FROM THESE DRAWINGS FOR USE BY ANYONE OTHER THAN SPOKANE METAL PRODUCTS OF SPOKANE, WA IS STRICTLY PROHIBITED WITHOUT WRITTEN CONSENT.

Item No.	Part No.	Cage Code	Description 1234	Qty per Assy	Usable on code	SMR code
0	07-1110U	66144	.Drain,Remote,Funnel	1		PAFFFP
1	07-11103	66144	..Base Section,Funnel	1		XB
2	AST-15	72661	...Adapter,Straight,Pi	1		PAFZZN
3	05-10012	66144	...Clamp,Funnel Base	1		PAFZZN
4	1/4-UNC x 5/8,18	1N109	...Bolt,1/4-UNC x 5/8"	3		PAFZZN
5	MS35338-139	96906	...Washer,Lock	3		PAFZZN
6	07-11104	66144	..Stem,Lower,Funnel	1		PAFZZN
7	07-11105	66144	..Stem,Upper,Funnel	1		PAFZZN
8	07-11106	66144	..Stem Funnel Section	1		PAFZZN
9	05-10182	66144	....Handle,Clamp	3		PAFZZN
10	05-0037	66144	....Wedge,Clamp	3		PAFZZN
11	07-11107	66144	...Cover,Funnel	1		XB
12	06-1022T	66144	...Seal,Lid,Funnel	1		PAFZZN
13	04-1053	66144	....Latch,Pull Down	1		XB
14	04-1039	66144	...Strainer,Funnel	1		PAFZZN
15	MS51922-2	96906	....Nut,Self-Locking,He	1		PAFZZN
16	1/4 x 1 UNC,18-8	1N109	....Bolt,Carriage	1		PAFZZN
17	1/4 UNC,18-8 STA	1N109	....Nut,1/4"-UNC,Nyloc	2		PAFZZN
18	01-8407	66144	....Pin,Hinge	1		PAFZZN
19	1/4,18-8 Stainle	1N109	....Washer,Flat,1/4"	2		PAFZZN
20	01-8406	66144	....Spacer,Hinge	1		XB
21	SSD64SSBS	07707	....Rivet,Blind	4		PAFZZN
22	9753K42	3A054	.....Cap,Handle	3		XB