

SPOKANE METAL PRODUCTS

Spokane Washington

CONFIDENTIAL PROPRIETARY INFORMATION
Reproduction of this data or the manufacturing of products from
this data by anyone other than Spokane Metal Products of Spokane
Washington is strictly prohibited without written consent

200 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 200-03

**© COPYRIGHT 1991 By SPOKANE INDUSTRIES INC.
ALL RIGHTS RESERVED**

This document discloses subject matter in which Spokane Metal Products has Proprietary rights and such subject matter shall not, without the written permission of Spokane Metal Products, be either (A) used, released or disclosed in whole or in part outside the government, (B) used in whole or in part by the government for manufacture, or (C) used by a party other than the government, except for (1) emergency repair or overhaul work only, by or for the government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that release or disclosure hereof outside the government shall be made subject to a prohibition against further use, release or disclosure, or (2) release to a foreign government, or for emergency repair or overhaul work by or for such government under the conditions of (1) above. This legend shall be marked on any reproduction hereof in whole or in part.

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.

2.0 SAFETY

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 be consulted for further restrictions.

2.2 Telescoping Drain

- 2.2.1 Care should be exercised in using the telescope to prevent injuring fingers between clamps by dropping sections.

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.

2.5 Parking

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

2.6 Air Supply

- 2.6.1 **Caution:** Check the air pressure of supply lines to the vacuum generator to assure it is not in excess of 100 PSI.

2.7 Inspections

2.7.1 Inspection of tires, undercarriage, tow bar, vent, valves, hoses, sight gauge, reflectors, safety labels, etc., should be inspected on a periodic basis. It is recommended these inspections be performed weekly.

2.7.2 Internal inspection will be necessary to insure structural integrity and cleanliness. It is recommended that interval inspections be performed at least every (6) six months.

Caution! When entering confined spaces such as the interior of the bowser tank, care should be taken to provide proper breathing equipment and a separate person dedicated solely to a safety watch of the person inside. It is strongly recommended that all local or other regulations be consulted.

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 left unattended.

3.3 Tow Bar and Undercarriage

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

3.3.2 Care should be taken not to jackknife the bowser when backing up.

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

3.4.1 The fuel bowser is equipped with a telescoping drain assembly. It is capable of being adjusted from 4'2" to 9'0" high.

3.4.2 To Raise:

- (1) Loosen top clamp if necessary.
- (2) Grasp top section with one hand and lift until the top clamp raises approximately 6 inches.
- (3) Tighten clamp securely with the other hand.
- (4) Reposition lifting hand by grasping tube below tightened clamp and lift until next clamp is raised approximately 6 inches.
- (5) 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 with one hand and loosen the securing clamp.
- (2) Slowly lower tube, hand over hand, until the following clamp is resting on the loosened clamp.
- (3) Repeat steps 1 and 2 until all sections are lowered.

3.4.4 Funnel is equipped with a nitrile rubber seal around the top edge to allow placement against the underside of a wing.

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

3.5 Vacuum Assembly

3.5.1 This assembly is equipped with an air powered vacuum generator.

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 recommended air supply of 60CFM at 100 PSI and turning on the air supply valve.

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

3.5.6 The vacuum assembly is supplied with 50 feet of vacuum hose and a ball valve on the vacuum suction.

3.5.7 The vacuum assembly is equipped with (4) four each 1/2" NPT opening for use with pencil drains. To use, the pipe caps must be removed and self-closing quick disconnects attached that match local standards. To operate, close vacuum suction valve and turn air supply on and connect drain lines.

3.6 Grounding Reels

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

3.7.1 The bowser unit is equipped with a 1-1/2" NPT ball valve with a camlock connector.

3.8 Sample Port

3.8.1 The bowser unit is equipped with a 1/2" NPT valve for use as a sample port.

4.0 MAINTENANCE

4.1 Parking Brake

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

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:

- (1) King pin bushing, turning bushings and tie rod ends are self lubricating and need no additional maintenance.
- (2) Pack wheel bearing at intervals not to exceed three (3) months.
- (3) Check tire pressure weekly. Pressure should be maintained at 60 PSI.

4.2.3 Tow bar pivot pin and hook ring should be inspected monthly for excessive wear or cracks.

4.3 Telescoping Drain Assembly

4.3.1 The telescoping Drain Assembly consists of stainless steel housing 3-1/2" in diameter permanently attached to the tank and five (4) 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

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 (3) eccentric latches.

4.4.2 The vacuum chamber is equipped with an automatic drain valve. This valve is pre-adjusted at the factory and should not need further adjustment.

4.4.3 The vacuum cover is equipped with an overflow valve which should require no maintenance.

4.4.4 The vacuum generator is attached to the chamber cover. It is equipped with an exhaust silencer which should be cleaned at six (6) month intervals or more often depending on the amount of use and conditions.

4.4.5 The vacuum hose should be inspected monthly for cracks. Any sudden loss of vacuum suction power may indicate a crack in the vacuum hose.

4.4.6 The cover gasket should be inspected monthly for deterioration. This gasket should be pliable and free from weather checking.

4.5 Grounding Reels

4.5.1 Grounding reel cables should be pulled out, cleaned and inspected monthly.

4.5.2 Cable clamps and ends should be inspected for loose connections monthly.

4.6 Sight Gauge

4.6.1 The sight gauge should be inspected monthly for loose connections and weathering of clear tubing.

5.0 REPLACEMENT PARTS

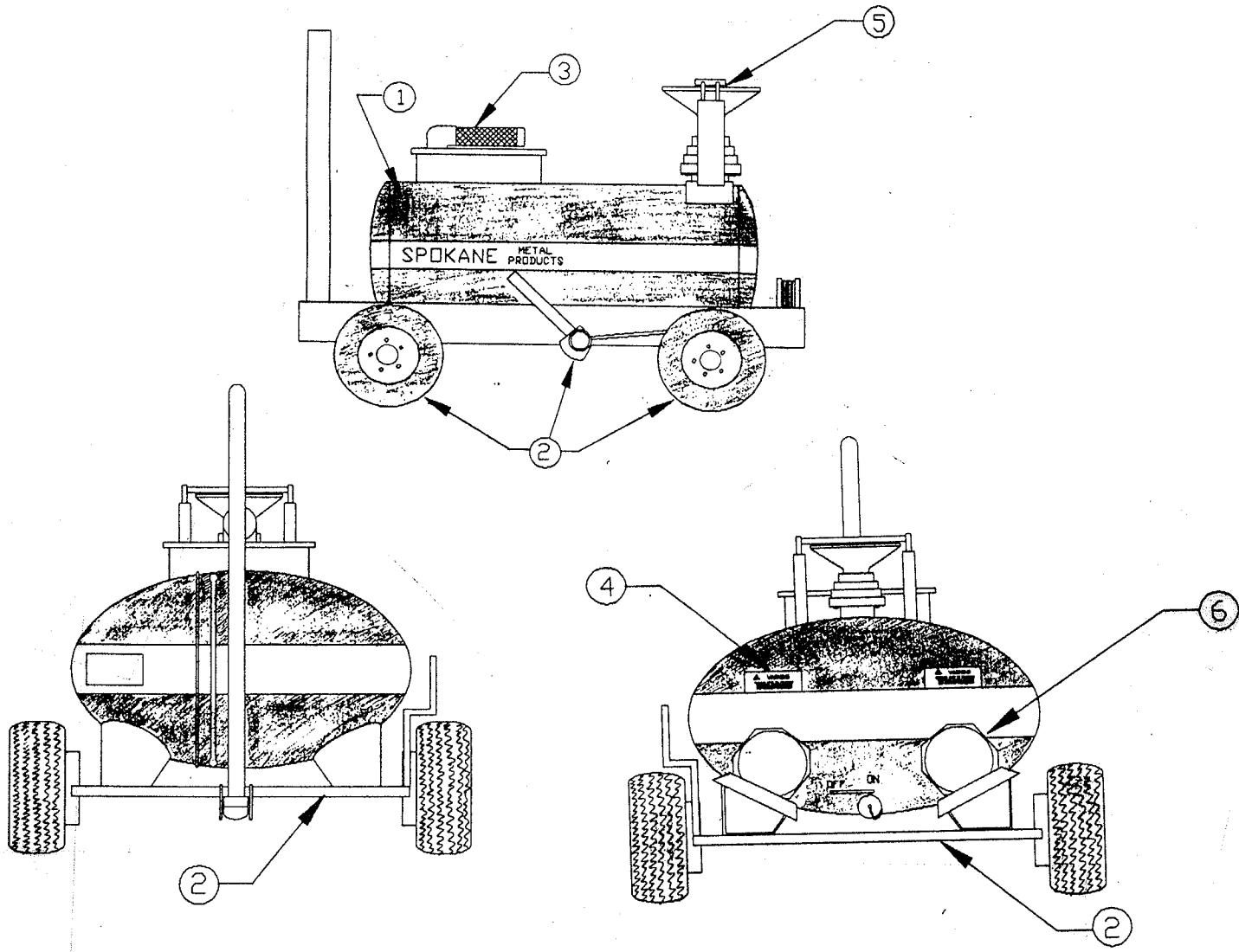
This section provides information for identification of parts for ordering. To order, it is important to have the Model Number, Subassembly Number, Part Number and Description. Parts may be ordered by calling or writing to:

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

SPOKANE METAL PRODUCTS

PO Box 3621, Spokane, WA 99220 • Hwy 4, Spokane Industrial Park • (509) 928-0720 • TWX 32-0456

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



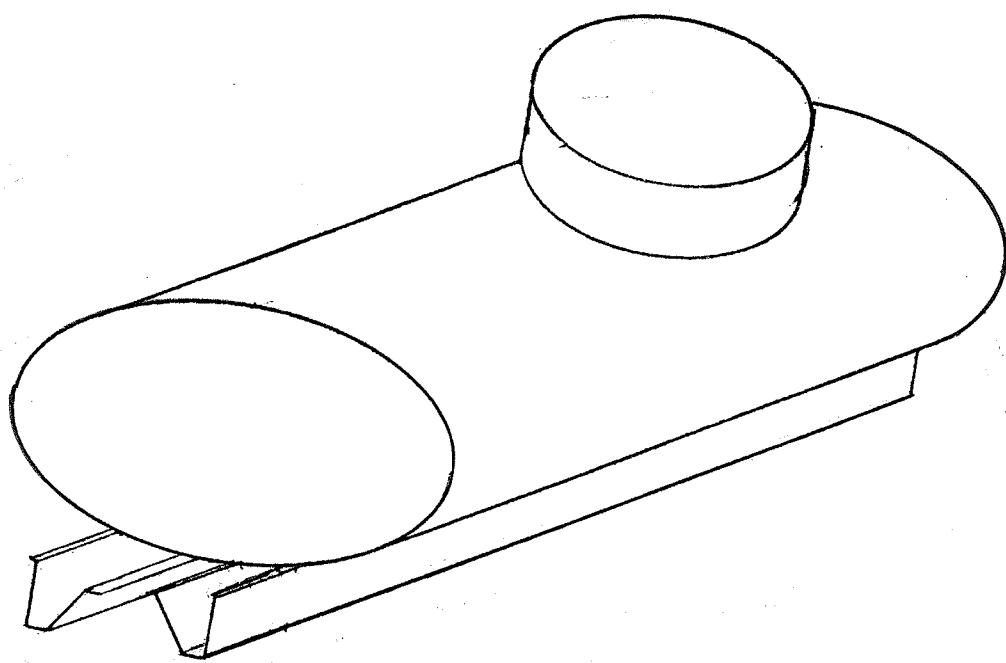
<u>Item No.</u>	<u>Section</u>
1 Main Tank	5.1
2 Axle, Front	5.2.1
2 Axle, Rear	5.2.2
2 Brake, Parking	5.2.3
2 Wheel Assembly, Front	5.2.4
2 Wheel Assembly, Rear	5.2.5
4 Decal Package	5.4
5 Telescoping Drain	5.5
6 Vacuum Assembly	5.6
7 Miscellaneous Fixtures	5.7

SPOKANE METAL PRODUCTS

P.O. Box 3681 Spokane, WA 99220 • Bldg 4, Spokane Industrial Park • (509) 928-0780 • TWX 32-6468

CONFIDENTIAL-PROPRIETARY INFORMATION
REPRODUCTION OF THESE DRAWINGS OR THE MANUFACTURING OF PRODUCTS FROM THESE DRAWINGS FOR USE BY ANY
ONE OTHER THAN SPOKANE METAL PRODUCTS OF SPOKANE, WA IS STRICTLY PROHIBITED WITHOUT WRITTEN CONSENT

SECTION 5.1



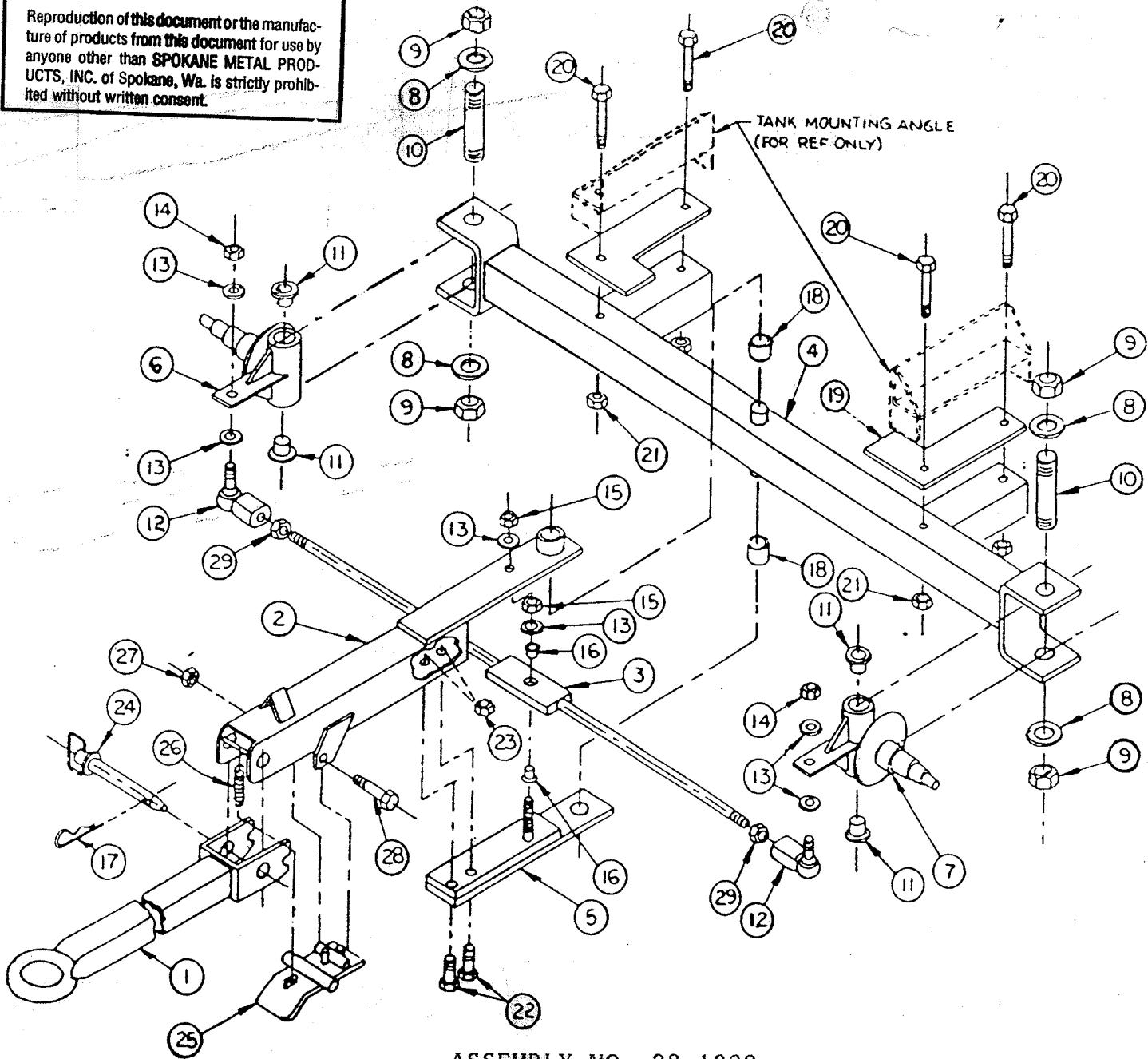
ASSEMBLY NO. 08-10008

MAJOR ASSEMBLY - TANK WELDMENT

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
	1	08-10008	1	Stainless Steel Tank Weldment, 200 Gallon Capacity Series BOW 200-03	175#

CONFIDENTIAL PROPRIETARY INFORMATION

Reproduction of this document or the manufacture of products from this document for use by anyone other than SPOKANE METAL PRODUCTS, INC. of Spokane, Wa. is strictly prohibited without written consent.



ASSEMBLY NO. 08-1029

MAJOR ASSEMBLY - AXLE ASSEMBLY

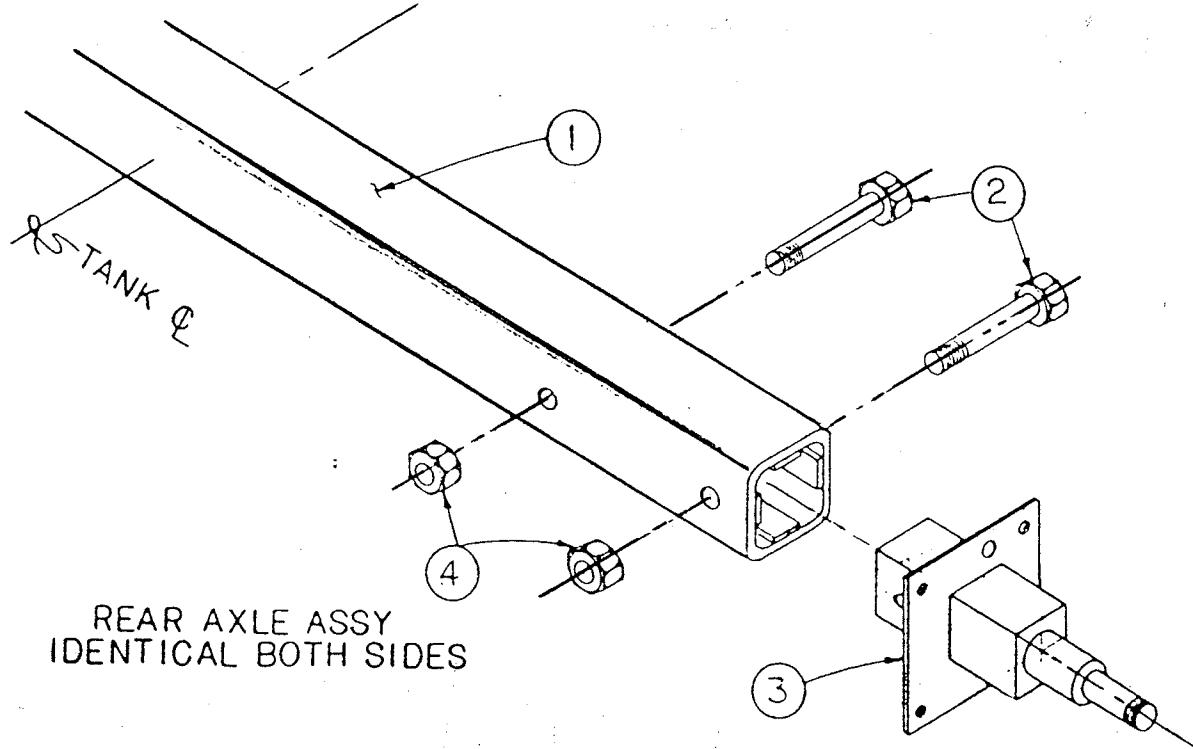
Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1029				Axle, Assembly, Front	
	1	07-1103	1	Tow Bar	23
	2	07-1052	1	Arm, Turning	16
	3	07-10371	1	Tie Rod	7.3
	4	07-1053	1	Axle, Front	53

MAJOR ASSEMBLY - AXLE ASSEMBLY (CONTINUED)

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
	5	07-1046	1	Steering Arm, Lower Plate	6.1
	6	05-1009	1	Sleeve, King Pin, Right	24
	7	05-1009	1	Sleeve, King Pin, Left	24
	8	02-11131	4	Washer, King Pin	1
	9	02-12131	4	Nut, King Pin	2
	10	05-1010	2	King Pin	11
	11	03-1013	4	Bushing, King Pin Sleeve	1
	12	03-1016	2	Ends, Tie Rod	5
	13	02-11072	5	Washers, Tie Rod	
	14	02-12071	2	Nuts, Tie Rod Ends	1
	15	02-12071	1	Nut, Tie Rod Pivot	.5
	16	03-1015	2	Bushing, Tie Rod Pivot	.8
	17	02-1300	2	Cotter Pin	.2
	18	03-1014	2	Bushing, Axle Pivot	1
	19	06-1023	2	Mounting Pad, Tank	4
	20	02-1503	4	Bolts, Tank Mounting	1.3
	21	02-12041	4	Nuts, Tank Mounting	.5
	22	02-1502	2	Bolts, Turning Arm Clamp	.32
	23	02-12041	2	Nuts, Turning Arm Clamp	.2
	24	02-1304	1	Hitch Pin	2
	25	07-1020	1	Toe Latch	3.1
	26	04-1054	1	Spring, Toe Latch	.5
	27	02-1201	1	Nut, Toe Latch	.1
	28	02-1501	1	Bolt, Toe Latch	.2
	29	02-12141	2	Hex Nut, Tie Rod	.2

Reproduction of this document or the manufacture of products from this document for use by anyone other than SPOKANE METAL PRODUCTS, INC. of Spokane, Wa. is strictly prohibited without written consent.

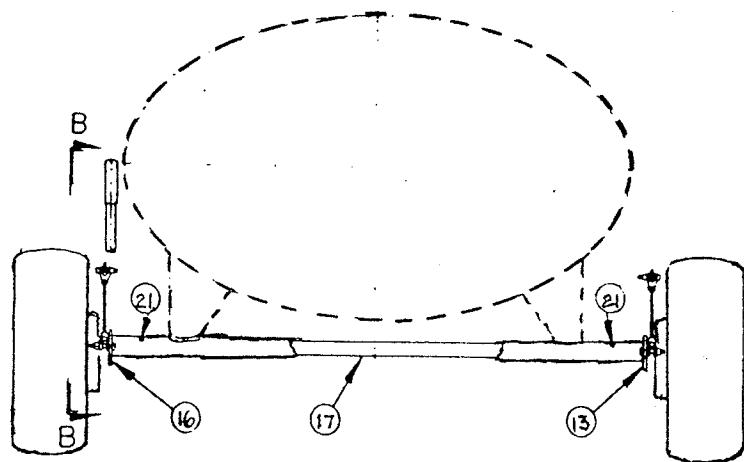
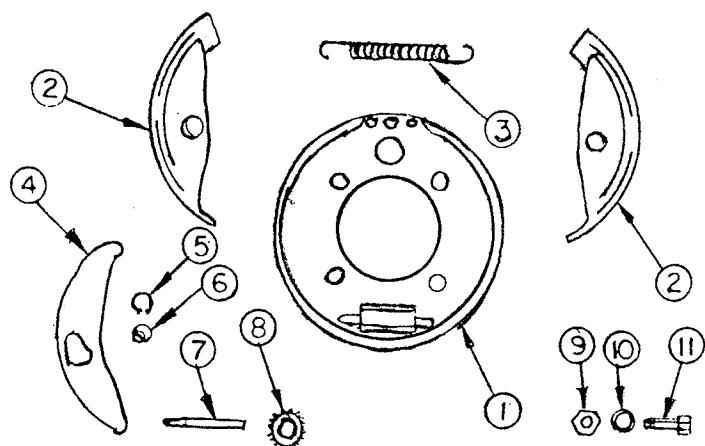
SECTION 5.2.2



ASSEMBLY NO. 08-1030Z

MAJOR ASSEMBLY - AXLE ASSEMBLY (CONTINUED)

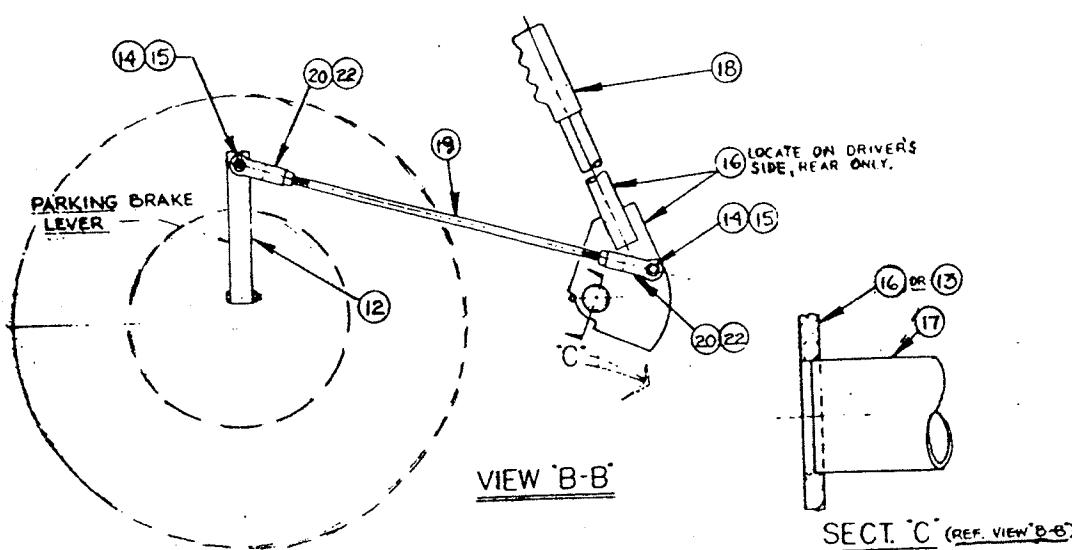
08-1030Z				Axle Assembly, Rear	
1	05-1054	1	Axle, Rear Weldment	40	
2	02-1505	2	Bolts, Mounting Spindle	.6	
3	02-12041	2	Nuts, Mounting Spindle	.5	
4	05-1022	2	Spindle, Rear	17	
5	06-1012	2	Mounting Pad, Tank	1	
6	02-1503	4	Bolt, Tank Mounting	1.3	
7	02-12041	4	Nuts, Tank Mounting	.5	



SPOKANE METAL PRODUCTS

PO BOX 3001 Spokane, WA 99203 • File # 4-Breaker Industrial Data • 408-365-0730 • FAX 509-365-4449

CONFIDENTIAL-PROPRIETARY INFORMATION
REPRODUCTION OF THESE DRAWINGS OR THE MANUFACTURING OF PRODUCTS FROM THESE DRAWINGS FOR USE BY AN
ONE OTHER THAN SPOKANE METAL PRODUCTS OF SPOKANE, WA IS STRICTLY PROHIBITED WITHOUT WRITTEN CONSEN

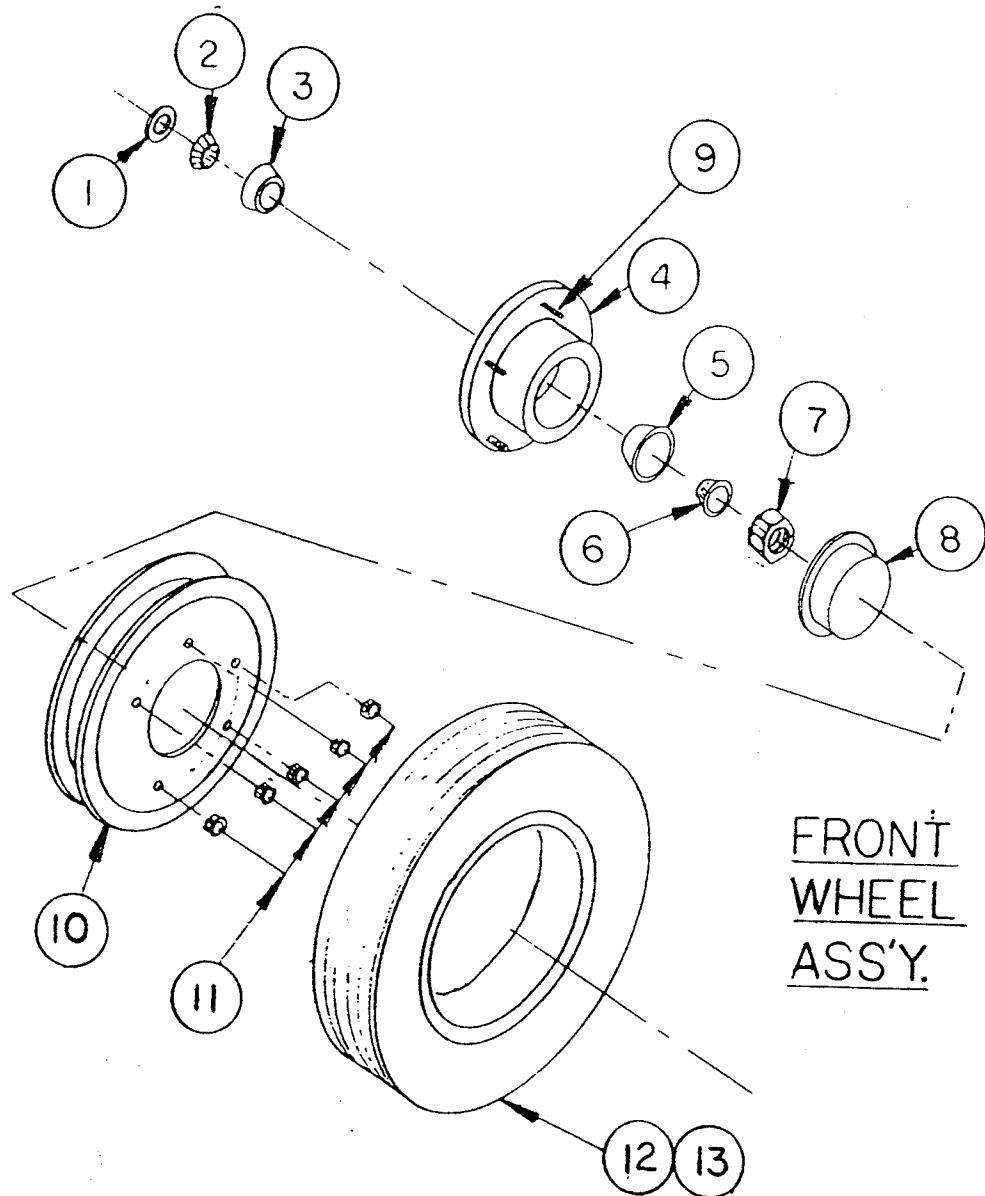


SECTION 5.2.3

MAJOR ASSEMBLY - BRAKE, PARKING

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1007	04-1063			Brake Assembly (2 Req'd)	
	1	04-1023	1	Brake, Plate Assembly	7
	2	04-1024	1	Brake, Shoe Assembly	4
	3	04-1026	2	Brake, Shoe Lever Spring	1
	4	04-1025	2	Brake, Shoe Lever	1
	5	02-1400	2	1\2" Retaining Ring	.2
	6	02-1303	2	Anchor Pin	.2
	7/8	04-1027	2	Adjusting Screw Assembly	.7
	9	02-12031	4	Nut	.2
	10	02-11031	4	Lockwasher	.1
	11	02-10031	4	Bolt, 7/16" Shoulder	.5
	12	04-1030	1	Brake, Control Arm	3
08-1008				Brake Linkage Assembly	
	13	05-1025	1	Cam, Brake Linkage	1.4
	14	02-10012	1	Bolt	.4
	15	02-12021	1	Nut	.1
	16	07-1033	1	Brake Handle, Fabd Sub-Ass	5.4
	17	01-8104	1	Brake Handle, Connector	4
	18	04-1055	1	Grip, Vinyl	1
	19	05-1026	1	Rod, Brake Linkage	1
	20	04-2516	4	Yoke Ends	.5
	21	03-1020	2	Grease Fitting	.5
	22	02-100231	4	Jam Nut, 3/8"	.5

SECTION 5.2.4

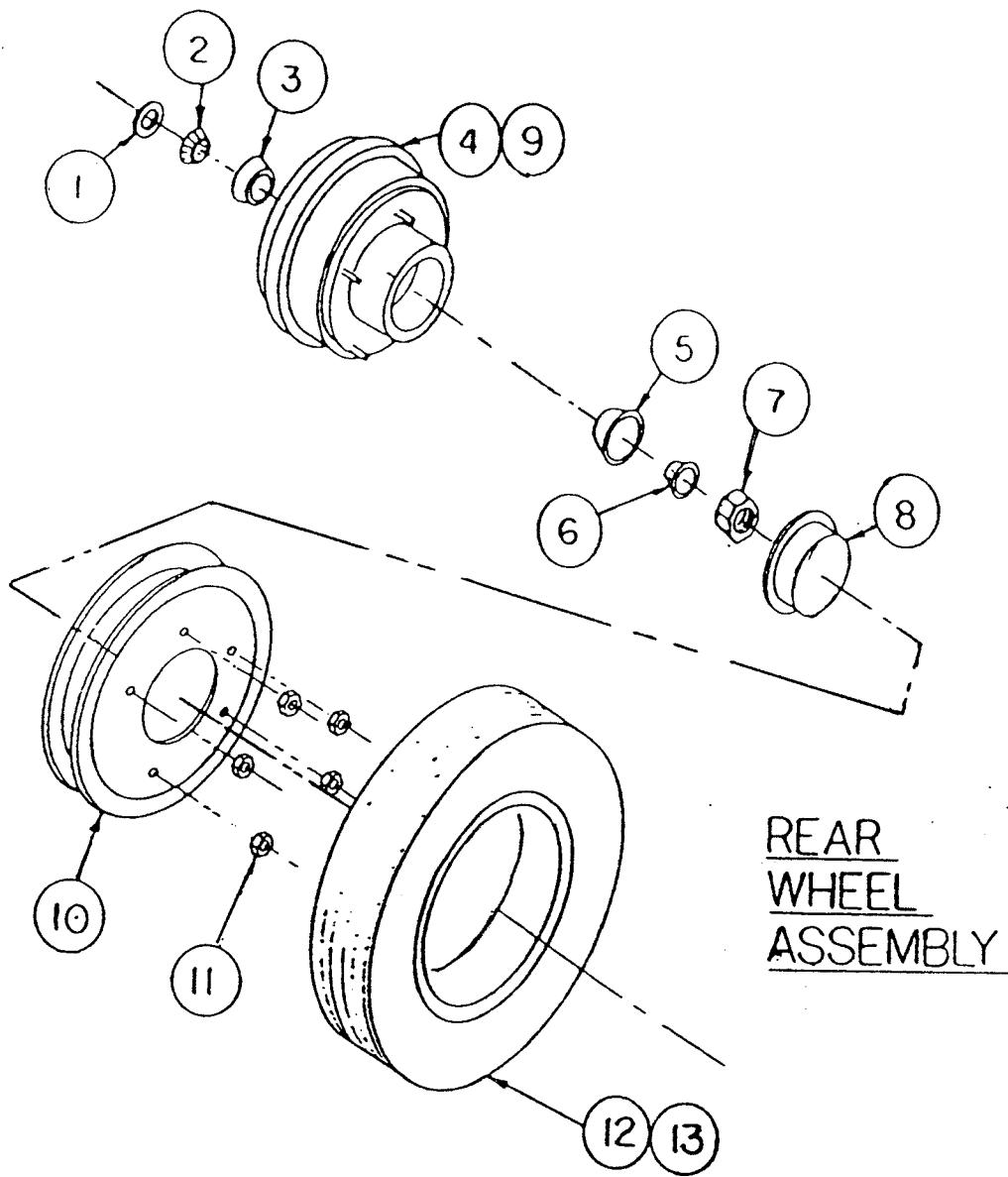


ASSEMBLY NO. 10-100042

MAJOR ASSEMBLY - WHEEL ASSEMBLY, FRONT

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1011		04-1050		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	04-1017	1	Hub, Wheel	7
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Spindle Nut	1
	8	04-1019	1	Dust Cap	1
	9	02-1017	5	Studs, Hub	1
08-10062		04-10201		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-1020	1	Wheel, Split Rim, 10"	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10222	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

SECTION 5.2.5



ASSEMBLY NO. 10-100052

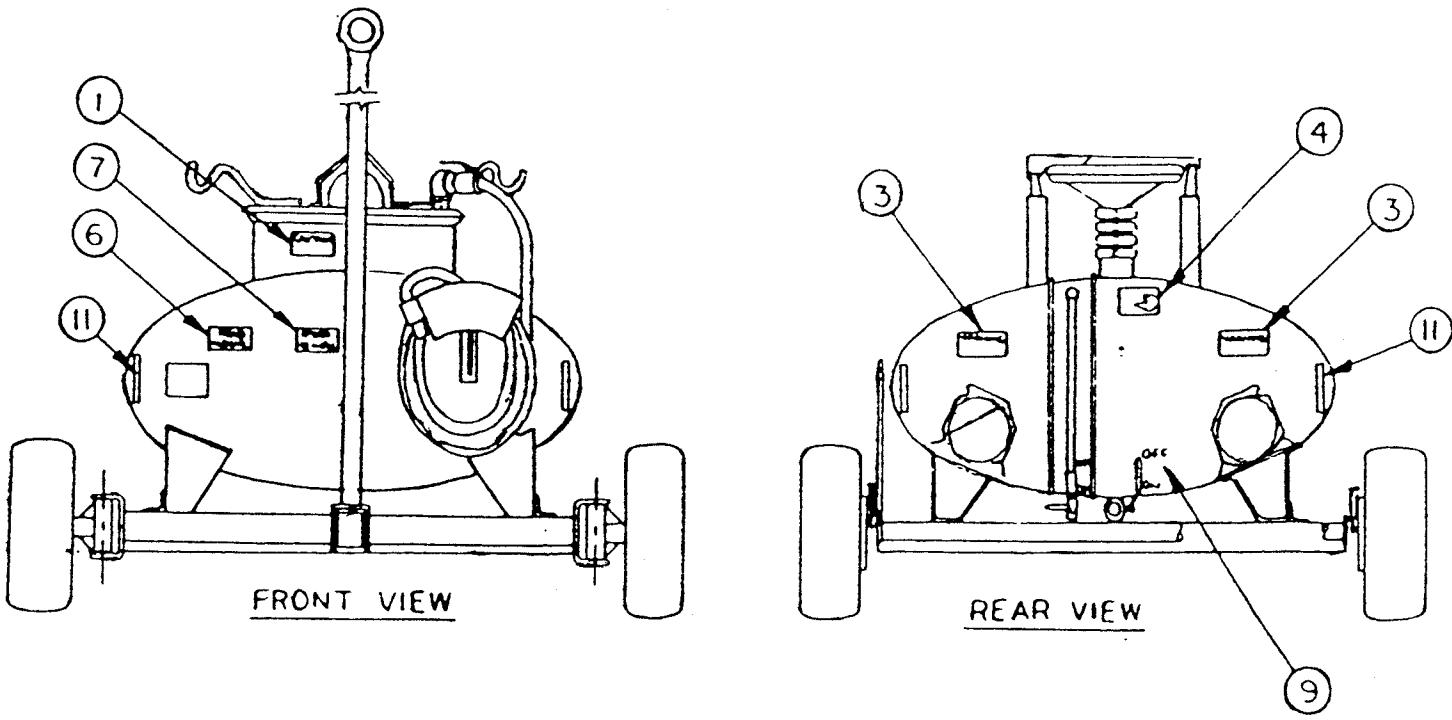
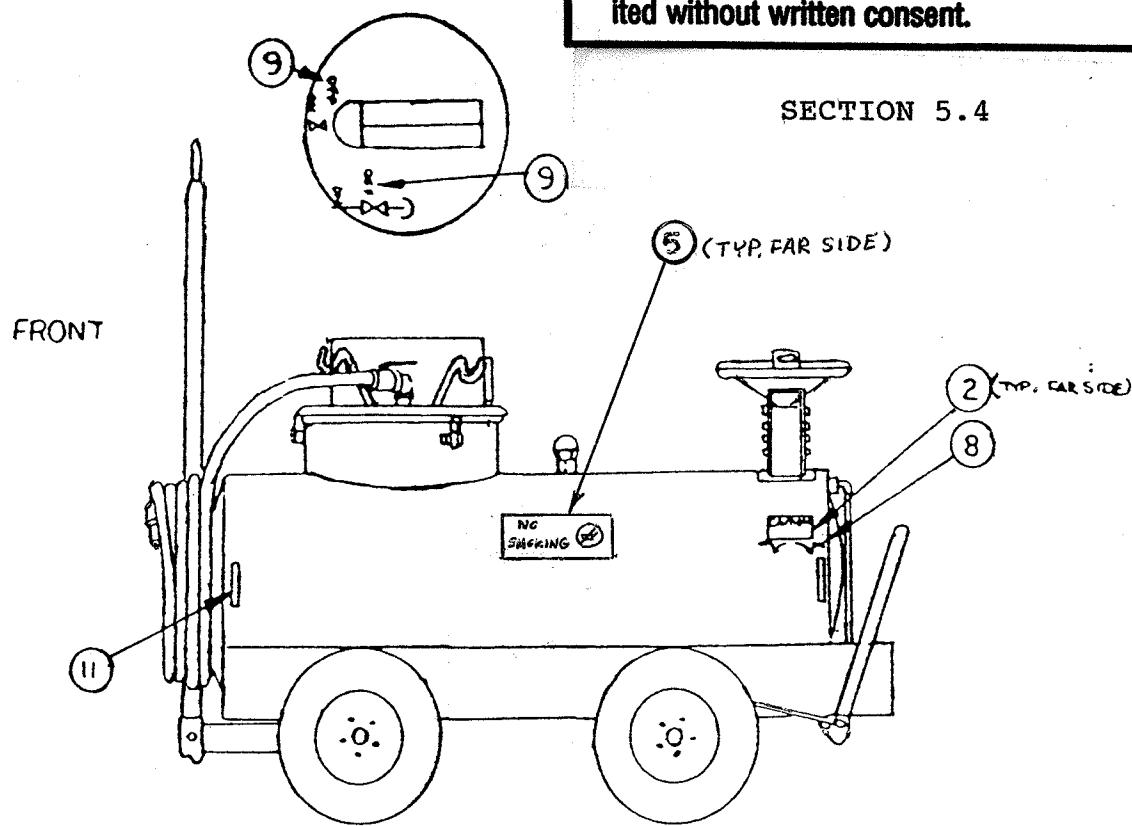
MAJOR ASSEMBLY - WHEEL ASSEMBLY, REAR

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-10111		04-1062		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	05-1008	1	Hub/Brake Drum Sub-Assy	16
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Nut, Spindle	1
	8	04-1019	1	Dust Cap	1
08-10062		04-10201		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-10201	1	Wheel, Split Rim	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10222	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

CONFIDENTIAL PROPRIETARY INFORMATION

Reproduction of this document or the manufacture of products from this document for use by anyone other than SPOKANE METAL PRODUCTS, INC. of Spokane, Wa. is strictly prohibited without written consent.

SECTION 5.4

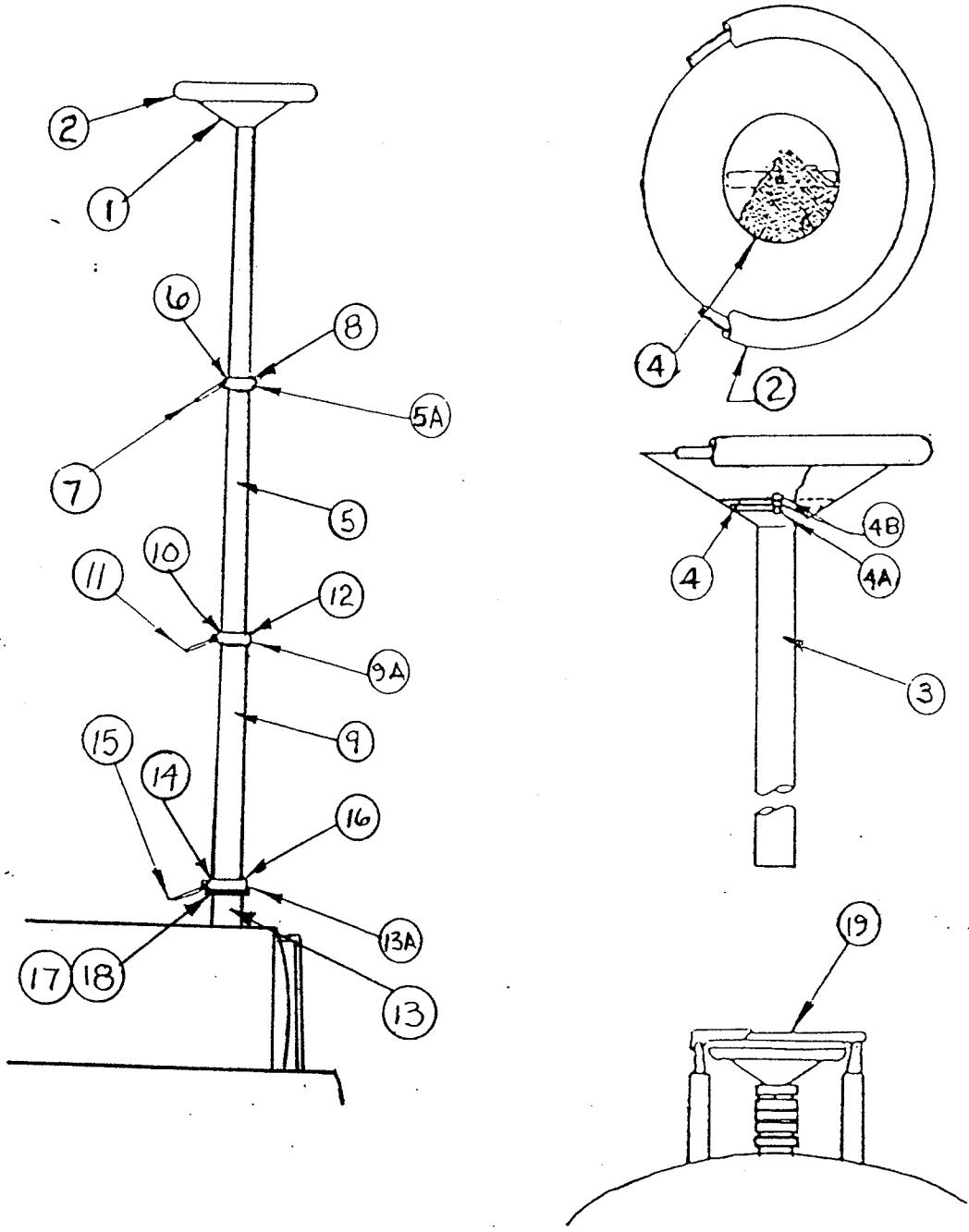


MAJOR ASSEMBLY - DECAL PACKAGE

Sub Assy.	Item	Part No.	Quantity	Description	Wt.#
10-100070				Decal Assembly	.1
	1	06-1002	1	Caution, Vacuum System	.1
	2	06-1003	1	Caution, Parking Brake	.1
	3	06-1004	2	Warning, Grounding Reels	.1
	4	06-1005	1	Warning, Telescoping Drain	.1
	5	06-1006	2	Danger, No Smoking	.2
	6	06-1007	1	Notice, Read Manual	.1
	7	06-1008	1	Maximum Towing Speed 15MPH	.1
	8	06-1010	1	Off/On, Parking Brake	.1
	9	06-1011	8	Off/On, Drain Valve	.8
*	11		8	Reflector Tape	.8

* = ITEMS NOT SHOWN

SECTION 5.5



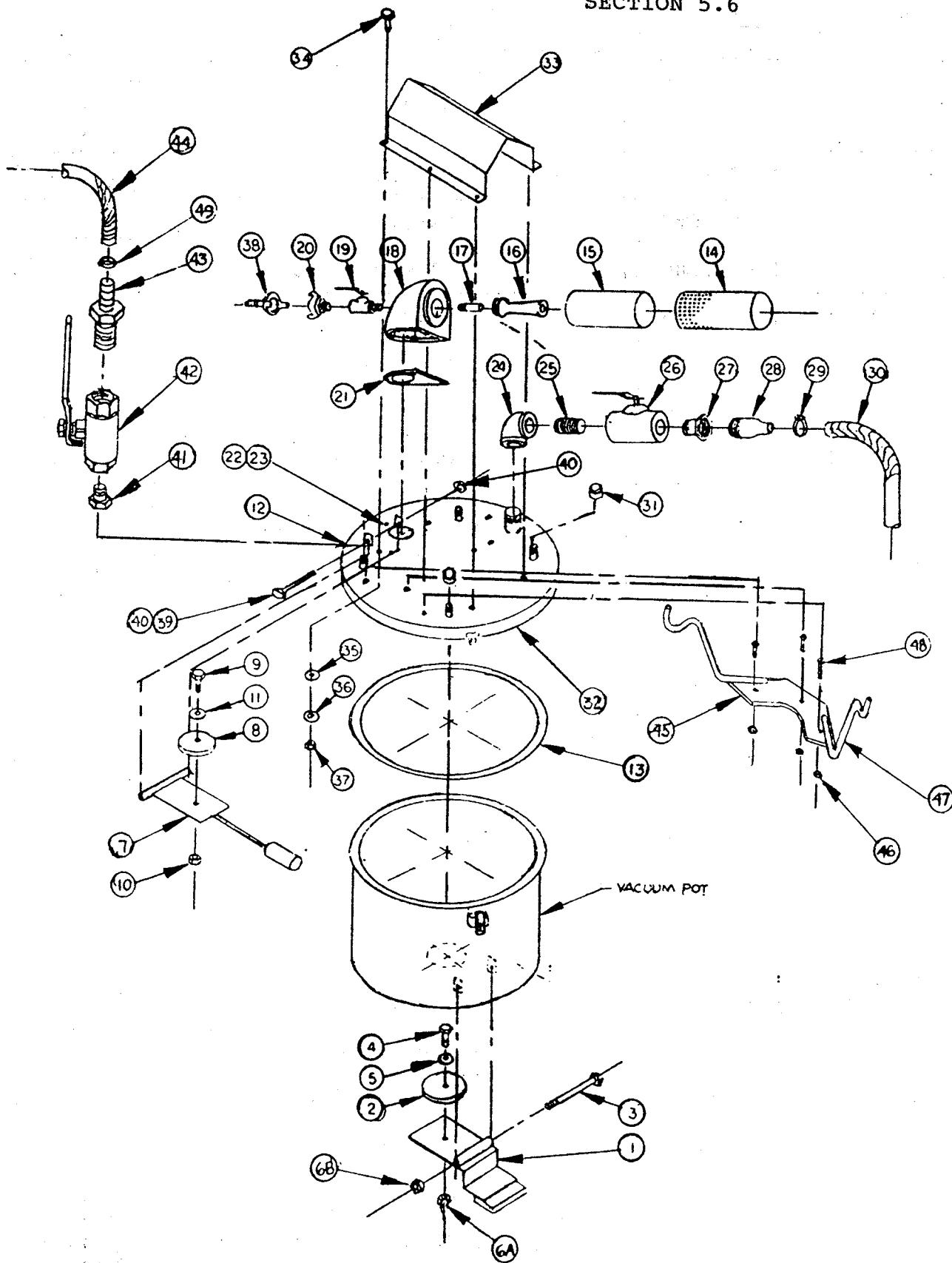
MAJOR ASSEMBLY - TELESCOPING DRAIN ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
07-1051				Drain Funnel Section Assembly	
	1	01-8250	1	Drain, Top (funnel)	.5
	2	06-1022	1	Gasket	.7
	3	01-92402	1	Tubing, 2" OD	
	4	04-1039	1	Screen	.5
	4A	02-10002	1	Bolt, 1/4"	.2
	4B	02-1200	1	Nut, 1/4"	.1
07-1049				Drain, Telescoping Sect. Assembly, 2-1/2" OD	
	5A	05-10271	1	Clamp, 2"	
	5	01-9242	1	Tubing, 2-1/2" OD	
	6	05-10051	1	WEDGE, 1"x11/16"x1 1/4"	.2
	7	05-10181	1	HANDLE, CLAMP	.3
	8	02-1005	1	SCREW, SET	.01
07-1045				Drain, Telescoping Sect. Assembly, 3" OD	
	9A	05-10281	1	Clamp, 2-1/2" OD	
	9	01-92452	1	Tubing, 3" OD	
	10	05-10021	1	WEDGE, 1"x7/8"x1 9/16"	.3
	11	05-10181	1	HANDLE, CLAMP	.3
	12	02-1005	1	SCREW, SET	.01
07-1043				Drain, Telescoping Section Assembly, 3-1/2" O.D.	
	13A	05-10291	1	Clamp, 3" TUBING	
	13	01-9254S	1	Tubing, 3-1/2" O.D.	
	14	05-10031	1	WEDGE, CLAMP	.5
	15	05-10181	1	Handles, Clamp	.3
	16	02-1005	1	SCREW, SET	.01

MAJOR ASSEMBLY - TELESCOPING DRAIN ASSEMBLY

	17	04-10560	1	Base Flange	
	18	02-100121	4	MOUNTING BOLTS, 1/4-16x3/4"	.2
08-1026	19		1	COVER ASSEMBLY	5

SECTION 5.6



VACUUM SYSTEM ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1000				Drain Stop Assembly	
	1	07-1000	1	Drain Stop Arm	3.5
	2	04-1000	1	Gasket	1.5
	3	02-10016	1	Bolt	.1
	4	02-10002	1	Bolt	.1
	5	02-1100	1	Flatwasher	.1
	6A	02-1201	1	Nut	.1
	6B	02-1200	1	Nut	.1
08-1001				Overflow Stop Assembly	
	7	07-1109	1	Float Sub. Assembly	4
	8	04-1001	1	Gasket	.1
	9	02-10003	1	Bolt	.1
	10	02-1200	1	Nut	.1
	11	02-1100	1	Flatwasher	.1
08-10022				Cover Assembly	
	12	07-1002	1	Lid	5
	13	06-1022	1	Gasket	2.7
08-1003				Nortech Vacuum Head Assy.	
	14	04-1004	1	Exhaust Housing	9.5
	15	04-1005	1	Exhaust Silencer	4.7
	16	04-1006	1	Venturi	2.2
	17	04-1007	1	Air Jet	2.7
	18	04-1008	1	Venturi Box	2.7
	19	04-1032	1	Valve	5.8
	20	04-1056	1	Coupler	1.7
	21	04-1010	1	Gasket	.1
	22	02-10010	3	Bolt	.1

VACUUM SYSTEM ASSEMBLY

	23	02-11001	3	Washer	.1
08-1004	24	03-1001	1	Accessories	
	25	03-02922S	1	Elbow	2
	26	04-10321	1	Nipple	.5
	27	03-1002	1	Valve	3
	28	03-1003	1	Hex Bushing	.2
	29	03-10101	1	Nipple	.1
	30	06-10161	1	Hose Clamp	.1
	31	06-10161	1	Hose	15
	32	03-1021	4	Pipe Cap (Optional)	1
	33	07-1019	1	Lid	24
	34	07-1034	1	Cover, Vacuum Generator	8
	35	02-10010	6	Bolt	.1
	36	06-1021	6	Washer	.1
	37	02-1100	6	Washer	.1
	38	02-1200	6	Nuts	.1
	39	04-1057	1	Coupler	.5
	40	02-10016	1	Bolt	.5
	41	02-1201	1	Nut	.1
	42	03-10155	4	Bushing (Optional)	.5
	43	04-10320	4	Ball Valve (Optional)	4
	44	03-10091	4	Hose Barb (Optional)	2
	45	06-10185	4	Tubing (Optional)	4
	46	01-9026S	2	Hanger Plate (Optional)	3
	47	02-12014	6	Hex Nuts (Optional)	.5
	48	01-9172S	4	Tubing Hangers (Optional)	2.5
	49	02-100115	6	Bolt (Optional)	1
		03-101005	4	Hose Clamp (Optional)	.5

MAJOR ASSEMBLY - MISC. FIXTURES

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1012				Drain Assembly	
	1A	04-10321	1	Ball Valve	.6
	1B	04-1033	1	Camlock Adaptor	1.5
	1C	04-10331	1	Camlock Plug	.5
	1D	04-1034	1	Safety Chain	.2
	1E	04-1034	1	S-Hook, Safety Link	.1
	1F	04-1035	1	S-Hook, Safety Link	.1
08-1013				Grounding Reel Assembly	
	2	04-10361	1	Grounding Reel	12
	2A	04-1036	1	Grounding Reel	12
	2B	02-10040	4	Bolts	.3
	2C	02-12041	4	Nuts	.1
08-1014	3			Sight Gauge Assembly	
	3A	03-0017S	2	Elbow	.5
	3B	03-1007	1	Tee	.5
	3C	03-1008	2	Nipple	.5
	3D	03-11130	2	Hose Barb	1
	3E	03-1010	2	Hose Clamp	.1
	3F	04-1032	1	Ball Valve	2.7
	3G	06-2527	1	Tubing	.1
	5	04-1037	1	Vent	3

SPOKANE METAL PRODUCTS

Spokane Washington

200 GALLON BOWSER FUEL DRAIN TANK

ONE YEAR LIMITED WARRANTY

Seller warrants its 200 Gallon Bowser Fuel Drain Tank to be free from defects in material and workmanship under the normal use and service for which the unit is intended if, but only if the unit has been properly operated, maintained and stored in accordance with printed directions contained in the product manual. Our obligation under this Warranty shall be limited to the repair or exchange of equipment and parts which may prove defective within one year of the date the unit is put into service but shall in no event extend beyond a date three years from the date the unit is shipped from our plant. All transportation charges on parts returned to us for replacement under this warranty must be returned pre-paid.

This warranty does not extend to damage caused by environmental factors varying from normal design conditions, whether natural or man-made, or to units subjected to misuse, negligence or accident. This warranty likewise does not extend to the unit or any parts thereof which have been repaired or altered improperly or in any way so as to effect adversely its stability or reliability. This warranty does not cover parts or labor required to repair or replace parts whose usefulness is exhausted due to normal operation of the unit.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE NOT SET FORTH IN A WRITING SIGNED BY AN AUTHORIZED REPRESENTATIVE OR SELLER. SELLER SHALL IN NO EVENT BE LIABLE FOR ANY CONSEQUENTIAL LOSS OR DAMAGE RESULTING FROM THE USE OR LOSS OF USE OF THE UNIT.

200-02 (SPECIEL)
ORIGINALS
FOR 18 FOOT TELESCOP.
DO NOT DESTROY

SINGAPORE AIRLINES
433 LITTLEFIELD AVE
SOUTH SAN FRANCISCO, CA.
94080
ATTN. TECHNICAL SUPPLIES MGR./DEPT.

S/0 3591 QTY 2
P/0 9122

MAILED 3-17-93

200 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 200-02 SPECIAL

INDEX

	<u>Page</u>
<u>Section 1.</u> Introduction	3
<u>Section 2.</u> Safety	3
<u>Section 3.</u> Operation	
3.1 Intended Use	4
3.2 Parking Brake	4
3.3 Tow Bar and Under Carriage	4
3.4 Telescoping Drain Assembly	5
3.5 Vacuum Assembly	5
3.6 Grounding Reels	6
3.7 Drain Valve	6
3.8 Sample Port	6
<u>Section 4.</u> Maintenance	
4.1 Parking Brake	6
4.2 Under Carriage and Tow Bar	7
4.3 Telescoping Drain Assembly	7
4.4 Vacuum Assembly	7
4.5 Grounding Reels	8
4.6 Sight Gauge	8
<u>Section 5.</u> Replacement Parts	8
5.1 Main Tank	10
5.2 Under Carriage	
Axe, Front	11
Axe, Rear	13
Brake, Parking	14
Wheel Assembly, Front	16
Wheel Assembly, Rear	18
5.4 Decal Package	20
5.5 Telescoping Drain	22
5.6 Vacuum System	25
5.7 Miscellaneous Fixtures	28
<u>Warranty</u>	30

200 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 200-03

INDEX

	<u>Page</u>
<u>Section 1. Introduction</u>	1
<u>Section 2. Safety</u>	1
<u>Section 3. Operation</u>	
3.1 Intended Use	2
3.2 Parking Brake	2
3.3 Tow Bar and Under Carriage	2
3.4 Telescoping Drain Assembly	3
3.5 Vacuum Assembly	4
3.6 Grounding Reels	4
3.7 Drain Valve	5
3.8 Sample Port	5
<u>Section 4. Maintenance</u>	
4.1 Parking Brake	5
4.2 Under Carriage and Tow Bar	5
4.3 Telescoping Drain Assembly	6
4.4 Vacuum Assembly	6
4.5 Grounding Reels	7
4.6 Sight Gauge	7

<u>Section 5. Replacement Parts</u>	7
5.1 Main Tank	9
5.2 Under Carriage	
Axle, Front	10
Axle, Rear	13
Brake, Parking	14
Wheel Assembly, Front	15
Wheel Assembly, Rear	16
5.4 Decal Package	18
5.5 Telescoping Drain	19
5.6 Vacuum Assembly	21
5.7 Miscellaneous Fixtures	24
<u>Warranty</u>	25

SPOKANE METAL PRODUCTS

Spokane Washington

CONFIDENTIAL PROPRIETARY INFORMATION
Reproduction of this data or the manufacturing of products from
this data by anyone other than Spokane Metal Products of Spokane
Washington is strictly prohibited without written consent

200 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 200-02 SPECIAL

© COPYRIGHT 1991 By SPOKANE INDUSTRIES INC.
ALL RIGHTS RESERVED

This document discloses subject matter in which Spokane Metal Products has Proprietary rights and such subject matter shall not, without the written permission of Spokane Metal Products, be either (A) used, released or disclosed in whole or in part outside the government, (B) used in whole or in part by the government for manufacture, or (C) used by a party other than the government, except for (1) emergency repair or overhaul work only, by or for the government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that release or disclosure hereof outside the government shall be made subject to a prohibition against further use, release or disclosure, or (2) release to a foreign government, or for emergency repair or overhaul work by or for such government under the conditions of (1) above. This legend shall be marked on any reproduction hereof in whole or in part.

ASSEMBLY 08-1034U (CONTINUED)

MAJOR ASSEMBLY - TELESCOPING DRAIN ASSEMBLY

08-1028U				Drain, Telescoping Section Assembly, 3-1/2" O.D.	
	13A	05-10291	1	Clamp, 3" TUBING	
	13	01-9248	1	Tubing, 3-1/2" O.D.	
	14	05-10031	1	WEDGE, CLAMP	.5
	15	05-10181	1	Handles, Clamp	.3
	16	02-1005	1	SCREW, SET	.01
07-1014U				Drain, Telescoping Section Assembly, 4" O.D.	
	17A	05-10301	1	Clamp, 3-1/2" OD	
	17	01-9259	1	Tubing, 4" O.D.	
	18	05-10041	1	WEDGE, 1"x1-7/32"x2-1/8"	.5
	19	05-10181	1	Handles, Clamp	.3
	20	02-1005	1	SCREW, SET	.01
07-1041U				Drain, Telescoping Section Assembly, 4-1/2" O.D.	
	21A	01-92565S	1	TUBE, 4-1/2" OD	
	21	05-10302	1	BASE CLAMP, 4"	4.4
	22	05-10051	1	WEDGE, 1"x1"x2-1/2"	.6
	22A	04-10561	1	BASE FLANGE	
	23	05-10181	1	HANDLE, CLAMP	.3
	24	02-1005	1	SET SCREW	.01
	25	02-100121	4	MOUNTING BOLTS, 1/4-16x3/4"	.2
	26	08-1026	1	COVER ASSEMBLY	5

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.

2.0 SAFETY

- 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 be consulted for further restrictions.
- 2.2 Telescoping Drain
 - 2.2.1 Care should be exercised in using the telescope to prevent injuring fingers between clamps by dropping sections.
- 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.
- 2.5 Parking
 - 2.5.1 Parking brake must be applied when filling and draining or when left unattended.
- 2.6 Air Supply
 - 2.6.1 Caution: Check the air pressure of supply lines to the vacuum generator to assure it is not in excess of 100 PSI.

2.7 Inspections

2.7.1 Inspection of tires, undercarriage, tow bar, vent, valves, hoses, sight gauge, reflectors, safety labels, etc., should be inspected on a periodic basis. It is recommended these inspections be performed weekly.

2.7.2 Internal inspection will be necessary to insure structural integrity and cleanliness. It is recommended that interval inspections be performed at least every (6) six months. Caution! When entering confined spaces such as the interior of the bowser tank, care should be taken to provide proper breathing equipment and a separate person dedicated solely to a safety watch of the person inside. It is strongly recommended that all local or other regulations be consulted.

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 left unattended.

3.3 Tow Bar and Undercarriage

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

3.3.2 Care should be taken not to jackknife the bowser when backing up.

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

3.4.1 The fuel bowser is equipped with a telescoping drain assembly. It is capable of being adjusted from 4'2" to 18'0" high.

3.4.2 To Raise:

- (1) Loosen top clamp if necessary.
- (2) Grasp top section with one hand and lift until the top clamp raises approximately 6 inches.
- (3) Tighten clamp securely with the other hand.
- (4) Reposition lifting hand by grasping tube below tightened clamp and lift until next clamp is raised approximately 6 inches.
- (5) 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 with one hand and loosen the securing clamp.
- (2) Slowly lower tube, hand over hand, until the following clamp is resting on the loosened clamp.
- (3) Repeat steps 1 and 2 until all sections are lowered.

3.4.4 Funnel is equipped with a nitrile rubber seal around the top edge to allow placement against the underside of a wing.

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

3.5 Vacuum Assembly

3.5.1 This assembly is equipped with air powered vacuum generator.

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 recommended air supply of 60CFM at 100 PSI and turning on the air supply valve.

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

3.5.6 The vacuum assembly is supplied with 50 feet of vacuum hose and a ball valve on the vacuum suction.

3.5.7 The vacuum assembly is equipped with (4) four each 1/2" NPT opening for use with pencil drains. To use, the pipe caps must be removed and self-closing quick disconnects attached that match local standards. To operate, close vacuum suction valve and turn air supply on and connect drain lines.

3.6 Grounding Reels

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

3.7.1 The bowser unit is equipped with a 1-1/2" NPT ball valve with a camlock connector.

3.8 Sample Port

3.8.1 The bowser unit is equipped with a 1/2" NPT valve for use as a sample port.

4.0 MAINTENANCE

4.1 Parking Brake

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

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:

- (1) King pin bushing, turning bushings and tie rod ends are self lubricating and need no additional maintenance.
- (2) Inspect wheel bearing at (3) month intervals. Repack and, or replace as needed.
- (3) Check tire pressure weekly. Maintain Pressure as per tire markings.

4.2.3 Tow bar pivot pin and hook ring should be inspected monthly for excessive wear or cracks.

4.3 Telescoping Drain Assembly

4.3.1 The telescoping Drain Assembly consists of stainless steel housing 4-1/2" in diameter permanently attached to the tank and five (5) 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

4.4.1 The vacuum assembly consist of a vacuum chamber with an air powered vacuum generator mounted on a removable cover. The cover is held in place by (3) three eccentric latches.

4.4.2 The vacuum chamber is equipped with an automatic drain valve. This valve is pre-adjusted at the factory and should not need further adjustment.

4.4.3 The vacuum cover is equipped with an overflow valve which should require no maintenance.

- 4.4.4 The vacuum generator is attached to the chamber cover. It is attached to the silencer which should be cleaned at (6) six month intervals or more often depending on the amount of use and conditions.
- 4.4.5 The vacuum hose should be inspected monthly for cracks. Any sudden loss of vacuum suction power may indicate a crack in the vacuum hose.
- 4.4.6 The cover gasket should be inspected monthly for deterioration. This gasket should be pliable and free from weather checking.

4.5 Grounding Reels

- 4.5.1 Grounding reel cables should be pulled out, cleaned and inspected monthly.
- 4.5.2 Cable clamps and ends should be inspected for loose connections monthly.

4.6 Sight Gauge

- 4.6.1 The sight gauge should be inspected monthly for loose connections and weathering of clear tubing.

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

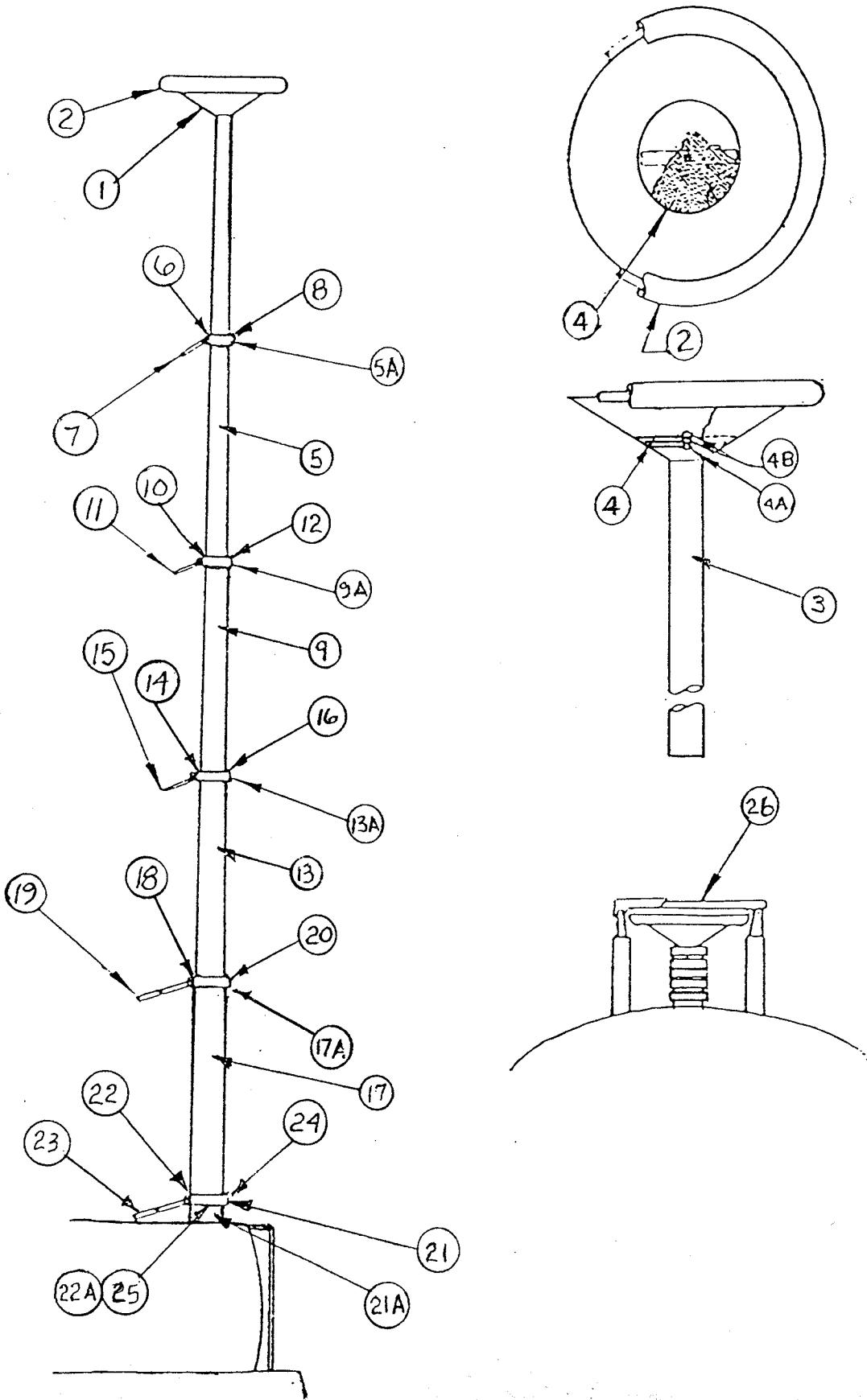
MAJOR ASSEMBLY - WHEEL ASSEMBLY, FRONT

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-1011		04-1050		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	04-1017	1	Hub, Wheel	7
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Spindle Nut	1
	8	04-1019	1	Dust Cap	1
	9	02-1017	5	Studs, Hub	1
08-10061		04-10201		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-1020	1	Wheel, Split Rim, 10"	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10221	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

MAJOR ASSEMBLY - WHEEL ASSEMBLY, REAR

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
08-10111		04-1062		Bearing & Hub Assembly (2 Reqd)	
	1	04-1012	1	Seal, Bearing	1
	2	04-1013	1	Bearing, Inner	3
	3	04-1015	1	Cup, Inner	2
	4	05-1008	1	Hub/Brake Drum Sub-Assy	16
	5	04-1016	1	Cup, Outer	4
	6	04-1014	1	Bearing, Outer	3
	7	02-1205	1	Nut, Spindle	1
	8	04-1019	1	Dust Cap	1
08-10061		04-1020		Tire/Wheel/Tube Assembly (2 Reqd)	
	10	04-10201	1	Wheel, Split Rim	9.5
	11	04-1021	5	Lug Nuts, Wheel	1
	12	04-10221	1	Tire, 10"	4
	13	04-1045	1	Tube Assembly	11

SECTION 5.5



NOTE:
THE FUNNEL ILLUSTRATED HERE IS A 16FOOT WHICH IS THE SAME AS THE
18 FOOT ORDERED EXCEPT ITEMS #3,5,9,13, & 17 ARE 2 1/2" LONGER
AND ITEM #21A IS 32 1/4" LG.

ASSEMBLY 08-1034U

MAJOR ASSEMBLY - TELESCOPING DRAIN ASSEMBLY

Sub Assy.	Item	Part No.	Quantity	Description	Wt. #
07-10541				Drain Funnel Section Assembly	
	1	01-8250	1	Drain, Top (funnel)	.5
	2	06-1022	1	Gasket	.7
	3	01-92402	1	Tubing, 2" OD	
	4	04-1039	1	Screen	.5
	4A	02-10002	1	Bolt, 1/4"	.2
	4B	02-1200	1	Nut, 1/4"	.1
08-1017U				Drain, Telescoping Sect. Assembly, 2-1/2" OD	
	5A	05-10271	1	Clamp, 2"	
	5	01-9242	1	Tubing, 2-1/2" OD	
	6	05-10051	1	WEDGE, 1" x 11/16" x 1 1/4"	.2
	7	05-10181	1	HANDLE, CLAMP	.3
	8	02-1005	1	SCREW, SET	.01
08-1027U				Drain, Telescoping Sect. Assembly, 3" OD	
	9A	05-10281	1	Clamp, 2-1/2" OD	
	9	01-92452	1	Tubing, 3" OD	
	10	05-10021	1	WEDGE, 1" x 7/8" x 1 9/16"	.3
	11	05-10181	1	HANDLE, CLAMP	.3
	12	02-1005	1	SCREW, SET	.01

200-05
SPECIAL

NATO

SPOKANE METAL PRODUCTS

Spokane Washington

CONFIDENTIAL PROPRIETARY INFORMATION
Reproduction of this data or the manufacturing of products from
this data by anyone other than Spokane Metal Products of Spokane
Washington is strictly prohibited without written consent

200 GALLON FUEL BOWSER

TECHNICAL MANUAL

PARTS, OPERATION AND MAINTENANCE

MODEL NUMBER BOW 200-05 SPECIAL

**© COPYRIGHT 1991 By SPOKANE INDUSTRIES INC.
ALL RIGHTS RESERVED**

This document discloses subject matter in which Spokane Metal Products has Proprietary rights and such subject matter shall not, without the written permission of Spokane Metal Products, be either (A) used, released or disclosed in whole or in part outside the government, (B) used in whole or in part by the government for manufacture, or (C) used by a party other than the government, except for (1) emergency repair or overhaul work only, by or for the government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that release or disclosure hereof outside the government shall be made subject to a prohibition against further use, release or disclosure, or (2) release to a foreign government, or for emergency repair or overhaul work by or for such government under the conditions of (1) above. This legend shall be marked on any reproduction hereof in whole or in part.