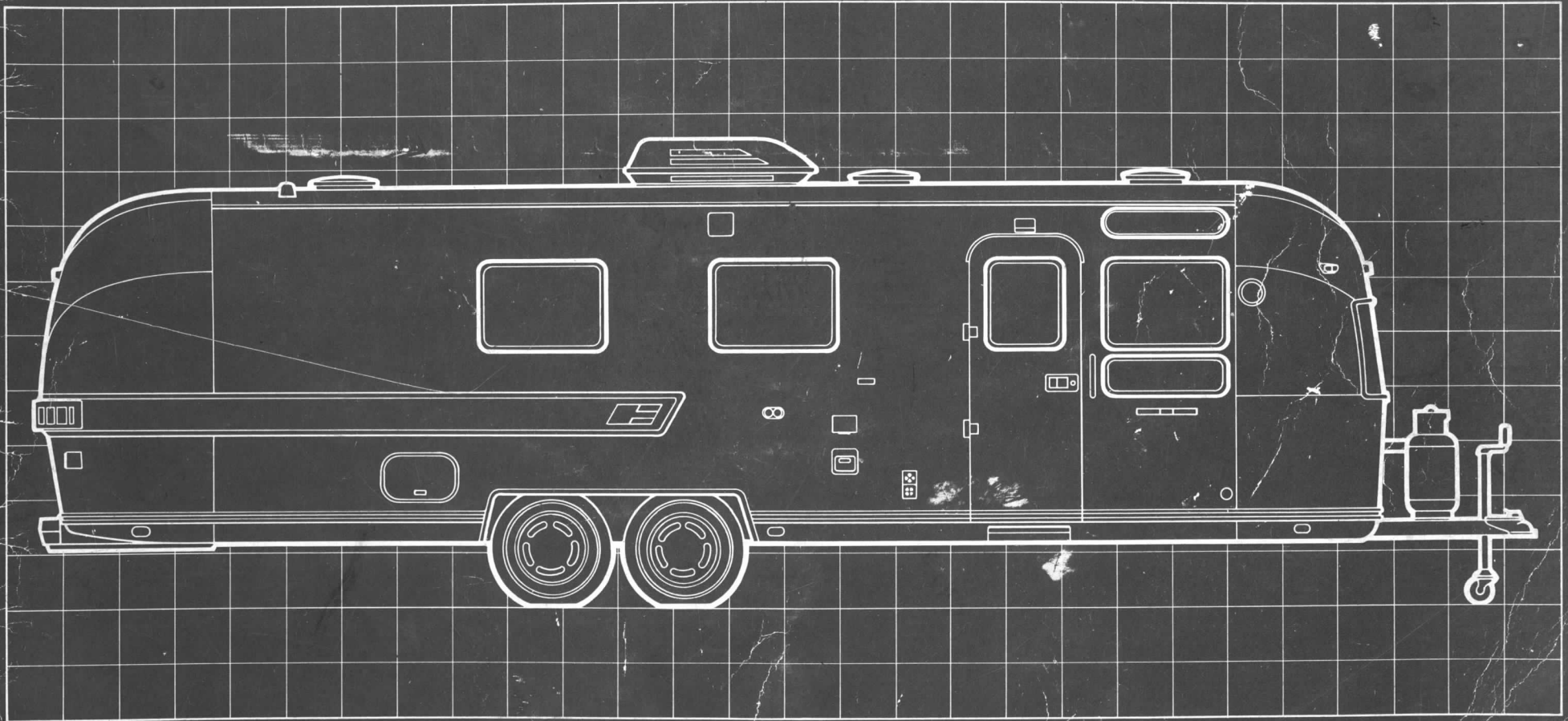


1977 AIRSTREAM SERVICE MANUAL



1977 Airstream Service Manual

This manual includes illustrated parts lists, procedures for maintenance and adjustments, service operations, removal and installation for components, including options for Airstream 21 Ft., 23 Ft. Twin and Double, 25 Ft. Twin and Double Land Yacht and 27 Ft. Twin and Double, 29 Ft. Twin and Double, 31 Ft. Twin and Double International Rear Bath and Center Bath models.

The Section Index on the following page enables the user to quickly locate any desired section. At the beginning of each section containing more than one major subject is an Index, which gives the page number for each illustrated parts list and major subject. The Floor Plan Section gives the location of each major interior component and the page where detail information can be found on these components.

This manual should be kept in a handy place for ready reference. If properly used, it will enable the technician to better serve the Airstream owners.

All information, illustrations and specifications contained in this literature are based on the latest product information available at the time of publication approval. The right is reserved to make changes at any time without notice.

Airstream, Inc.

Airstream Ohio
Jackson Center, Ohio 45334

Airstream California
15939 Piuma Avenue
Cerritos, California 90701

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Chassis

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Chassis - Single (21 Ft.)

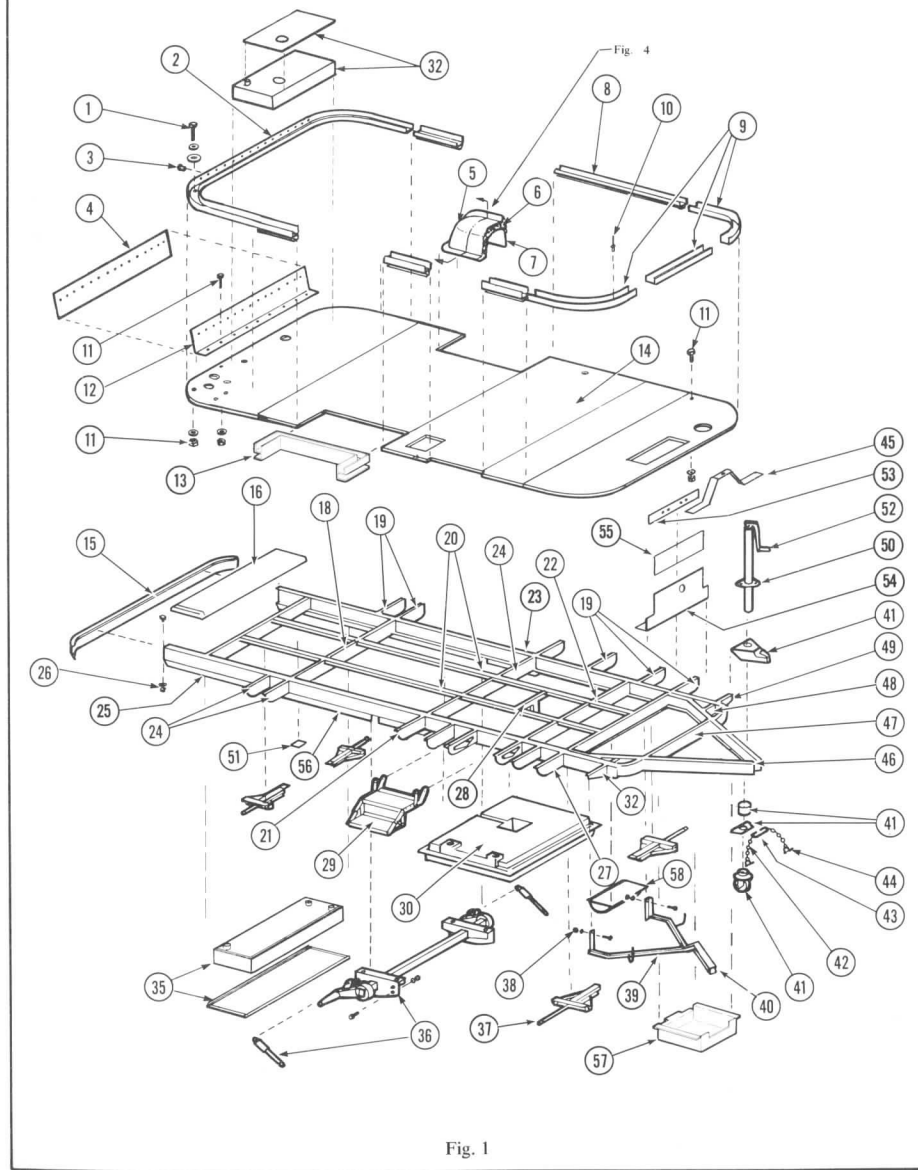


Fig. 1

Chassis - Tandem (23 Ft.-31 Ft.)

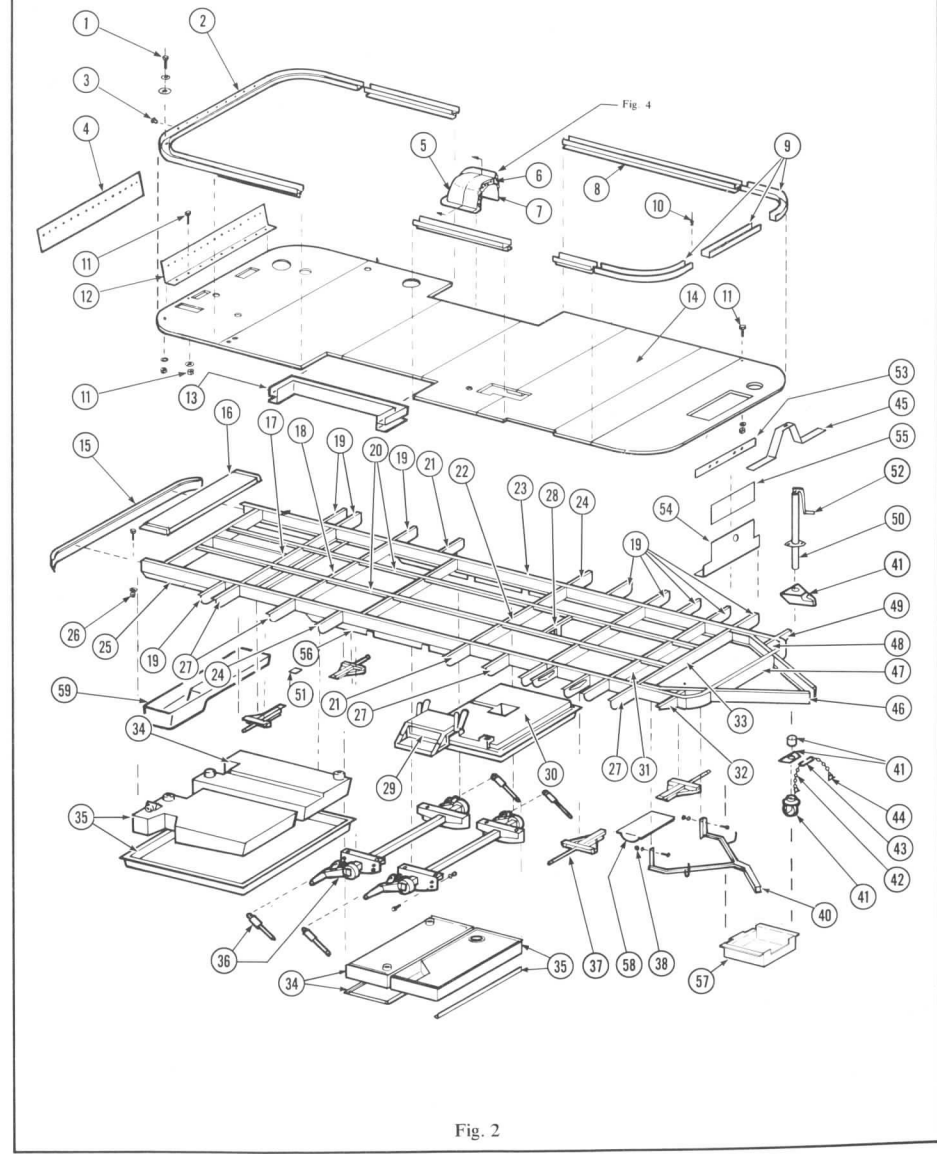


Fig. 2

Chassis Assembly—Tandem & Single

No.	Part No.	Description
1	345018	3/8 — 16 x 1 1/2 bolt
	350005	Nut 3/8 — 16
	300019	Washer flat 3/8 I.D. x 3/4 O.D.
	300023	Washer flat 1 1/2 x 3
2	101116	Floor channel formed rear
3	325008	Rivet, hard 4-8 hard
4	101397	Aluminum clad sheet .032 x 3 1/2 x 61 1/2
5	201084	Wheel well single (interior)
	201083	Wheel well tandem (interior)
6	200048	Insulation
7	201307	Wheel well single (exterior)
	201308	Wheel well tandem (exterior)
8	101056	Floor channel
9	100065	Floor channel formed front
10	335006	Rivet bond self plugging GSP-7-RB-15
11	345010	Screw weld 1/4 — 20 x 2 1/2 type WSV
	350004	Nut
	300007	Lock washer
12	410172	Rear hold down plate
13	—	Extrusion, wheelwell
14	800047	Plywood 1/2 x 48 — 91 1/2
15	410121	Bumper
16	912119	Hose carrier assembly
		Includes the following
	912120	Lid hose carrier
	380452	Hinge
	380392	Hold back spring
	200161	End cap
	101134	Aluminum sheet
17	400154	Crossmember
18	400120	Crossmember
19	410116	Outrigger
20	400136	Longitudinal tubing
21	400026	Outrigger
22	400157	Crossmember
23	410111	Chassis channel — specify length
24	400027	Outrigger
25	410142	Skid rear
26	350010	Nut 5/16 — 18 hex.
27	410115	Outrigger, roadside
28	400158	Support "T"
29	—	Step assembly (see page 1-5)
30	—	Water tank assembly (see page 1-7)
31	400123	Crossmember standard
32	410117	Outrigger tapered
33	400122	Front crossmember
34	—	Main holding tank ass'y (shower bath) see page 1-12, (full bath) see page 1-8, (center bath) see page 1-10
35	—	Auxiliary holding tank ass'y (shower bath) see page 1-12, (full bath) see page 1-8, (center bath) see page 1-10
36	—	Tandem running gear (see page 1-14)
		Single running gear (see page 1-14)
37	—	B.A.L. jacks (see page 1-26)
38	345031	Hex bolt
39	410176	Spare wheel carrier
40	345016	Bolt machine
41	400042	Hitch marvel (less jack) (see page 1-25)
		Includes the following
	MC883	Coupler
	MC542	Caster w/thumb screw
	MC353-4	Guide plate with modified hole
	—	Hex bolts
	MC557	Locking mechanism
	—	Guide plate bushing (power jack only)
42	400137	Chain safety
43	400034	Chain retaining loop
44	400043	Shackle
45	450426	Gas bottle base
46	410171	Tubing A frame
47	410122	Crossmember, formed
48	410123	Gusset plate
49	410118	Outrigger tapered
50	400035	Jack post (Atwood) see page 1-24
51	385020	Jack pads
52	—	Grip jack handle
53	450427	Brake actuator mounting strap
54	450428	Front hold down plate
55	410129	Plate, hold down
56	400118	Mounting plate L.H.
	400119	Mounting plate R.H.
57	400628	Pan, vacuum booster tank
58	C-3098-K	Disc brake vacuum reservoir
59	912119	Hose carrier

Replacement of Wheel Well (Exterior)

1. Remove wheels to allow access.
2. Using no. 30 drill, remove wheel well trim strip.
3. With sharp razor knife cut off old wheel well 2" above main rail around entire periphery and remove.
4. Install 2" aluminum strip (.032 min. thick) behind remaining portion of old wheel well. Pop rivet approximately 12" center to hold it in place.
5. Clean remaining portion of old wheel well and add generous bead of silicon or equivalent caulking compound.
6. With sharp razor knife, cut off lower flange of replacement wheel well.
7. Lift new wheel well into position taking care that the fiberglass insulation is in place.
8. Place 2" wide strip of aluminum (min. .032 thick) on exterior lower edge of new wheel well. Attach with sheet metal screws @ 3" centers thru ext. 2" wide strip, new wheel well, old wheel and 3" strip installed in step 4.
(See fig. 3).
9. Add silicon or equivalent caulking between exterior skin and new wheel well and replace wheel well trim.

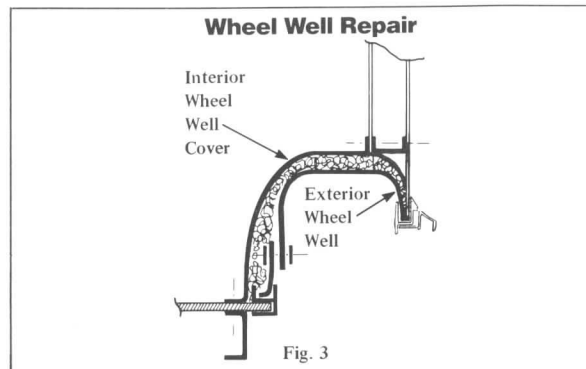
Repair Damaged Wheel Well (Exterior)

Rock damage or split may be repaired as follows:

1. Remove wheel assembly to gain access.
2. Clean dirt from area to be repaired and rough surface with sandpaper.
3. If damage is a crack, drill 1/4" hole at each end to stop crack propagation.
4. Caulk surface liberally.
5. Use a piece of aluminum or galv. metal at least 1" larger than damaged area and attach with sheet metal screws.
6. Fillet caulk perimeter of metal plate.

Replacement or Repair of Wheel Well Cover (Interior)

1. Original cover is held in place with screws and/or pop rivets attached to floor and trailer wall.
2. Where furniture does not permit the removal of entire cover, repair to the present cover may be more advantageous.
3. Cut out damaged area and remove.
4. Cut appropriate portion from a new wheel well cover.
5. Install new section, securing its' perimeter with screws to floor, wall and original wheel well.
6. Fillet caulk as necessary.



Main Door Step Assembly

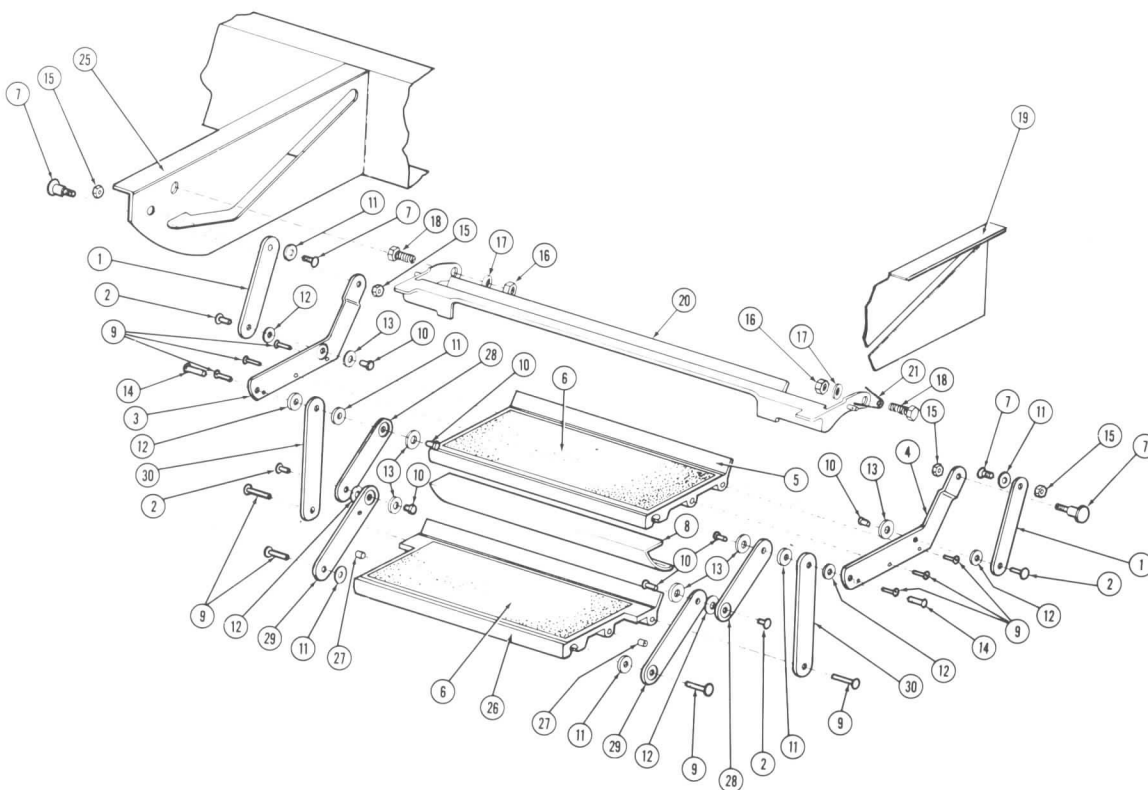


Fig. 4

Step Assembly

No.	Part No.	Description
	410136	Main door step assembly
1	*	Arm, support upper
2	*	Pin, hinge
3	*	Step bracket, left
4	*	Step bracket, right
5	*	Extrusion, step 20½"
6	380069	Safety tread
7	345005	Shoulder bolt, ½" shoulder 3/8" THD.
8	—	Panel
9	*	Flat head socket screw
10	*	Socket bolt
11	*	Washer, bronze, 3/8" ID x 5/8" OD x .010
12	*	Washer, wave 5/8" ID
13	*	Washer, Alum. 5/16 ID x ¾ OD x 1/16
14	*	Pivot pin
15	350005	Nut
16	350000	Nut, nylock 1/4" - 20
17	300005	Washer, flat 1/4"
18	345016	Screw 1/4" x 20 x 1" hex head
19	400054	Outrigger, R.H.
20	100298	Step release casting
21	380231	Spring
25	400055	Outrigger, L.H.
	*	Part of assembly No. 410136

Auxiliary Step Assembly (Optional)

	410169	Auxiliary step assembly
26	410200	Extrusion, step 20"
27	410201	Spring plunger (bullet catch)
28	400004	Hinge arm, upper
29	400003	Hinge arm, lower
30	400005	Arm, support lower

Main Door Step Removal

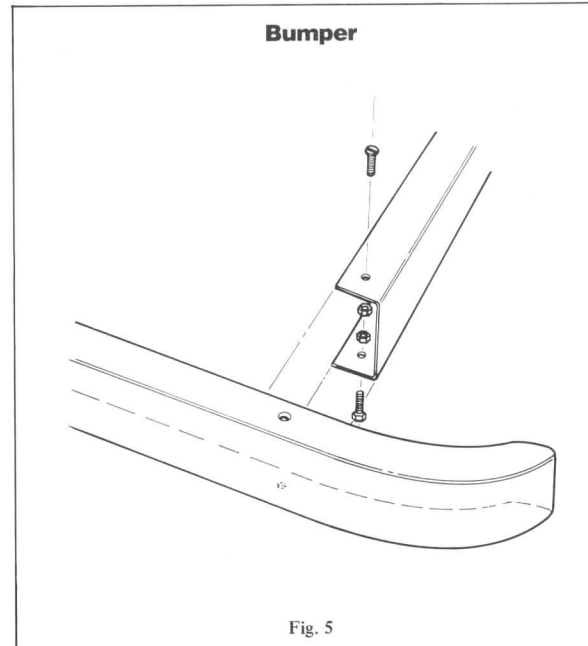
1. Using a number 11 drill bit, drill the rivets that attach the underbelly to the step frame.
2. Drill under curved sides of trailer. Use metal snips and cut underbelly from step frame approximately 8" square (both sides of step).
3. The 8" square opening will now permit access to the four bolts (item No. 7) attaching step to mounting frame.
4. Use an allen wrench to hold the head of these bolts and an end wrench to remove the nut. NOTE: The bolt that holds the pivot arm is reversed from the bolt that slides in the slotted outrigger.
5. When replacing, reverse step No. 4.
6. Replace cut-out area using a piece of underbelly approximately 9" square with pop rivets in each corner and one additional rivet centered on each side. Pop rivet size is AD45BS.

Installation Auxiliary Step (Optional)

1. Attach support (Item No. 30) and linkage (Item No. 28) arms to step brackets (left hand, Item No. 3, and right hand, Item No. 4).
2. Attach second linkage arm (Item No. 29) to first linkage arm (Item No. 28)
3. Attach step (Item No. 26) to lower end of support arm (Item No. 30).
4. Attach step (Item No. 26) to lower end of second linkage arm (Item No. 29).
5. Insert screws, bolts, spacers and washers as shown.
6. Use Lock tite C to prevent screws and bolts from coming loose.

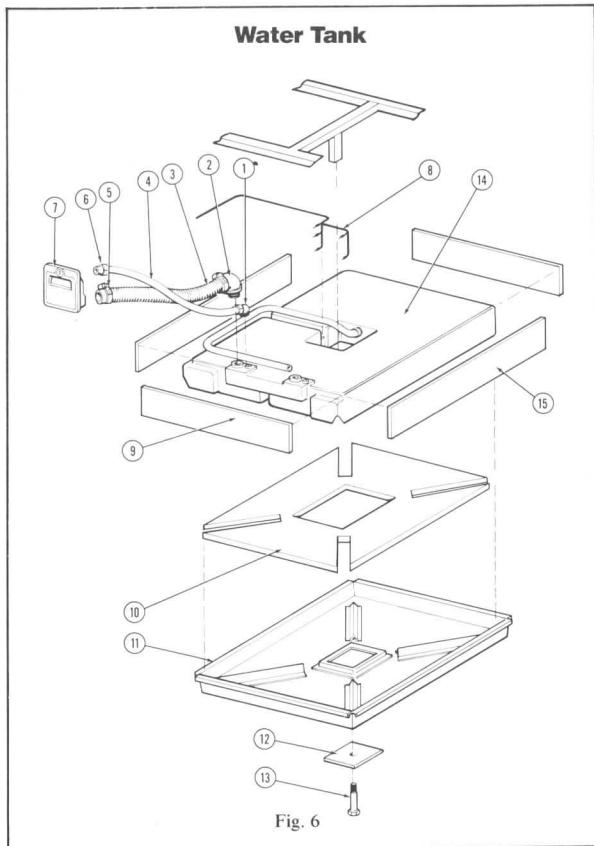
Bumper Removal and Replacement

1. Remove 4 bolts attaching bumper to frame.
2. Remove bumper.



Floor Splice To Repair a Damaged Floor Section

1. Determine how much damaged section must be removed.
2. Remove no more than necessary, making straight cuts wherever possible (a saber saw can be used). In areas where the outriggers, stringers and main frame are located it will be necessary to use a circular saw in which the cutting depth is only through the wood.
3. After damaged section is removed, use it for a pattern to cut replacement section. If it is not possible to use damaged section, place new section over cut out area and mark from bottom side. Then, with a saber saw, cut replacement section to fit cut-out area.
4. Using 4" wide pieces of flooring plywood the same length of cut out area, place a heavy bead of a good wood glue (such as Elmer's glue), approximately 1" from edge on one side and flow the glue the full length of the piece
5. Fit these strips on the bottom side of the cut-out area, allowing approximately 2" of strip to extend into cut-out area.
6. Secure these strips into place with wood screws every 2" along the edge. (Screws must be counter sunk.)
7. After strips are in place along all sides, apply a bead of wood glue to portion of strip extending in cut-out area, then put replacement section into cut-out area.
8. Install counter sunk wood screws every 2" along edge of replacement section.
9. Any cracks can be filled by using rock hard wood putty. After it is dry it can be sanded to a smooth finish.



No.	Part No.	Description
1	600270	ELL 3/8 MPT x 3/8 bar B
2	600580	ELL 1 1/2 MPT x 1 1/2
3	600579	Flexible hose 1 1/2 x 20"
4	600016	Hose vent 3/8 I.D. x 25"
5	340024	Adjustable clamp #24
6	340022	Clamp spring 3/8"
7	600351	Spout-water fill
8	510165	Harness - probe
9	200151	Styrofoam 1/2 x 7 1/4 x 44 1/4
10	200131	Styrofoam bottom
11	600550	Pan - water tank
12	400155	Plate support
13	345074	Bolt 5/16 - 18 x 7/8
14	600571	Water tank
15	200152	Styrofoam 1/2 x 7 1/4 x 57

Water Tank Removal

1. Empty tank by opening a drain valve or faucet and turn water pump switch on.
2. Remove hose clamps from fill and vent pipes. Remove heat duct.
3. Disconnect water tank probe wires (these are push-together connectors) in area below galley.
4. Remove center support bolt and plate from underside of trailer.
5. Loosen clamp on discharge line leading from tank to water pump and remove line from tank.
6. Under trailer, remove clamps securing gas lines.
7. Disconnect gas lines and swing them free of water tank area. In some cases, depending on model, the lines can be moved without disconnecting. On a few models the lines leading to the shut-off valves must be removed.
8. Support center of support pan and tank with floor jack.
9. Remove bolts securing support pan to chassis.
10. Lower support tank pan assembly.
11. When installing, reverse above steps, making sure styrofoam strips are reinstalled.
12. When reinstalling gas lines, be sure to check for gas leaks. Be careful not to get dirt into line when inserting through floor area.
13. Water check when connections are completed.

Main & Auxiliary Waste Tank (Full Bath)

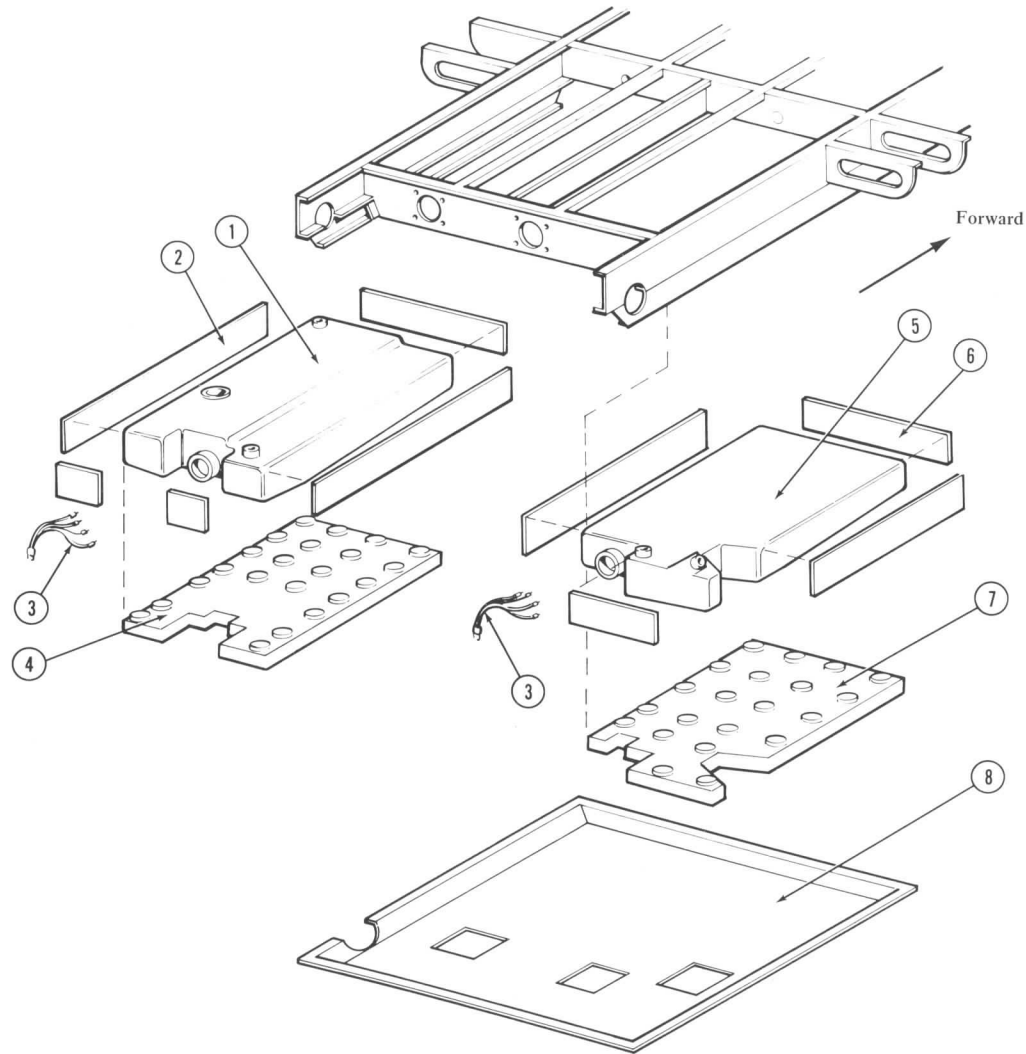
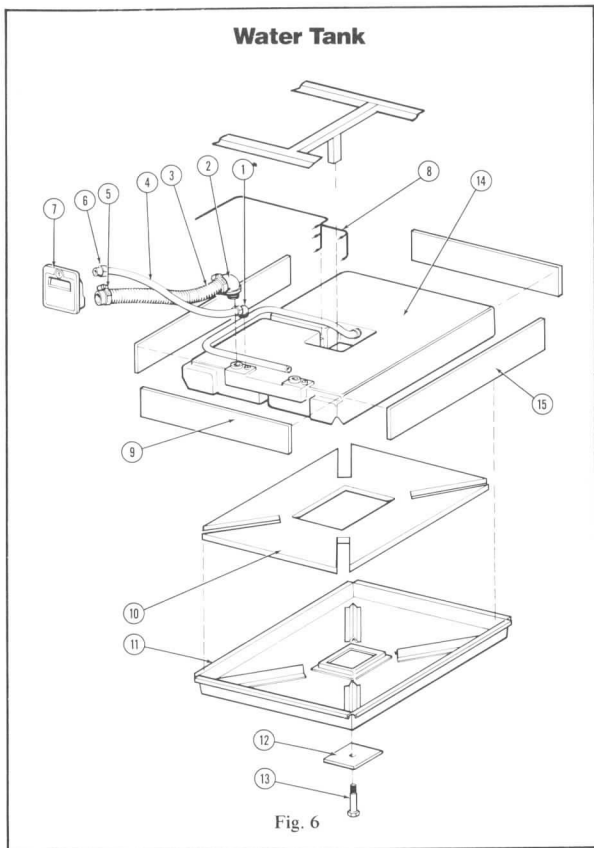


Fig. 7

No.	Part No.	Description
1	600494	Holding tank main
2	200151	Styrofoam 1/2 x 7 1/4 x 44 1/4
3	510165	Harness
4	200282	Slope pad, main tank
5	600495	Holding tank auxilliary
6	200152	Styrofoam 1/2 x 7 1/4 x 57
7	200283	Slope pad, auxiliary tank
8	600572	Pan holding tank



No.	Part No.	Description
1	600270	ELL 3/8 MPT x 3/8 bar B
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Water Tank Removal

1. Empty tank by opening a drain valve or faucet and turn water pump switch on.
2. Remove hose clamps from fill and vent pipes. Remove heat duct.
3. Disconnect water tank probe wires (these are push-together connectors) in area below galley.
4. Remove center support bolt and plate from underside of trailer.
5. Loosen clamp on discharge line leading from tank to water pump and remove line from tank.
6. Under trailer, remove clamps securing gas lines.
7. Disconnect gas lines and swing them free of water tank area. In some cases, depending on model, the lines can be moved without disconnecting. On a few models the lines leading to the shut-off valves must be removed.
8. Support center of support pan and tank with floor jack.
9. Remove bolts securing support pan to chassis.
10. Lower support tank pan assembly.
11. When installing, reverse above steps, making sure styrofoam strips are reinstalled.
12. When reinstalling gas lines, be sure to check for gas leaks. Be careful not to get dirt into line when inserting through floor area.
13. Water check when connections are completed.

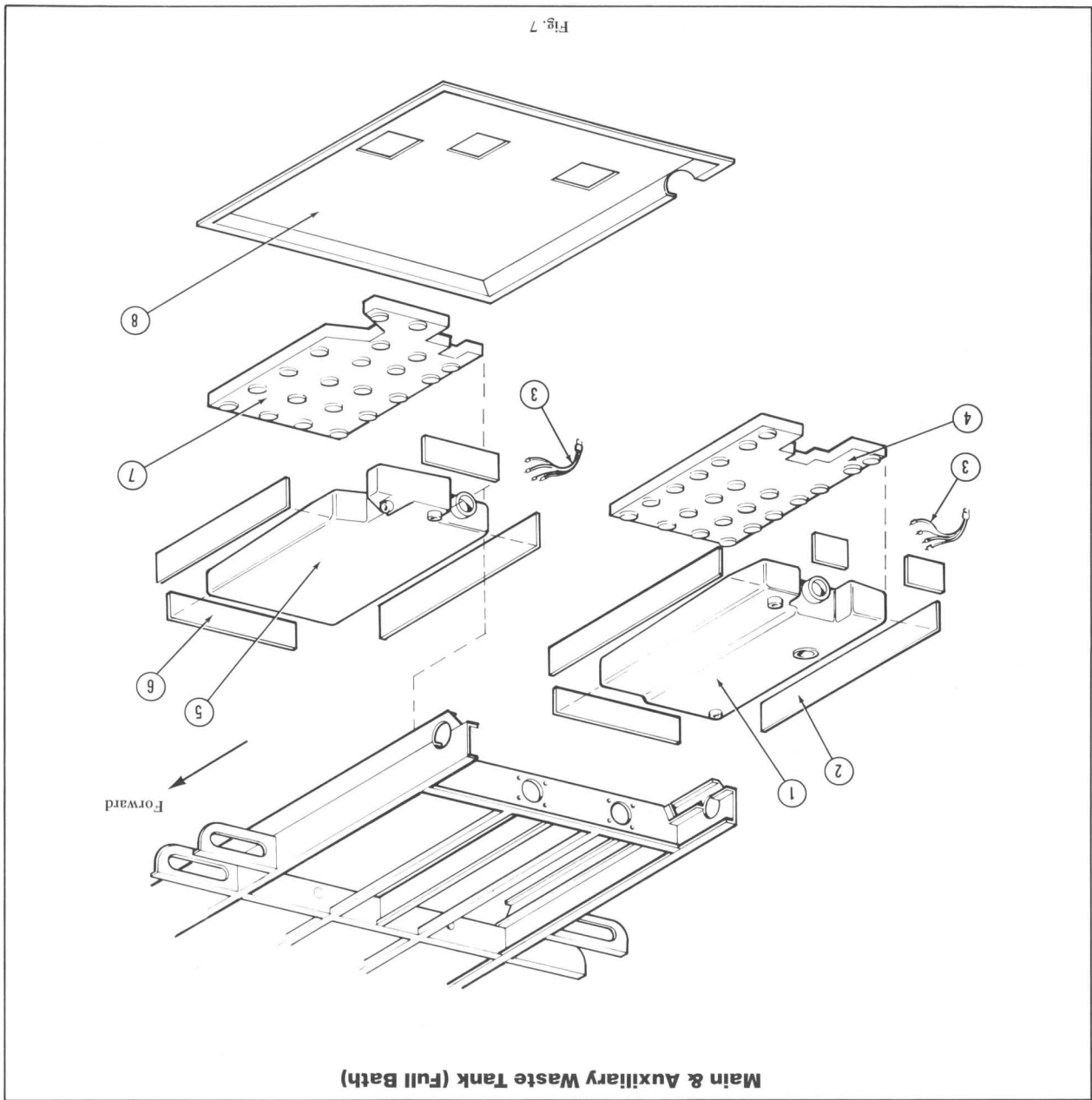


Fig. 7

Main & Auxiliary Waste Tank (Full Bath)

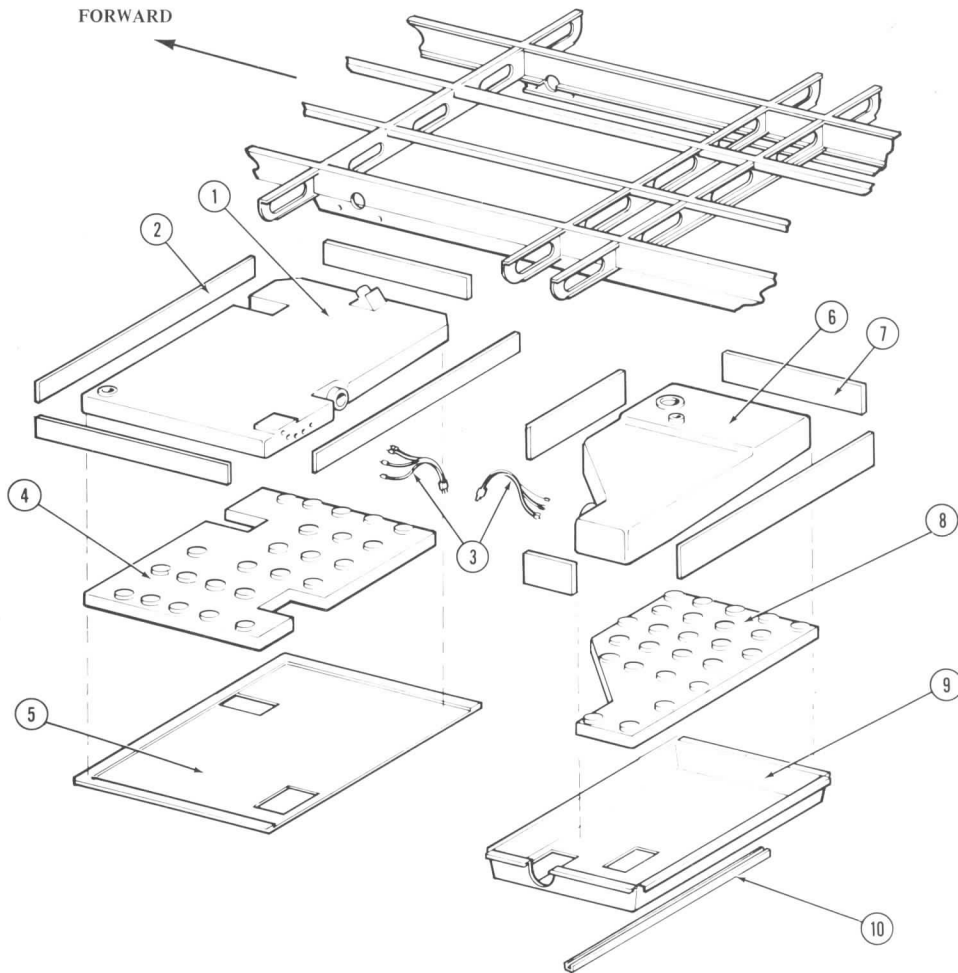
No.	Part No.	Description
1	600494	Holding tank main
2	200151	Styrofoam 1/2 x 7 1/4 x 44 1/4
3	510165	Harness
4	200282	Slope pad, main tank
5	600495	Holding tank auxiliary
6	200152	Styrofoam 1/2 x 7 1/4 x 57
7	200283	Slope pad, auxiliary tank
8	600572	Pan holding tank

Main & Auxiliary Holding Tank Removal and Replacement (Full Bath)

1. Empty both tanks. If tanks are not completely emptied they may be damaged during the removal procedure.
2. Remove bumper and hose carrier liner.
3. Remove vents and drain lines from tank being removed. Remove toilet if main holding tank is being replaced. Unplug the fluid level wires from tank.
4. Remove 4 screws securing slide valve to tank being removed. Access gained through rear service compartment.
5. Support tank pan with floor jack.
6. Remove bolts securing tank support pan to chassis.
7. Lower support pan and tank(s) assemblies.
8. Replace the pad material if sewage has come in contact with it.
9. Transfer termination valve to the new tank.
10. Apply adequate sealant between support pan flanges and chassis to insure a proper seal.
11. Replace by reversing above procedures.

NOTE: Check replacement tank for leaks by filling with water before and after installation.

Waste Tank Removal – Main & Auxiliary (Center Bath)



No.	Part No.	Description
1	600556	Holding tank auxilliary
2	200149	Styrofoam
3	510165	Harness
4	200104	Slope pad, auxiliary tank
5	600575	Pan support, auxilliary
6	600563	Holding tank, main
7	200152	Styrofoam
9	600574	Pan support, main
10	400166	U-channel

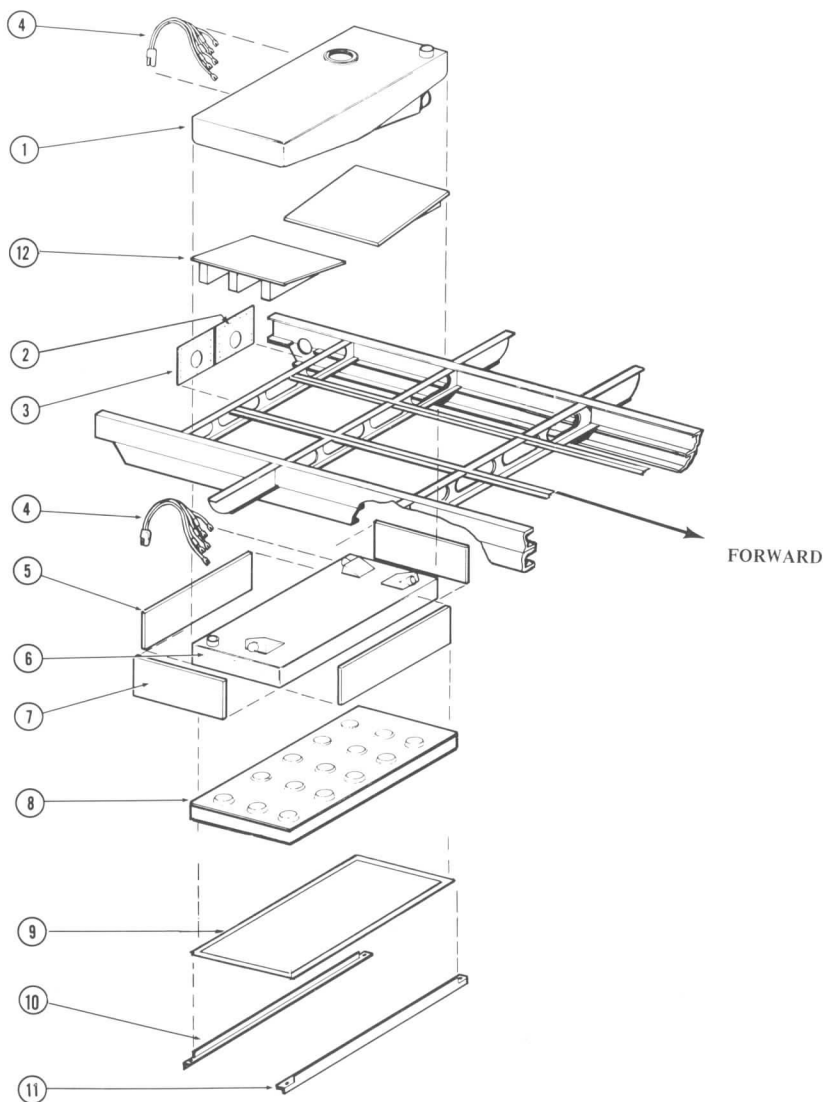
Fig. 8

Main & Auxiliary Waste Tank Removal and Replacement (Center Bath)

1. Empty tank completely. If tank is not completely emptied it may be damaged during this removal procedure.
2. Remove drain lines.
3. Unplug liquid level wires located under nightstand or wardrobe.
4. From under trailer remove waste tank access panel.
5. Support tank pan with floor jack.
6. Remove bolts which secure tank pan to chassis.
7. Pan can be slid forward of the axle to remove tank.
8. Remove drain outlet from drain pipe. It is not necessary to remove slide valve.
9. Lower tank by sliding back and down.
10. Apply adequate sealant between support pan flanges and chassis to insure a proper seal.
11. Replace by reversing above procedures.

NOTE: Check replacement tank for leaks by filling with water before and after installation.

Waste Tank Removal—Main & Auxiliary (Shower Bath)



No.	Part No.	Description
1	600319	Holding tank, main
2	101222	Plate L.H.
3	101223	Plate R.H.
4	510165	Harness
5	201100	Styrofoam 1/2 x 7 x 42
6	600320	Holding tank, auxiliary
7	201199	Styrofoam 1/2 x 7 x 31
8	200281	Slope pad, auxiliary tank
9	600321	Pan, auxiliary tank
10	410158	Angle, aft
11	410159	Angle, forward
12	-	Slope pad, 5/8 plywood

Fig. 9

Main Waste Tank Removal and Replacement (Shower Bath)

1. Make certain waste tank is empty.
2. Cover floor with protective material.
3. Remove toilet (see drainage section).
4. Remove toilet mounting flange from holding tank. (This unscrews from tank by turning counterclockwise.)
5. From inside hose carrier door remove access panel.
6. Remove four screws which secure valve to tank flange.
7. Inside trailer remove snap plastic trim along front edge of lavatory extrusion.
8. Remove extrusion by drilling out pop rivets.
9. Remove cabinet assembly under lavatory by drilling out rivets that secure it to the shower stall and hamper panel. Remove the screws through the extensions into tank cover.
10. Lift upwards on the lavatory and pull cabinet assembly out.
11. Remove the screws and rivets that secure the hamper panel.
12. Remove hamper.
13. Remove the screws and rivets that secure the tank cover to the floor, wardrobe, and inside skin.
14. Cut sealer and remove tank cover (carpet tack strip may interfere, remove if necessary).
15. Disconnect probe wires and vent pipe inside wardrobe.
16. Remove tank.
17. Replacement can be made by reversing above steps. Water check tank to be installed.
18. Cover hole made in step #5 with metal securing it with screws, fillet caulk.

Auxiliary Waste Tank Removal and Replacement (Shower Bath)

1. Empty tank completely. If tank is not completely emptied it may be damaged during the removal procedure.
2. Detach lower tank pan from chassis.
3. Remove metal from forward end of sewer hose carrier to gain access to termination valve.
4. Remove four screws securing slide valve to flange.
5. Cut both vent pipes off above plywood floor.
6. Remove "P" trap.
7. Lower tank.
8. Replace by reversing above steps.

Axle & Running Gear Assembly

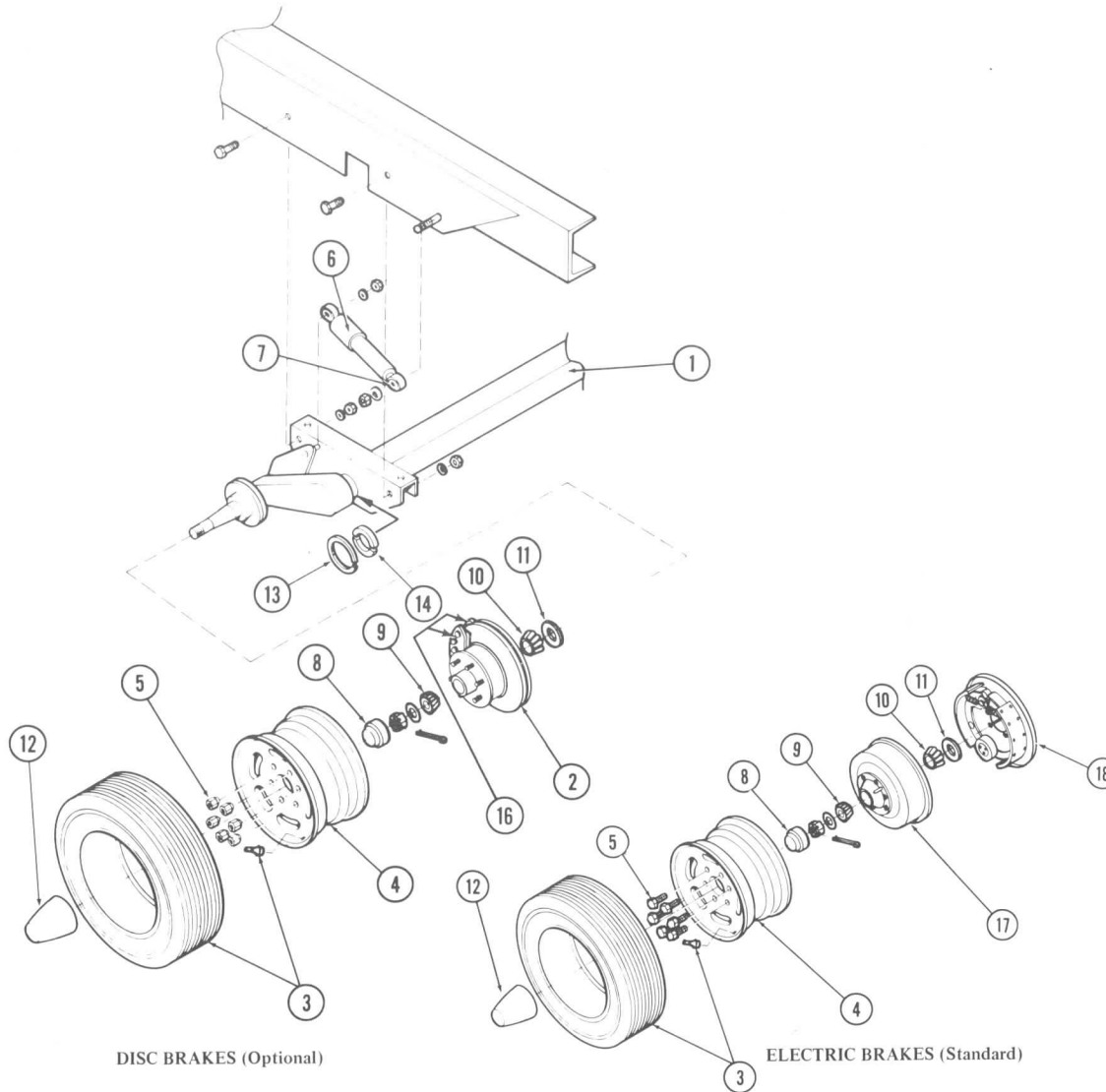


Fig. 10

Running Gear Assembly – Single

No.	Part No.	Description
1	400051	Axle assembly (21') 4500 lbs.
	410125	Axle assembly (23') 5000 lbs.
3	400038	Tire and valve stem, black wall (load range D.)
	400078	Tire and valve stem, white wall (load range D.)

Running Gear Assembly – Tandem

No.	Part No.	Description
1	410126	Axle assembly (23') 2600 lbs. (optional)
	410126	Axle assembly (25') 2600 lbs.
	410127	Axle assembly (27') 2800 lbs.
	410128	Axle assembly (29' and 31') (pair) 3200 lbs.
		Axle assembly (Excella) 3860 lbs.
2	100989	Hub and rotor, see Page 2-22
3	400038	Tire and valve stem, black wall (load range C.)
	400077	Tire and valve stem, white wall (load range C.)
	410007	Michelin tire and tube, (Aluminum wheel only) (load range C.)
4	410067	Wheel – steel
	410012	Wheel – forged aluminum
5	400201	Lug nuts
6	400008	(Delco) shock absorber
7	400040	(Delco) shock absorber bushing (8 per axle)
8	45896	Dust cover
9	LM67048	Outer bearing cone (Timkin)
10	25580	Inner bearing cone (Timkin)
11	42385	Grease seal
12	410011	Spindle cover (aluminum wheel only)
13	410071	Retainer ring
14	410070	Nylon bushing
15		Grease, wheel bearings (MIC 75-B)
16	28323	Stator and lining assembly, see Page 2-22
17	400086	Unicast hub and drum (Kelsey-Hayes 85451)
18	400098	Brake set (Pair)

Axle Removal and Replacement

1. Jack trailer at marked jack pads behind axle on main frame. Raise trailer until wheels clear by at least 1"
2. Remove wheel and tire assembly.
3. Disconnect brake wires.
4. Remove upper attachments of shocks.
5. Support axle at center with floor jack.
6. Remove 2 attachments bolts at each end of axle.
7. Lower axle with floor jack.
8. Check shocks for leakage or other visual damage – replace if necessary.
9. To replace, reverse procedure.

Axle Nylon Bearing Replacement

1. Jack up trailer to remove all weight from the wheels.
2. Take a 1/8" rod and flatten one end. Bend rod 1/2" from flat end at approximately 45 degree angle.
3. Insert flat end of tool under end of bearing retainer ring and pry ring out of torsion arm cup.
4. Using a wire with a 1/8" hook on one end, insert into joint between the two bearing halves and work out one-half bearing at a time. It is helpful to blow compressed air into this joint which will build up pressure behind the bearing and help in its removal. In some cases it may be necessary to break the bearing with a chisel and remove it in small sections.
5. Clean bearing cup of all dirt and chips.
6. Lubricate new bearings with a good quality wheel bearing grease and insert top bearing into cup with rounded edge going in first. Repeat with lower bearing.
7. Replace steel retainer ring, making sure it has seated into the ring groove.

Inspecting Shock Mountings

If noisy and/or loose shock mountings are suspected, place vehicle on hoist that supports wheels and check all mountings for the following conditions:

1. Worn or defective grommets
2. Loose mounting nuts
3. Possible interference condition

If no apparent defects are noted in this step but noise condition still exists when vehicle is bounced up and down, proceed.

Inspecting Shocks for Possible Loss Of Hydraulic Fluid

1. Disconnect each shock lower mounting as required and pull down on the shock until it is fully extended.
2. Inspect shocks for leaks in seal cover area. Shock fluid is a very thin hydraulic fluid and has a characteristic odor and dark brown tint.

Certain precautions should be observed when inspecting shocks for leaks:

- a. Shocks may have glossy paint on them. Do not confuse this paint with a leak condition.
- b. A slight trace of shock fluid around the seal cover area is not cause for replacement. The shock seal is engineered to permit a slight seepage to lubricate the rod. The shock absorber has reserve fluid to compensate for the slight seepage.
- c. Shocks are sometimes incorrectly diagnosed as leakers due to oil spray originating from some other source. If in doubt, wipe the wet area and manually operate shock. Fluid will reappear if shock is leaking.

Shock Replacement

1. Remove upper attachment of shock.
2. Remove lower attachment of shock and slide off of stud. Because of minimum clearance between the stud and axle mounting plate, the shock may have to be slightly twisted or rotated to remove.
3. To replace reverse procedure.

Wheel Bearing Maintenance

1. Jack trailer at marked jack location pad under trailer behind axle on main frame.
2. Index marks should be added to wheel and rotor. Realign these marks when replacing wheel thus eliminating the need for wheel rotor rebalance.
3. Remove hub cap or spindle cover, wheel and tire.
4. Remove dust cap.
5. Remove brake fluid from Master Cylinder reservoir as required so that it has enough fluid to just cover bottom of reservoir approximately 1/8" deep.
6. Remove brake linings as described in section "Brake Lining Replacement". This requires removal of clevis pins and clip pins.
7. Remove four (4) brake assembly bolts, brake lining, backing plate and two (2) spacers.
8. Remove cotter pin.
9. Remove spindle nut and washer.
10. Remove outer wheel bearing cone and roller assembly from hub.
11. Remove hub and rotor assembly from spindle. (Fig. 10)
12. If dust shield or mounting bracket needs to be replaced, see section on replacing rotor splash and mounting bracket.
13. Lay rotor down on a clean surface with inside grease seal down. Knock out inner bearing and grease seal, using wood or plastic dowel and hammer.
14. Clean all parts thoroughly with kerosene.
15. Check all bearings and races for chips or roughness of any kind. Any damaged components must be replaced.
16. Pack bearings with a good grease (MIC 75-B available through Ford dealer's Parts Department).
17. Install inner bearing.
18. Install new grease seal in rotor using wooden or rawhide mallet.
19. Slide hub and rotor assembly on spindle, with wheel mounting studs facing out.
20. Install outer bearing, thrust washer, and spindle nut.

1-16

21. While rotating the wheel, tighten the spindle nut with a 12 inch wrench until there is a slight tension. Then back off one notch and install cotter pin. There should now be from .001" to .010" end play in the hub. If not, back off one more notch. If it is necessary to check rotor run out, do according to steps 22, 23, 24. If run out is determined to be OK, skip the next 3 steps and proceed to step 25.
22. Install a dial indicator and check the run out of the rotor on both sides. The run out must not exceed .020 inches.
23. Important: after checking rotor run out to specification, readjust wheel bearing clearance.
24. If rotor run out exceeds specifications, discard and replace hub and rotor assembly, if new bearings do not correct run out.
25. Clean grease cap, coating the inside with wheel grease (do not fill) and install the cap.
26. Reinstall brake lining backing plate and brake linings by reversing the removal procedures.
27. Install the dust cap.
28. Install the tire and wheel, making sure all wheel bolts are properly torqued to specifications. (See item No. 2 for indexing.)
29. Advise customer to check and retighten the lug bolts if necessary, every 50 miles for the first 200 miles of travel. They should be tightened to a torque of 90-95 ft. lbs. on the standard steel wheel and on the optional forged aluminum wheel.
30. Care should be taken at all times when handling the forged aluminum wheel because of possible damage to its appearance.

Axle Alignment

To better understand trailer axle alignment, it is helpful to know some of the causes of excessive tire wear. In the following paragraphs and photographs, we will describe some of the possible causes and their remedies.



Fig. 11

UNDER INFLATION is probably the greatest cause of excessive tire wear. (See Fig.11&12) Unlike the wear of a passenger car tire, the under inflated trailer tire will usually wear on the outer edges only. This is due to the high profile of the trailer which will rock from side to side on soft tires. The curbside tires usually wear faster than the roadside. The reason for this being that on crowned roads, the trailer leans slightly to the curbside, causing the outer edge of the tire to roll under.

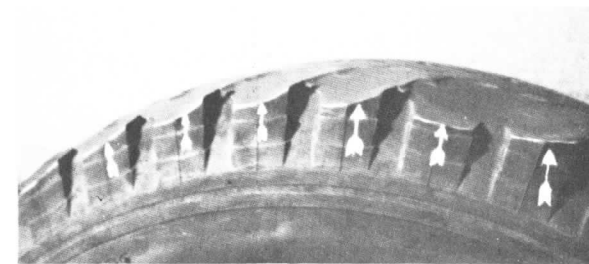


Fig. 12

IMPROPER TOE IN would be the second most common cause of excessive tire wear. A tire which has an excessive amount of toe in or toe out will cause the tire to side slip as it is traveling down the highway. This type of misalignment will wear the tread with a sharp edge on one side and a rounded edge on the other side. For instance, a tire with too much toe in (See Fig. 12) will wear the outer edge of the tire in much the same manner as an under inflated tire, except that the grooves of the tread will have a sharp edge on the inward side of the tire. A tire with toe out will wear the inner edge of the tire with the sharp edges of the tread grooves being on the outer edge.

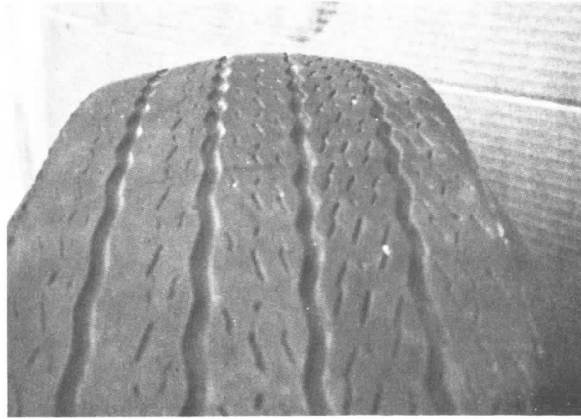


Fig. 13

CAMBER is the smallest offender of alignment problems since it has to be extremely out of tolerance before any great tire wear is noticed. A wheel with too much positive camber will wear the outer half of the tire, while a wheel with negative camber will wear the inner half of the tire. In each case, the tread will wear evenly around the tire, (See Fig.13) not in spots as seen with improper toe in (See Fig.12).

Alignment Procedure

1. Jack trailer at marked jack location pad behind axle on main frame and check for any loose wheel bearings. This should have from .001 in. end play. See bearing adjustment, page 1-21.
2. With the trailer jacked up, check for bent wheels and run out in the tires by holding a piece of chalk on a steady rest, spinning the wheel and moving the chalk in against the spinning wheel side wall just far enough to mark the point of greatest run out. Any wheel with more than one eighth inch run out should be replaced if maximum tire life is to be expected.



Fig. 14

3. Remove jacks and pull trailer up on a pair of eight inch ramps to provide room to work under the trailer. Raise front of trailer until trailer is level (See Fig.14).

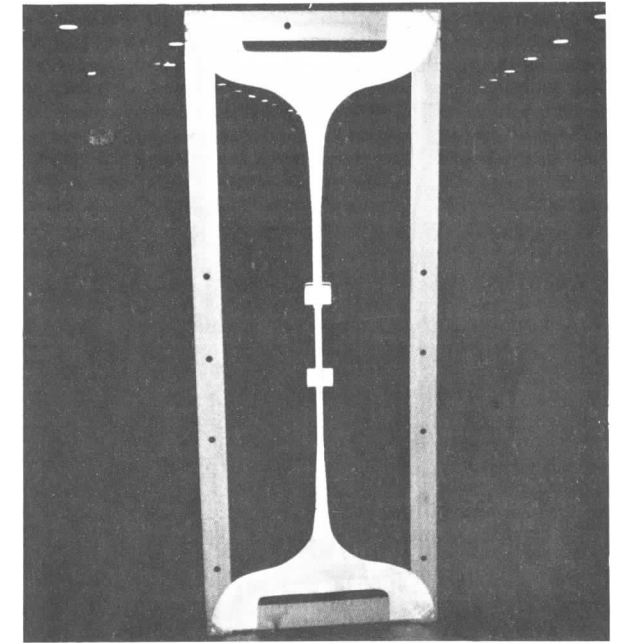


Fig. 15

4. Checking toe-in requires a special toe gauge such as the model TG-68. (See Fig. 15)

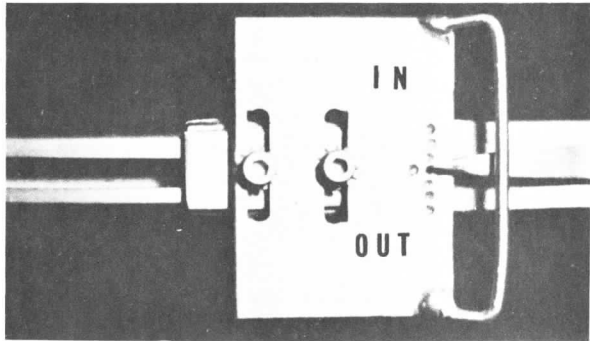


Fig. 16

5. Remove the gauge from the wall rack, making sure that the pointers are on zero when the gauge is in the rack. (See Fig. 16) If not @ zero, adjust by loosening aligning screws and move to zero.

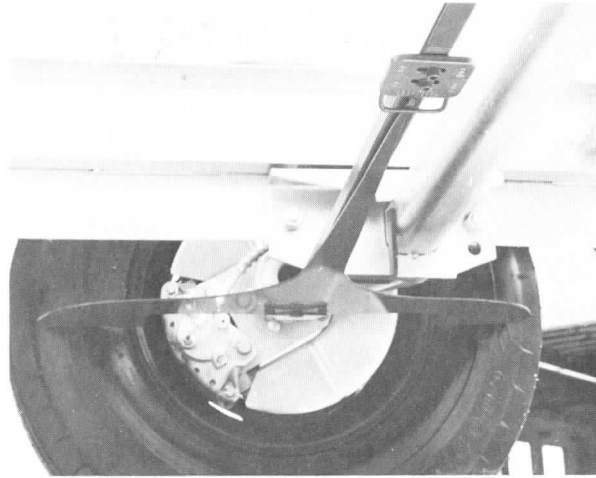


Fig. 17

6. If chalk mark occurred in step No. 2, it should be at the top or bottom, before toe-in checking. Grasp the gauge with one hand on each section holding it so that the pointer side of the gauge faces the floor, and the (L) shaped locaters are toward the front of the trailer. Pulling together on the two sections of the gauge, insert it between the left and right wheel, making sure that the (L) shaped locator is in contact with the rear of the axle tube. (See Fig. 17). The pointer feet must be parallel with the trailer frame. (See Fig. 17.)

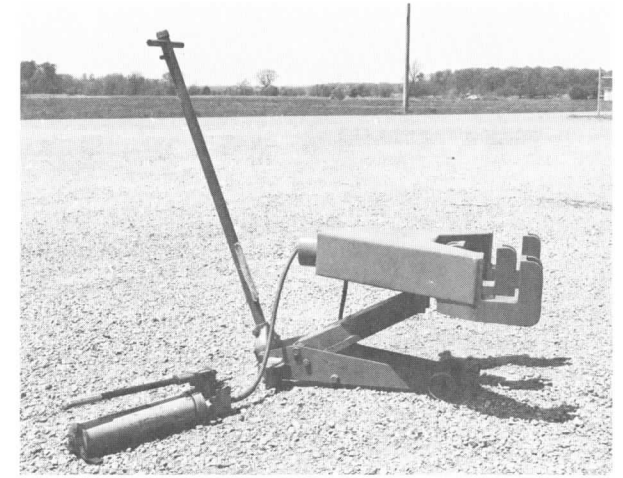


Fig. 18

Read amount of toe-in on scale (Fig. 16). See chart below for specifications. If correction is necessary, bend axle tube with a hydraulic bender. (See Fig. 20) The proper use of this bender is described on page 1-19

CAUTION: Do not apply heat to axle tube. The elastomers inside this tube will be destroyed if heat is applied.

Duo-Torque Axle Alignment Specifications

Toe In Each Side 1/16"	Tolerance 1/16" plus or minus
Camber Each Side 3/4 Degree Pos.	Tolerance 3/4 Degree plus or minus

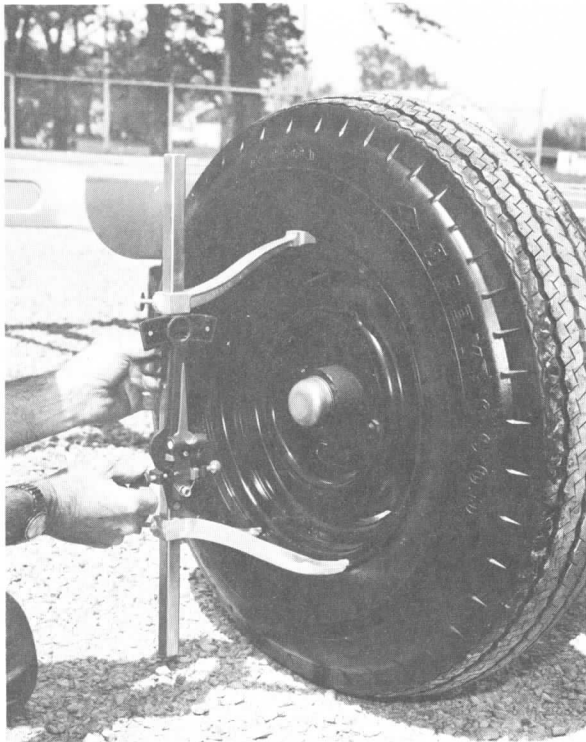


Fig. 19

7. Checking camber: If chalk mark occurred in Step 2, it should be at front or rear. Any standard automotive type camber gauge may be used to check camber. Ammco Model 7825 shown. (Fig. 19) Follow instructions furnished with gauge.

Use of the Hydraulic Axle Straightener (Model No. HB68)

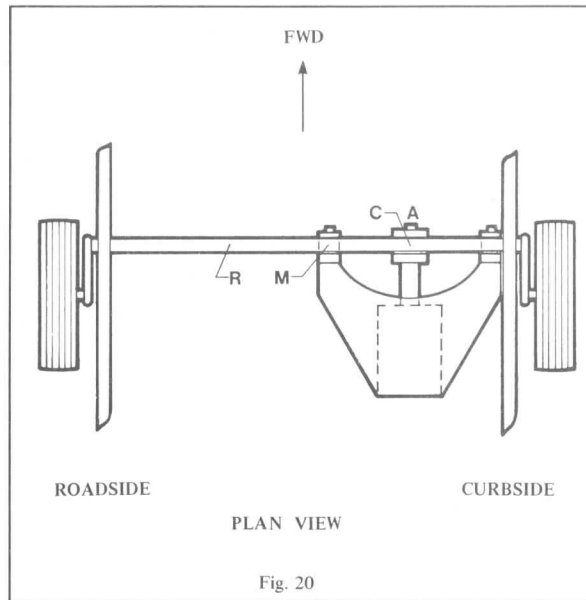


Fig. 20

1. Attach straightener to any standard floor jack. (See Fig. 20.)
2. Place cylinder jaw (A) at position (C) to correct curbside wheel.
3. Place cylinder jaw (A) at position (R) to correct roadside wheel.
4. Place cylinder jaw (A) at position (M) only when both wheels need to be bent equal amounts in the same direction.
5. Cylinder jaw (A) is moved toward front of the trailer to decrease the amount of toe in.
6. Cylinder jaw (A) is moved toward rear of the trailer to increase the amount of toe in.
7. To determine the amount axle has been bent, place a mark on the underbelly of trailer along axle tube. Hold pencil along tube while bending and place a second mark on underbelly after bending. The distance between these two marks represents approximate movement of the wheel.
8. For use of a straightener to correct camber, remove from the jack and swing into a vertical position (hanging on the axle tube). Use in the same manner as for toe-in, except that moving cylinder jaw up increases camber and moving it down decreases camber. This will require cutting of underbelly for clearance.

Alignment Equipment Required

AMMCO CAMBER GAUGE Model No. 7825 (Fig. 19)

HENSCHEN TOE GAUGE Model No. TG 68 (with wall rack) (Fig.16)

HYDRAULIC AXLE STRAIGHTENER Model No. HB 68
(less floor jack) (Fig. 20)

FLOOR JACK Model No. 1½ ton

RAMPS (8" high) Fig. 14

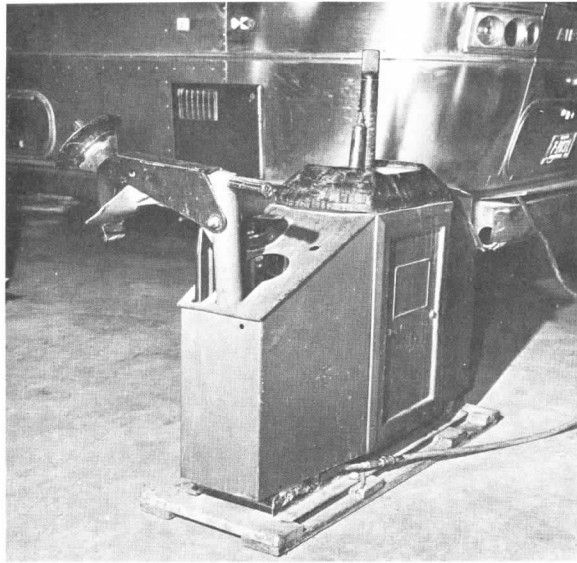


Fig. 21

Wheel & Tire Maintenance

1. Air Pressure

Air pressure is important and should be checked often and only when tires are cool. (At running temperature pressure increases and should not be bled.) See chart for correct p.s.i.

2. Balancing

Proper balance of wheel and tire assemblies is very important. Out-of-balance can set extreme vibration that could eventually cause structural damage to the trailer and its interior components.

Balance within the first 1000 miles. If a tire is repaired, it should be rebalanced.

Several methods of balancing are available, with bubble balancing and spin balancing two common methods.

Be sure to rebalance the tire, wheel hub/rotor assemblies each time a tire is changed.

3. Changing Tires

Jack trailer at jack location pad behind axle on main frame. A flat tire may be changed without the aid of a jack on tandem trailers by pulling onto a ramp until the wheel to be removed spins free.

4. Repairing Tires

Use tire removal/Installation equipment as shown in Fig. 21; remove tire from rim.

5. Troubles and Remedies

TROUBLE	REMEDY
WHEEL SHIMMY	
A. Loose wheel bolts.	A. Tighten up 90-95 ft.-lbs. torque on steel wheel and aluminum wheel.
B. Loose or broken wheel bearing.	B. Tighten spindle nut or replace bearing and adjust. See p. 1-16.
C. Bent Wheel.	C. Replace.
D. Improper axle alignment.	D. Align axle. See p. 1-16 thru 1-18
E. Wheel out-of-balance	E. Balance wheel. See para. 2

IMPROPER TIRE WEAR

A. Improper air pressures.	A. Inflate tires to correct pressures.
B. Improperly acting brake.	B. Correct as required. See Sec. 2
C. Improper axle alignment.	C. Align axle. See pgs. 1-16 thru 1-18.

Tubeless Tires

These tires have an inner liner which, if punctured, tends to cling to the penetrating object forming a partial seal until the object is removed from the tire. It is essential to conduct a periodic pressure check according to the tire inflation tables on the following pages plus a visual tire inspection to detect imbedded objects which might otherwise go unnoticed and cause serious casing damage.

Tread Wear

When the depth of tread becomes 1/16-inch or less, there is a significant decrease in traction and anti-skid properties, also, the majority of tire troubles will occur in the last 10% of tire life.

Tire Inflation Pressure (PSI) Cold Inflation

Model	7.00 x 15 Load Range C	7.00 x 15 Load Range D	7.00 x 15 XC Steel Radial Tires
21 & 23 FT. SINGLE AXLE	N.R.*	60 PSI	N.R.*
23, 25, 27 FT. DUAL AXLE	35 PSI	N.R.*	35 PSI
29, 31 FT. DUAL AXLE	40 PSI	N.R.*	45 PSI

*N.R. Not recommended by tire manufacturer

Tire Load and Inflation Pressure Notes

1. Tire inflation pressure may increase as much as 6 pounds per square inch (PSI) when hot.
2. Cold tire inflation pressure: after vehicle has been inoperative for 3 hours or more, or driven less than 1 mile. Hot tire inflation pressure: after vehicle has been driven 10 miles or at speeds of more than 60 miles per hour.

Wheel Nut Torques

On a new vehicle or after the wheel has been changed, the wheel nut torque must be checked at 100, 1,000 and 6,000 miles and every 6,000 miles thereafter. The proper torque is 90-95 ft. lbs.

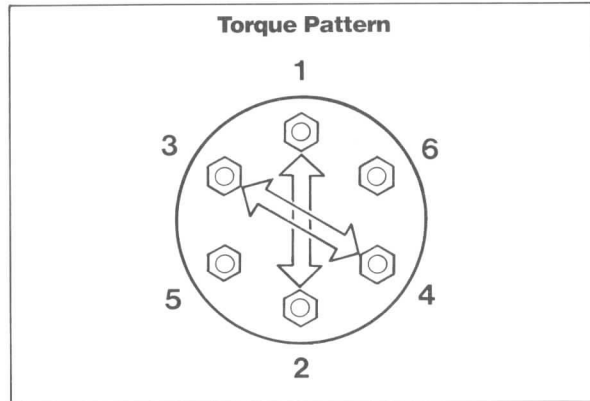


Fig. 22

Wheel and Tire Balancing

It is desirable from the standpoints of tire wear, vehicle ride and handling ease to maintain proper balance of wheel and tire assemblies on all models. This may be accomplished by either of the two types of balancing systems in current use which balance wheels either on the vehicle or off. The "on the vehicle" type, however, is the more desirable in that all rolling components (brake rotors, bearings, seals, etc.) are included in the balancing procedure and thereby have any existing unbalance corrected.

Static Balance

Static balance (sometimes called still balance) is the equal distribution of weight of the wheel and tire assembly about the axis of rotation in such a manner that the assembly has no tendency to rotate by itself, regardless of its position. Any wheel with a heavy side is statically out of balance. Static unbalance of a wheel causes a hopping or pounding action (up and down) which frequently leads to wheel "flutter" and quite often to wheel "tramp".

(CAUTION: A wheel with a chunk of dirt on the rim will always rotate by itself until the heavy or dirty side is at the bottom, so it is important to clean wheels before balancing.)

Dynamic Balance

Dynamic balance (sometimes called running balance) means that the wheel must be in static balance, and also run smoothly at all speeds.

To insure successful, accurate balancing, the following precautions must be observed:

1. Wheel and tire must be clean and free from all foreign matter.
2. The tires should be in good condition and properly mounted with the balance mark on the tire, if any, lined up with the valve.
3. Bent wheels that have runout over 1/16" should be replaced. (Fig. 23)
4. Inspect tire and wheel assembly to determine if an eccentric or out-of-round condition exists. Note that this condition, if severe, cannot be "balanced out." An assembly which has an out-of-round condition exceeding 3/16"
5. When balancing wheels and tires, it is recommended that the instructions covering the operation of the wheel balancer being used be closely followed.

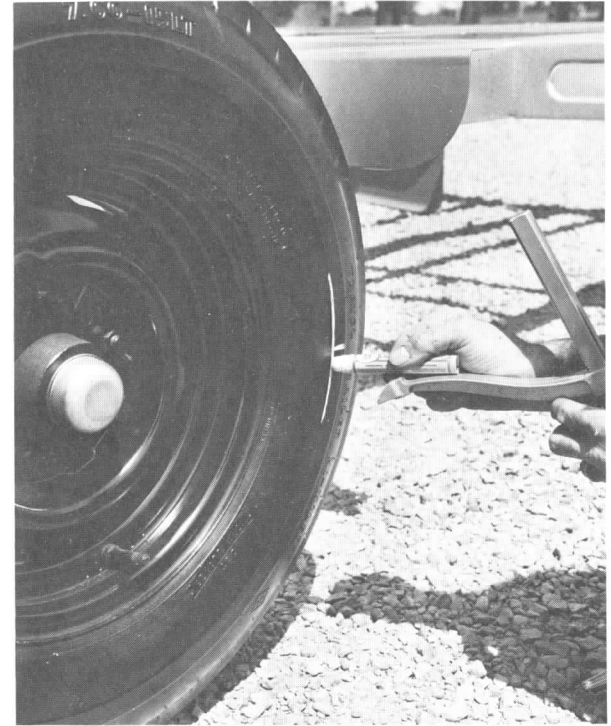
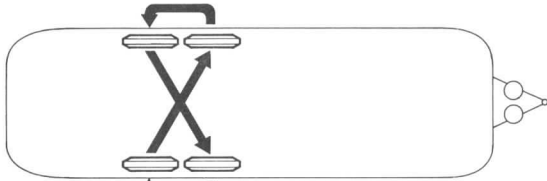


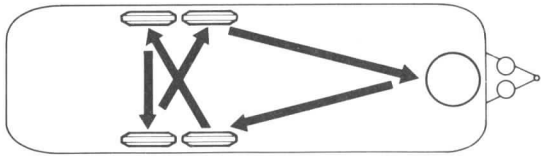
Fig. 23

Tire Rotation

Bias Belted
7:00 x 15 LT

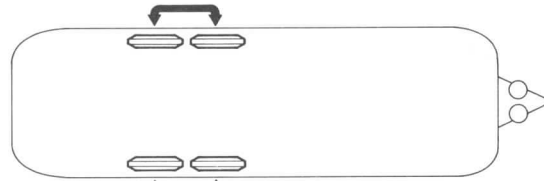


Without Spare

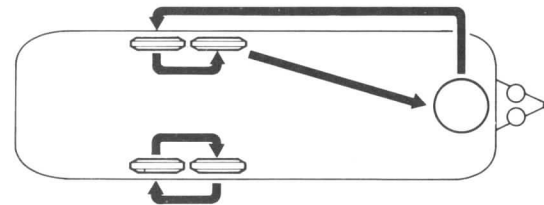


With Spare

Steel belted radial
7:00-15 XCA

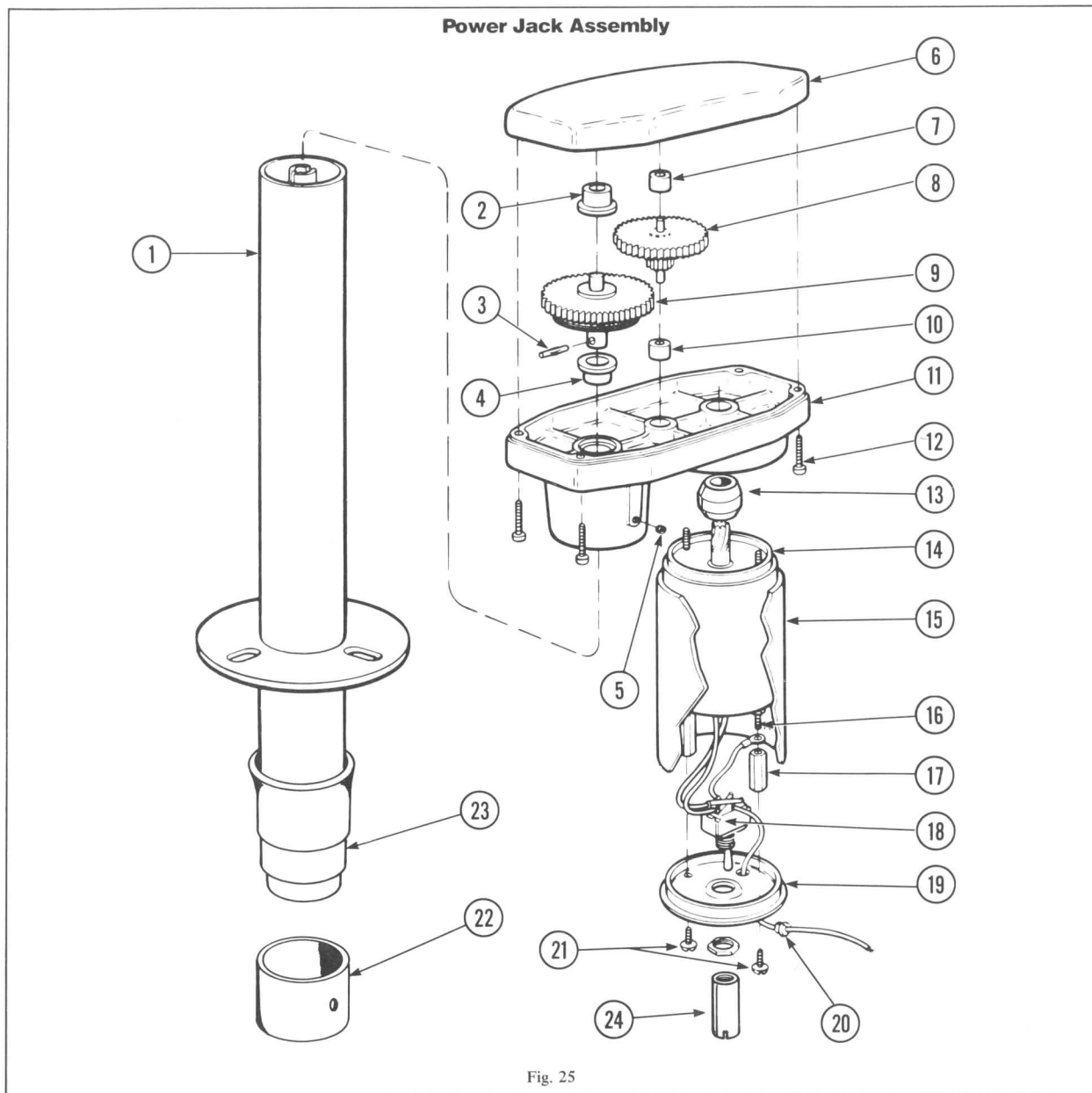


Without Spare



With Spare

Fig. 24



Power Jack (Model BPJ)

No.	Part No.	Description
	400079	Power jack assembly
1	10768	Mechanical Ball Jack Post (Less Power Head)
2	10055	Bushing
3	80400	Drive Pin
4	10054	Bushing
5	80100	Set Screws (2 per unit)
6	10048	Cover Casting
7	80501	Bushing
8	10051	2nd/3rd Gear Set
9	10737	Torque Limiter/Drive Gear
10	80501	Bushing
11	10049	Body Casting
12	80102	Cover Screws (4 per unit)
13	10066	Bushing
14	10061	12 Volt Motor**
15	10062	Motor Sleeve
16	10691	End Bell Stud (2 per unit)
17	10065	Hex Connector (2 per unit)
18	10064	Switch
19	10063	Motor Sleeve Cover
20	80504	Wire Grommet
21	80101	Motor Sleeve Cover Screw (2 per unit)
22	10011	Dolly Adapter
23	10017	Post Adapter
24	10069	Metal switch cover
	80600	Hex Wrench*

*Not shown

**When ordering replacement motor, the manufacturer's model number on the body must be furnished

**Installation and Operating Instructions
Power Jack (Model BPJ)**

Installation

1. To install H & H Power Jack, raise trailer's front end and place blocks or stabilizing jacks under the front "A" frame.

Lower the trailer until it rests securely on the jacks or blocks and retract manual jack completely.
2. Unbolt jack from coupler and attach Power Jack using same mounting bolts.
3. Connect the 12 gauge lead-wire directly to hot lead at break-a-way switch.

Operation

1. The Power Jack utilizes a momentary spring return switch placed at the bottom of the motor housing.

To raise trailer, push this switch toward the jack post. To lower, push switch away from the jack post.

2. When the Power Jack reaches the end of its travel (either raising or lowering), a built in torque limiter goes into operation with a clicking noise.

This torque limiter permits the final drive gear to slip and thus protects the unit.

NOTE: To prolong the life of this torque limiter, it is recommended that you avoid using it whenever possible.

3. If an electrical failure should ever occur, remove the power head by loosening the two allen set screws holding it to the jack post (wrench is included for this operation). Once removed, the emergency handle may be inserted into the jack post coupling and the jack can be raised or lowered.

Maintenance

1. Once a year, the power unit should be removed (See No. 3 under "Operation".) and a liberal amount of grease (wheel bearing grease) applied directly to the coupling on which the drive pin rests.

When placing the power head back on the jack post, make sure that the drive pin is securely engaged in the jack post coupling. (See par. 8)

2. Once every two years, the housing cover should be removed and the gears inspected for proper lubrication. If lubrication is needed, use Lubriplate 6-30AA or comparable material. (See par. 7 and 8)

Torque Limiter Replacement

1. Loosen two Allen screws (item No. 12) and lift head from post (item No. 1). NOTE: Take care to ease the grey wire through the bottom part of the wire guard tube to avoid damage to wire insulation.
2. Remove four cover screws (item No. 12) and lift off cover (item No. 6). NOTE: Do not force cover off with screwdriver blade. A light tap on the side of the cover with a wooden mallet is sufficient.
3. Remove 2nd/3rd gear set (item No. 8).
4. Turn torque limiter (item No. 9) until pin (item No. 3) is opposite hole* in body casting (item No. 11).
5. Punch pin (item No. 3) out with pin punch and hammer – avoid heavy blows otherwise bushing (item No. 4) will be damaged.

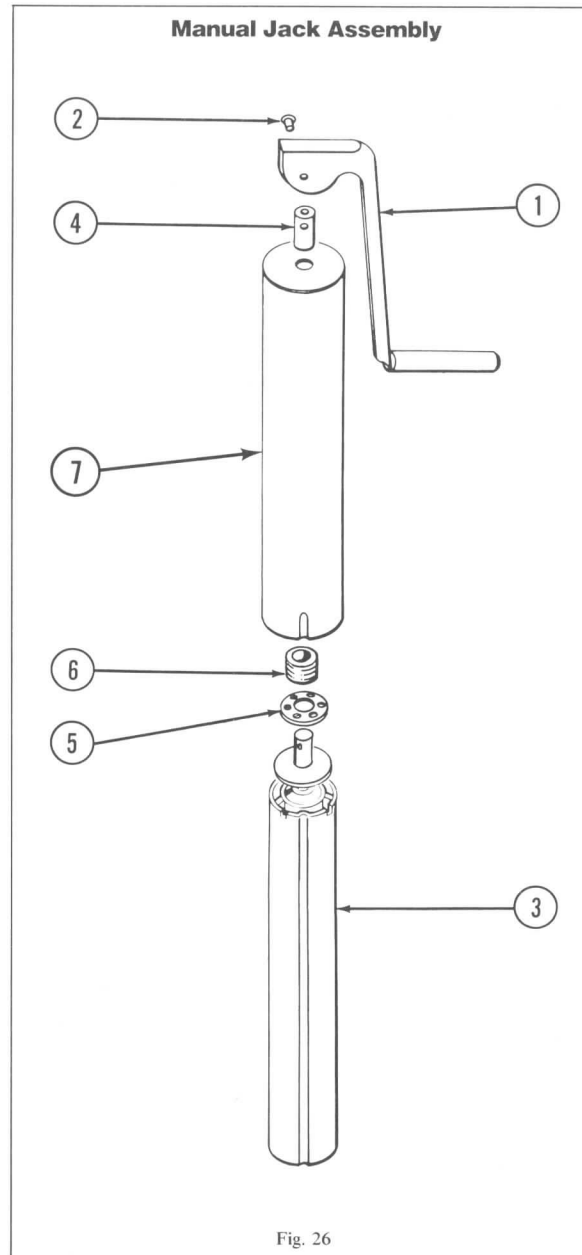


Fig. 26

6. Remove defective torque limiter and replace with new one. Use a new pin (item No. 3).

7. Before refitting the cover (item No. 6), clean the edges of the groove and tongue of the cover and body (item No. 11) castings so that they will mate correctly and provide a good seal. Apply a small quantity of Lubriplate 630-A to these edges and to the gear teeth and bushings. Re-assemble.

8. Lower head back on to post (item No. 1) and engage pin (item No. 3) with the adapter. Push down fully, then raise the head approximately 1/16" before tightening set screws (item No. 12).

Atwood Top Wind Jack (SK-TW-1)

No.	Part No.	Description
	01192	Atwood Manual Jack Assembly

Handle Replacement Kit

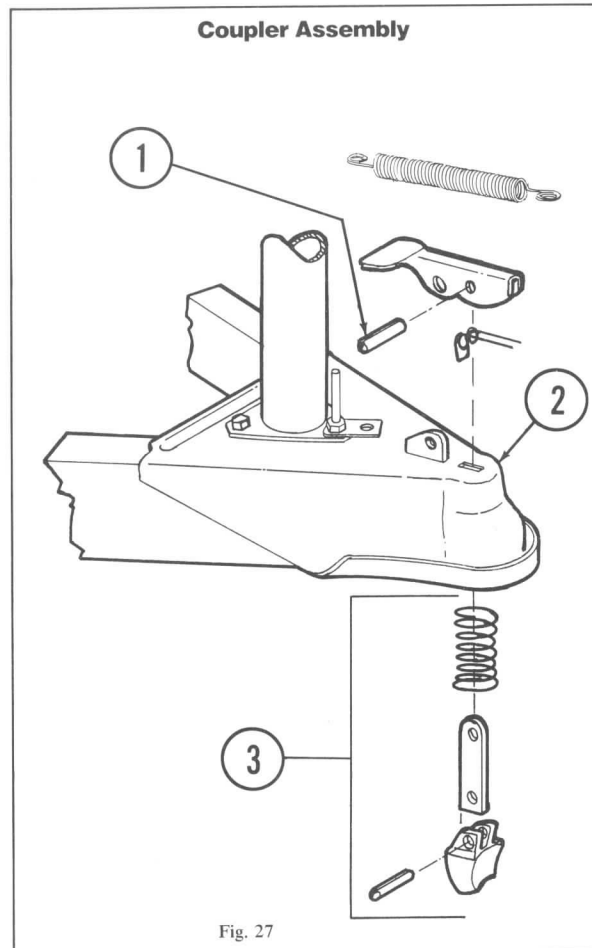
1	19375	Handle, Top Wind
2	14614	Rivet

Inner Ram Kit (SK-TW-3)

3	25888	Inner Ram
4	17231	Sleeve, Handle
5	25503	Washer
6	25504	Thrust Bearing
7		Outer Housing
(Available only with complete Jack Assembly)		

Jack Removal

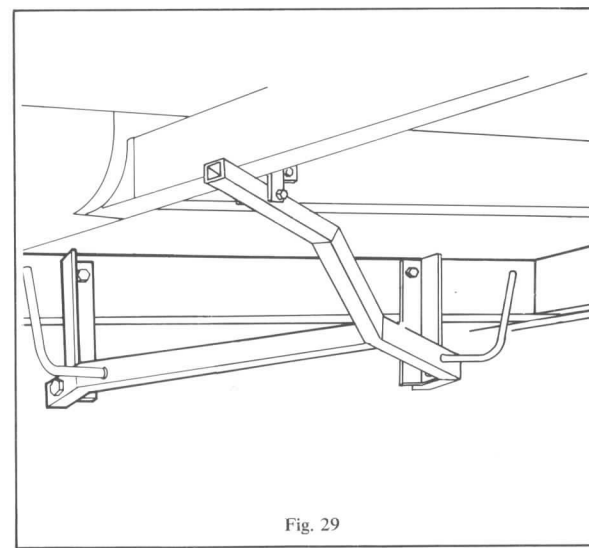
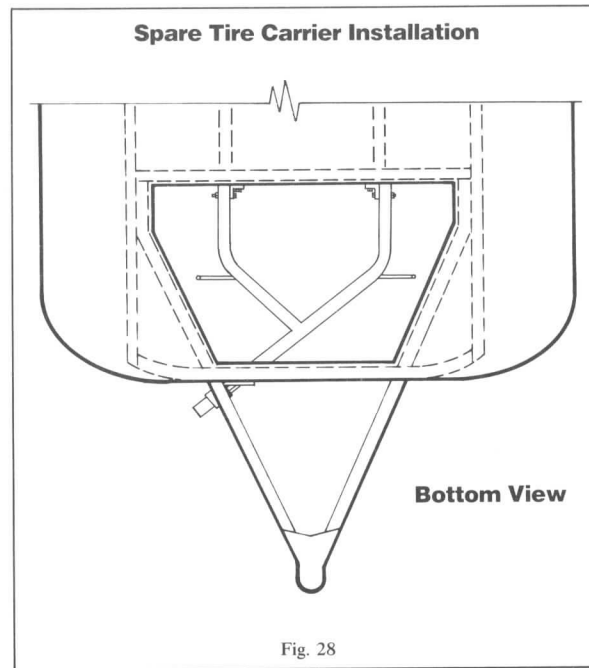
1. Support front 'A' frame of trailer with blocks or stabilizing jacks.
2. Retract old jack.
3. Remove bolts that attach old jack to coupler.
4. Install new jack and attach using same bolts.



No.	Part No.	Description
1	—	Drive pin
2	MC883	Coupler (2-5/16") complete assembly.
3	MC557	Coupler (2-5/16") latch assembly.

Remove Coupler Latch Assembly

1. Remove drive pin (Item No. 1) from handle.
2. All components (except handle and drive pin) will fall from coupler ball cavity.



Spare Tire Carrier Installation

1. With use of metal snips, cut underbelly from 1st section aft of front chassis crossmember. Cut to the inside perimeter of this section. See Fig. 28

CAUTION: DO NOT USE A SABER SAW OR ANY SIMILAR TOOL TO CUT THE ACCESS HOLE IN ORDER TO AVOID DAMAGING HYDRAULIC AND VACUUM LINES WHICH ARE ROUTED THROUGH THIS AREA.

2. Insert caulking material between underbelly and chassis frame member. Pop rivet (@ 4" centers) underbelly to chassis frame.
3. Cut a piece of metal the proper size and place against the underside of the plywood floor securing with screws. Caulk edges with vulkum to prevent moisture from reaching plywood.
4. Attach rear of tire carrier to 2nd crossmember through 1/2" nuts located in crossmember with 1/2" x 1" bolts. See Fig. 29
5. Locate front lock bracket centered on front crossmember and 1" from bottom. Drill two 3/8" holes to attach bracket to crossmember with 3/8" x 3/4" bolt and nuts. See Fig. 29
6. Attach front of carrier to front lock bracket. See Fig. 29

B.A.L. Stabilizer Jack Assembly

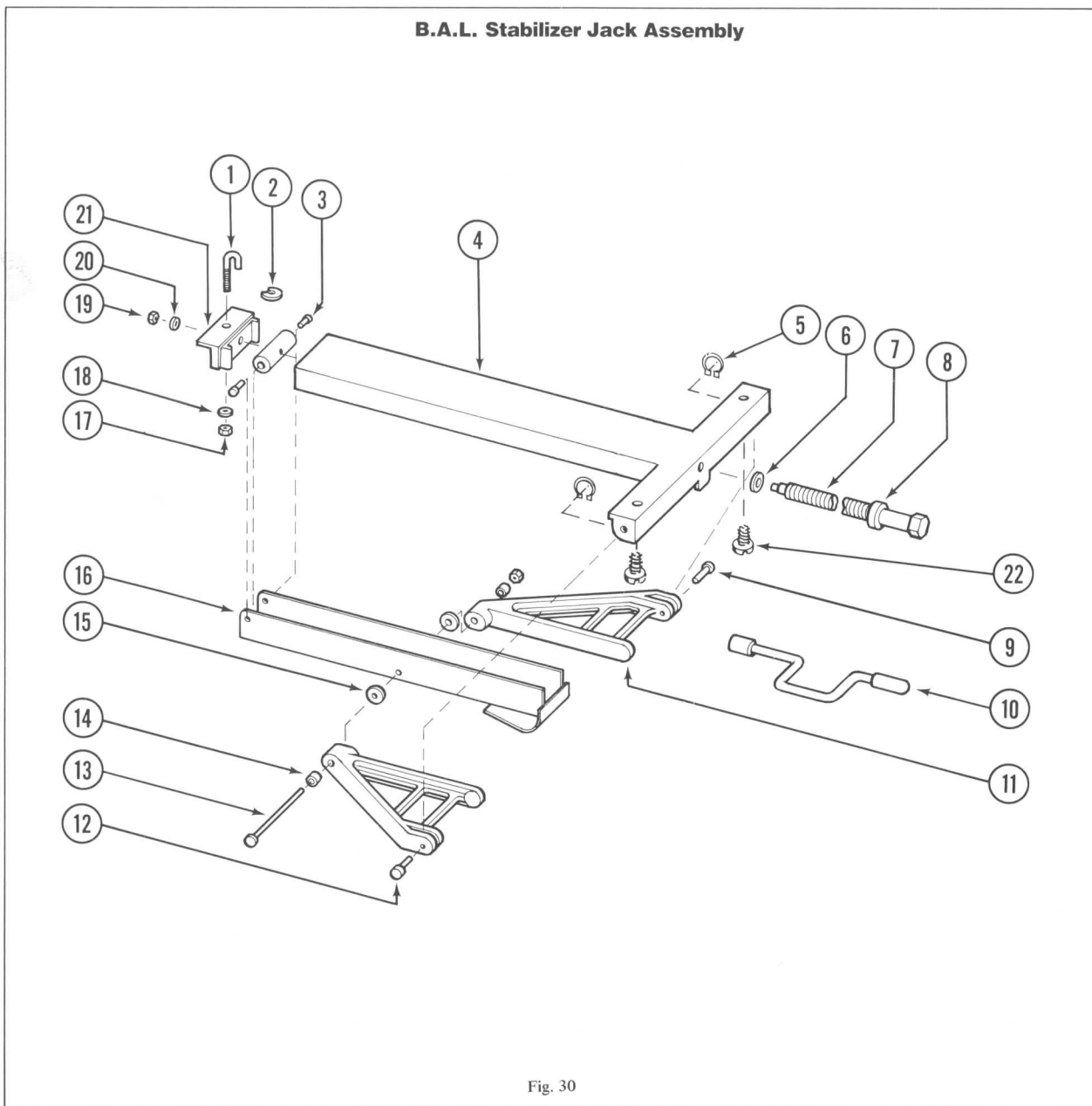


Fig. 30

B.A.L. Stabilizer Jack (Model Number 20-13-TAL)

No.	Description
1	"J" Bolt
2	Plastic washer
3	Trunion pin (2)
4	Bedplate
5	Snap ring (2)
6	Thrust washer
7	Drive screw
8	Collar
9	Stay pin (2)
10	Crank - specify painted or chrome
11	Side stay
12	Stay pin
13	Leg bolt
14	Spacer washer (2)
15	Spacer washer (2)
16	Leg
17	Hex nut
18	Lock washer
19	Hex nut
20	Spacer washer
21	Rear mtg. plate
22	Self tapping screw (2)

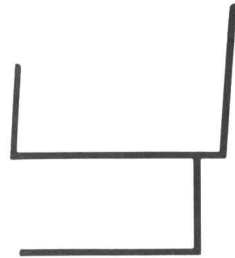
Removal

1. Remove nut (Item No. 17) off J-Bolt (Item No. 1) and 2 self-tapping screws (Item No. 22).

Extrusions – Chassis



100147 Mill 1976-1977



101056 Mill 1972-1977