MFG: ELI BRIDGE COMPANY
NAME: KIDDIE KOMBO
TYPE: KIDDIE

INSTRUCTIONS

FOR

ERECTING, OPERATING, AND MAINTAINING

THE

KIDDIE KOMBO

Manufactured By

ELI BRIDGE COMPANY

800 CASE AVENUE

JACKSONVILLE, ILLINOIS 62650

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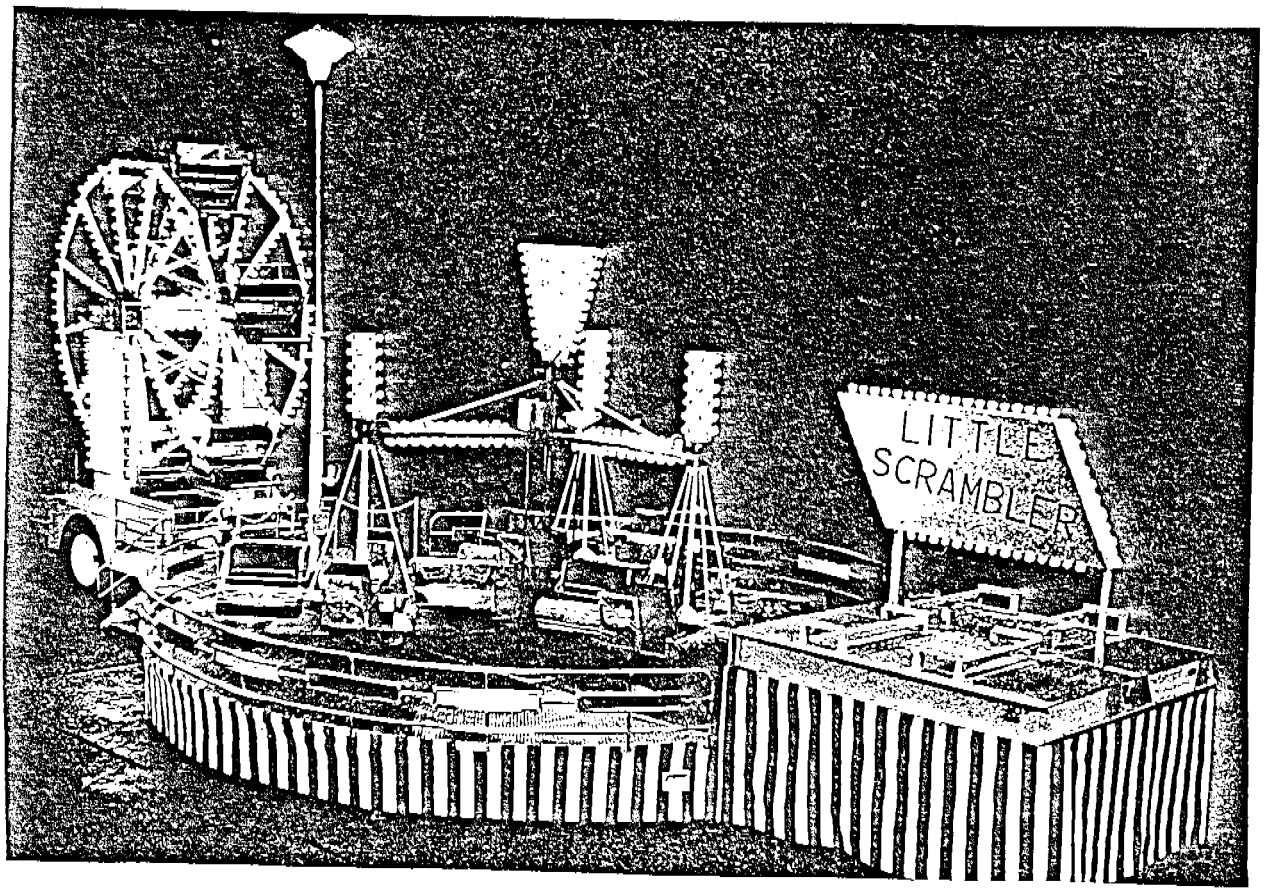
BIG ELI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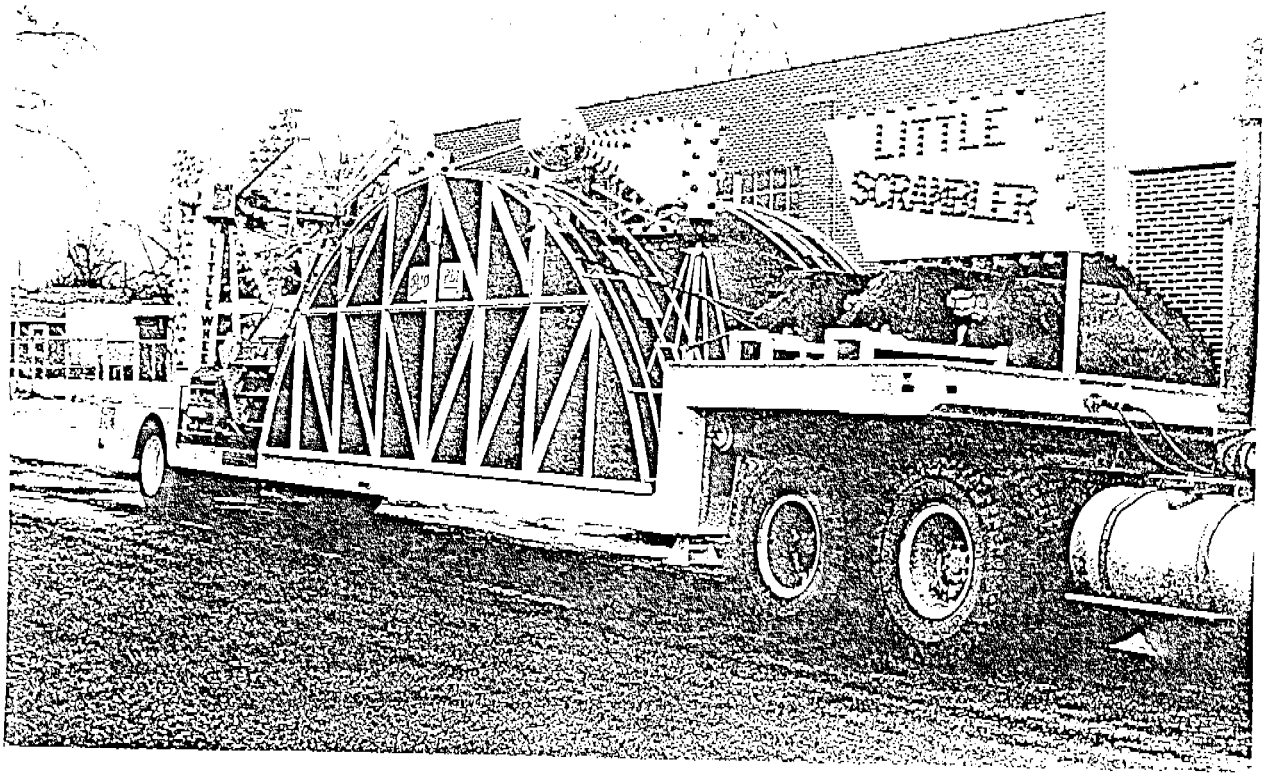

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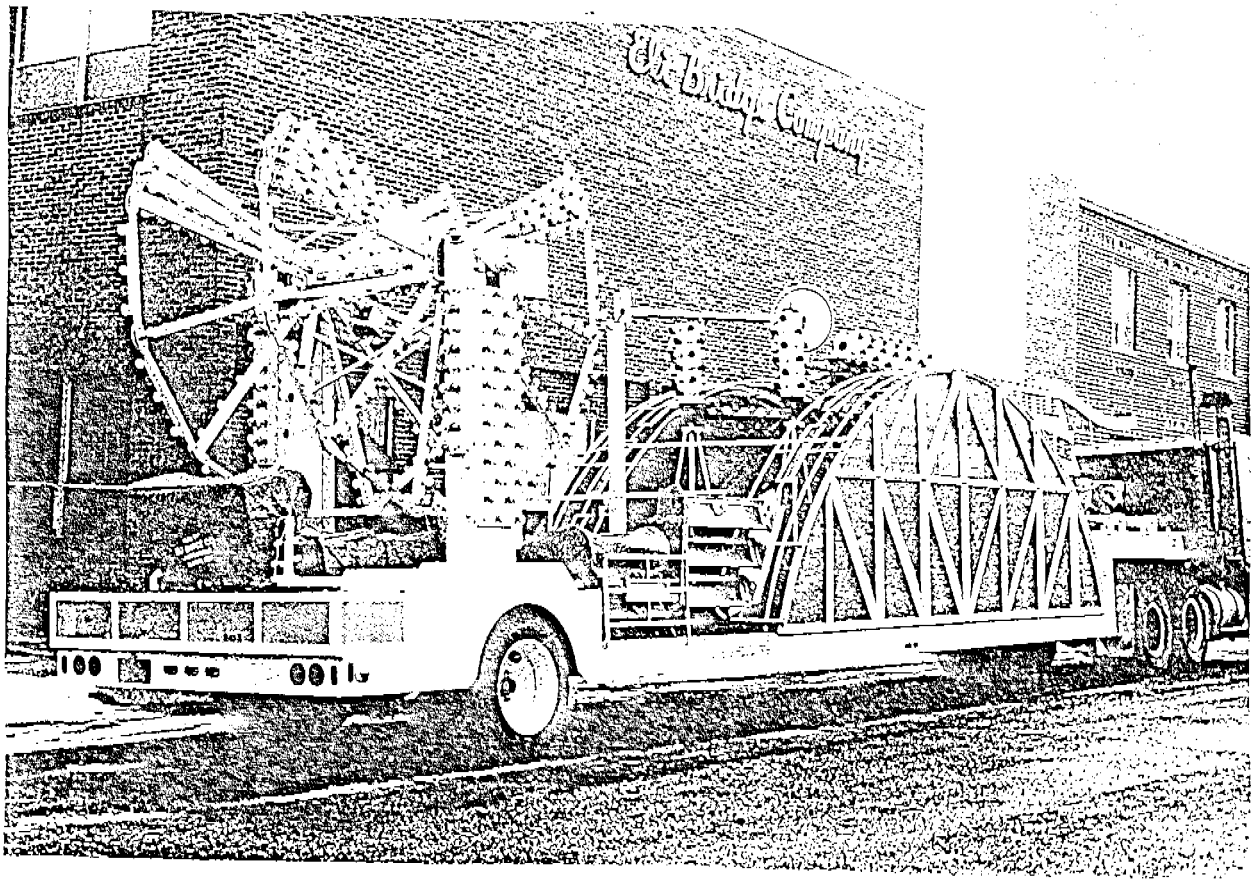


3

THE KIDDIE KOMBO

DESCRIPTION

The Kiddie Kombo shown in Picture No. 1 combines the Little Scrambler and the Little Wheel into one self-contained unit adapted for quick transport and erection. It can be operated by either one or two persons from a convenient location between the two rides. Passengers can enter and leave by means of a central stairway on each side of the Kiddie Kombo.

There are 12 seats on the Little Scrambler, six on the Little Wheel, and all are made of aluminum for easy handling and corrosion resistance. The Little Scrambler turns 10 revolutions per minute and the Little Wheel 7 RPM. Power is supplied by a 7.5 horsepower, 1160 rpm, 230/460 volt, 3 phase, 60 Hz electric motor which has a shaft extending from each end. A 6 gallon per minute variable displacement hydraulic pump is connected to a shaft end and it powers the Little Scrambler through a hydraulic motor and chain drive. A 14.7 GPM pump on the other end of the electric motor drives the Little Wheel through a hydraulic motor and chain drive.

All lighting is 110 volt fluorescent and programmed incandescent. A Baptist Sound Custom Stereo/Cassette System is built in as standard equipment.

The Kiddie Kombo requires 20 KW of power, with the electric motor requiring 9 KW, and the lights and music system 11 KW.

Picture Nos. 2 and 3 show the Kiddie Kombo all folded, ready for transport on the highway. The overall length is 45 feet, and it is 8 ft. 4 in. wide. The overall height is approximately 13 ft. 2 in., depending on the height of the tractor fifth wheel.

The total weight of the Kiddie Kombo is 18,660 lbs., with 12,300 lbs. on the rear axle, and 6,360 lbs. on the kingpin. The 20,000 lb. axle is equipped with air-bag suspension for smooth riding, and 16.5 x 7 air brakes. The dual tires supplied are Michelin radial 255/70R-22.5, with 10-hole Budd-type wheels, 7.50 x 22.5.

The gooseneck of the trailer is equipped with two independent manual landing gear.

ERECTING THE KIDDIE KOMBO

Throughout these instructions, whenever reference is made to front, rear, left, or right, these directions are taken from the driver's position while seated in the towing vehicle.

The equipment requires a reasonably level space 23 feet wide, 45 feet long, and overhead clearance of 22 feet for the erection of the central pole light.

Position the Kiddie Kombo where you wish it to operate. Then using a hand crank, lower the two landing gear, shown in Picture Nos. 4 and 5. The hand crank is stored in the extreme front end inside the right storage box. Both landing gear are to be lowered until the load has been taken off the fifth wheel of the tractor. Because the load on the kingpin is only 6,300 lbs. it should never be necessary to put a spread footing under each landing gear unless the ground is extremely soft.

Disconnect the brake hoses and electric line from the panel in the front of the trailer

as shown in Picture No. 6. Note that provision has been made to use either the smaller or larger type of electrical connector.

With the landing gear supporting the weight, disconnect the fifth wheel and drive out the tractor.

For best operation it is wise to level the Kiddie Kombo, although it can operate quite satisfactorily even if not absolutely level. The structure and drive will perform best when the Kiddie Kombo is level, with less wear on all of the working parts.

Fold down the steps on each side of the trailer. They are held in the vertical positions with the long locking bar extending across the tops of the steps and pinning into the upper end of each step assembly as shown in Picture No. 7. Disconnect the locking bar and lower the steps until they rest against the side of the trailer. See Picture No. 8. Because of the method in which the step assembly is hinged it is necessary for it to stick up out of the floor when the step is in operating position. Even though the hinge plates are at each side of the step they represent a small tripping hazard, and it is for that reason that these hinge plates are painted in black and yellow stripes for high visibility. Watch the passengers carefully to make sure that they do not trip. Picture No. 9 shows the hinge in the raised position.

In the right front compartment of the trailer there is a tube with a rope attached to it. See Picture No. 10. This piece is used as leverage for raising the central pole light into the vertical position. Climb up on the winch as shown in Picture No. 11 and insert the tube into the socket on the hinged light pole.

The top end of the hinged light pole is strapped down as shown in Picture No. 12. Release the canvas strap, and the light pole can then be raised into its vertical position by pulling on the rope as shown in Picture No. 13. Pin the top and bottom parts of the light pole as shown in Picture No. 14, and lock the pin with a Klik-pin. Then remove the tube lever as shown in Picture No. 15, and store it again in the right front compartment.

Next, unpin the Little Scrambler center pole light from its stored position as shown in Picture No. 16. Raise it to the vertical position and fasten it in place with the spring-loaded wing nut as shown in Picture No. 17.

Then remove the cradle for the pole light by taking out the locking pin (Picture No. 18), and sliding the cradle out of its socket as shown in Picture No. 19. Store the cradle under the trailer.

The Little Wheel is the next part to be opened up. It is positioned as shown in Picture No. 20 for traveling on the highway, but to open up the Wheel it must be turned over so that the spokes and rims to be relocated can be reached easily from the deck of the trailer and out of the way of the stored seats.

Bracing cables on the left side of the Little Wheel must be removed. They are shown in Picture No. 21. Their attachment to the seat rack is shown in Picture Nos. 22 and 23, and the attachment at the seat pin shows in Picture No. 24. The purpose of these cables is to prevent the Little Wheel from being turned accidentally on the highway. This could happen from hitting low hanging tree branches, and then the turned Little Wheel could raise the overall height and give clearance problems. These bracing cables should always be used when traveling on the highway

If power is available, then the Little Wheel can be turned on and rotated to the inverted position.* Without electrical power at this time, the spring-loaded mechanical

* The charger breaker, Picture No. 82, must be turned on or the brake will not release! Also, both safety switches in the same picture must be turned on!

brake must be hydraulically released.

At the extreme rear end of the trailer there is a box going clear across the trailer, and it contains most of the hydraulic drive equipment. That used to drive the Little Wheel is shown in Picture No. 25. On the far right in the picture you can see the handle of a needle valve. Turn this handle clockwise until the needle valve is shut off. On the front side of the hydraulic box there is a hand pump not shown in the picture. Pump on the handle until pumping becomes difficult. This will release the brake.

Next, you must put the variable displacement pump in the drive position, and this can be done by moving the control lever shown in Picture No. 26 clockwise all the way.

When both of these things are done, you can then turn the Little Wheel by hand, although it will still not be easy. With the Little Wheel inverted, open the needle valve and the brake will lock the Little Wheel in that position.

Turning the Little Wheel by electrical power is preferred, but sometimes that may not be possible, and so we have provided this alternative procedure for you to use.

If you turn the Little Wheel under electrical power, then moving the control handle in Picture No. 26 to neutral will lock the hydraulic system and also engage the mechanical brake.

As shown in Picture No. 27, the ends of the spokes are connected to each other with flat plates, each of which has two holes in it. Remove the pins connecting the bottom two spokes on the forward end, and the bottom spoke on each side will swing down. These two are not X-braced to each other and so each one will swing down independently. Swing the flat plates hanging down in Picture No. 28 up in line with the hole in the stored rim, and re-insert the pin you have just removed. The pin can be inserted in either direction, whichever you find the easiest. For appearance sake, all should be inserted in the same way. Be sure to lock all pins with Klik-pins.

Next, unpin the upper end of the rim section where it is stored, as shown in Picture No. 29, swing it down, and connect it to the freely hanging spoke.

Unpin the second set of two-hole plates on the front side of the Wheel, and allow the spokes to swing down. This will free them from the spokes just above. Unpin the rim from the upper spoke and connect it to the spoke which has just been lowered. Since the lowered spoke is X-braced across the Wheel, both spokes will move at the same time. If you pin the rim on one side of the Little Wheel, then go to the other side, you will find that as you swing down the other rim from its storage position it will not clear the spoke but would scrape off paint. All that needs to be done is to put a little side pressure on the rim to deflect it to one side of the spoke, swing it down, and bring it up from the bottom to pin it to the spoke. Pin the two-hole plates in place, and lock all pins with Klik-pins. This completes the assembly of the front end. The remainder of the Little Wheel is to be assembled in a similar manner, starting with the folded spokes on the bottom.

Next, hang the six seats on the Little Wheel. They should be in numerical order. From the right side of the Wheel, the seats should be numbered in a clockwise direction. They are racked in the following manner: under the Little Wheel, seats 1, 2, and 3 are hanging on the seat rack. Picture No. 30 shows the No. 3 seat being lifted off the seat rack. Seat Nos. 4 and 5 are on each side of the trailer in front of the towers. The sixth seat is on the rear end, as shown in Picture No. 31. Each end of a seat rack

can be seen in Picture Nos. 32 and 33. Lift up the seat racks and store them under the trailer.

While racked, the seats are all protected with seat covers which are firmly strapped down as shown in Picture Nos. 34 and 35. Remove them as shown in Picture No. 36, fold them, and store them in the canvas bag provided. The bag is to be placed under the gooseneck.

Every seat must be locked to each seat pin with a safety as shown in Picture No. 37.

Each lap bar should be stored as shown in Picture No. 38, so that it rests on top of the folded footbottom. Grasp the lap bar and handlebar as shown in Picture No. 39. This will hold the lap bar above the footbottom as you release the handlebar and swing it out so the footbottom can be lowered into operating position. Release the D-6 lock on each footbottom hinge, and then re-lock each one after the footbottom has been lowered. The hinge castings have built-in locating notches. With the handlebar closed, the lap bar hangs freely as shown in Picture No. 40.

Swing the operator's seat around into working position as is being done in Picture No. 41.

Next, remove the step hand rails from the right front compartment as shown in Picture No. 42. On each stairway there are two short posts for locating a handrail. See Picture No. 43. Slip the hand rail down over the posts, and secure it in each place with a safety as shown in Picture No. 44.

The next operation is to lower the aprons for the Little Scrambler. At the rear ends of the aprons each one is stabilized with a short brace that connects from the apron to the central pole light. See Picture No. 45. On the front end two long braces cross over each other and connect the two aprons to the gooseneck. See Picture No. 46. Remove all four braces and store them under the gooseneck in the location shown in Picture Nos. 47 and 48. The pins may be tight so that they cannot be removed easily, but if the winch shown in Picture No. 49 is tightened or loosened this will often take the pressure off a pin so that it can be removed. Slip out the cross hand rail as shown in Picture No. 50 so you can get to the winch.

With the braces removed at both the front and rear, the aprons are held up only by the cable coming from the winch. That cable pins to a thimble in the middle of a long cable that passes around two pulleys which are pinned to the top of the center pole as shown in Picture No. 51. Each end of the cable is connected to the edge of a deck as shown in Picture No. 52. Unwind the winch, and the aprons will descend as shown in Picture No. 53. The apron feet are shown hanging loose in the picture. All of the feet can be reached when the aprons are in this position. Remove the storage pin as shown in Picture No. 54, and re-insert the pin into matching holes in the foot. Let each foot hang free.

Do not get under the apron where it could swing down and hit you if a cable should fail. These cables are securely made, but it is always wise not to put yourself in a location where you might possible be hurt if a cable should let loose.

Lower the aprons until they are in line with the trailer deck, and then drop each foot until it touches the ground. Pin each foot using a matching set of holes in the sliding tubes of the foot, and be sure to lock each pin with a Klik-pin. Disconnect the cable from each apron, un-pin the cable and pulleys at the top of the center pole, and disconnect the winch cable. Wind up the winch cable and then lift off the winch

as shown in Picture No. 55. Store it under the gooseneck.

The pull of the winch cable is toward the rear of the trailer. To resist this pull, two cables brace the front side of the center pole. The way they are attached to the center pole is shown in Picture No. 56. The forward end of each cable is attached to a bracket on the edge of the gooseneck as shown in Picture No. 57. Remove these cables and store them in the front compartment.

Replace the cross hand rail shown in Picture No. 50.

In the right front compartment you will find two posts each with a plastic chain attached to it. See Picture No. 58. Each post is to be installed in a socket at the top of the stairway as shown in Picture No. 59. Lock it in place with a safety. The plastic chains connect to the cross hand rail as shown in Picture No. 60, and are used to keep passengers from entering the operating area of the Little Scrambler while it is turning. Do not connect these chains at this time so you will have access to the Little Scrambler from the stairways.

Next, the Little Scrambler is to be opened up. One of the unit poles is located toward the front of the trailer and is supported by top and bottom sweeps permanently pinned in position. The remaining two unit poles are toward the rear and are supported on pivoting sweeps that are braced in their stored positions by bars shown in Picture Nos. 61 and 62. Remove these bracing bars, and then lift out the pin on each unit pole, shown in Picture No. 63, that keeps the unit pole from turning when it is stored. Swing the sweeps around to operating positions and pin them to the center pole as shown in Picture No. 64. Then lift out the pin which locks the front unit pole and bottom sweep to the trailer frame. See Picture No. 65. On the right side of Picture No. 61 can be seen a vertical tie rod pinned to the bottom side of the top sweep. The lower end shows in Picture No. 64. This tie rod supports the side of the top sweep that is not pinned to the center pole to keep it from drooping while traveling on the highway. Remove these two tie rods at this time. Store them under the gooseneck as shown in Picture No. 47.

Next, install the two top sweep tie rods as shown in Picture No. 66. To align the pin holes it is often helpful to lift on the end of the seat as shown in Picture No. 67. These tie rods are stored along the side of the gooseneck as shown in Picture No. 68, along with four seat brace tie rods. The longer top sweep tie rods go at the top, and the shorter seat brace tie rods underneath (See Picture No. 69).

The four removable seats are racked on top of the gooseneck as shown in Picture No. 70. Remove the long pin securing the seat to the seat rack, and pin the seat to the unit pole as shown in Picture No. 71. Then pin in place the seat brace tie rod as shown in Picture Nos. 72 and 73.

Remove the seat covers as shown in Picture No. 74, fold them, and store them in the rear compartment on top of the gooseneck.

Open the doors of the bottom sweeps to reveal the V-belt drive, as shown in Picture No. 75. Feed the V-belt around the two tensioning pulleys as shown in Picture No. 76 to connect the drive, and then close the doors.

Hang the striped skirting all the way around the Little Scrambler and the gooseneck as shown in Picture Nos. 77 and 78.

This completes the erection of the entire Kiddie Kombo.

OPERATING THE RIDES

The Kiddie Kombo was designed so that both the Little Scrambler and the Little Wheel could be operated by one person. However, some State or local regulations may require a separate operator for each ride, and so you should check the local conditions before starting to carry passengers.

On the Little Scrambler it is not necessary to balance the ride. Be sure that every passenger is properly seated, and that each lap bar is in place, before starting the ride.

The Little Wheel also does not require balancing. It has sufficient power to carry three seats loaded on one side. However, as with any machinery, balancing the load will extend the life of the equipment by reducing the heavy loads.

Be sure the Wheel passengers are properly seated, and for the smaller children the lap bar should be put right back into their laps. Larger children may require the lap bar to be out in front on their knees.

The Little Scrambler and the Little Wheel were designed to carry pre-teenage children, and were never intended for use by adults. With the Little Wheel, sometimes a parent will want to ride with a child, but this can present a safety problem.

With the Little Wheel seat suspended on two seat pins, two children in a seat are small enough so their centers of gravity are well below the seat pin centerlines, and the seat will hang in a stable position. A large adult may have his center of gravity actually above the seat pin centerlines, and if this happens the seat will turn over upside down.

If the seat is unstable it can begin to turn over backwards even before the loading platform has been lowered. If you see the seat attempting to turn either way, remove the passenger at once. If a seat appears to hang properly but you are not sure if it is really stable, rock it slightly. If it is not stable it will continue to swing back and forth without coming to rest very quickly.

It is our recommendation that a person taller than 5 feet 6 inches should not be allowed on the Little Wheel. We believe that this size limitation will prevent any dangerous tipping of the seat. Further, we believe that there will be absolutely no problem of stability of the seat so long as pre-teenage children are the passengers.

In starting either ride, it is important that this be done slowly and smoothly to allow the passengers to become accustomed to the ride motion. We recommend that the ride length be no more than 1½ minutes. Our experience indicates that this length of ride will produce maximum repeat business.

In stopping the ride, do so gradually, and do not allow anyone to get off either ride until all motion has stopped.

The passengers will all be minor children and cannot be expected to use good judgment at all times. It is up to the operator to maintain safe riding conditions. Any child who becomes frightened or who is doing something that might develop into a dangerous situation should be removed from the ride immediately.

The Kiddie Kombo is a sturdily-built amusement ride which will give long and satisfactory service if reasonably and regularly maintained.

ELECTRICAL CIRCUITRY

An electrical circuit diagram is included with this manual.

Incoming 3-phase, 220 volt, 60 Hz power is to be connected to the phenolic terminal block which will be found in the electric motor box on the extreme rear end of the trailer. It is attached to the motor carrier frame.

From there, power goes to the master safety switch. On the right side of the trailer just to the rear of the steps, part of the deck is double-hinged as shown in Picture No. 80. Raise the lid and underneath you will see three electrical boxes, as in Picture No. 81. The box that is partially shown on the left is the master switch that controls all incoming power. The box on the right is the safety switch for all lighting. The center box contains breakers for the stereo amplifier, the Little Scrambler sign and Little Wheel tower lights, the Little Wheel lights for the rotating structure, the Little Scrambler lights, the center pole light, and the 12V charger. Each breaker is identified as shown in Picture No. 82.

Power from the master safety switch goes to the lighting safety switch, and then to the breaker box.

Power also goes from the master safety switch to the magnetic starter for the 7.5 horsepower, 1200 rpm, 230/460V, 3-phase, 60 Hz electric motor. The motor has a shaft on each end, and each shaft is connected to a variable displacement hydraulic pump. The pintle for operating the larger pump is obscured by the hydraulic piping in Picture No. 25, but the pintle leverage can be identified as the flat plate with the control cable clevis attached to the right end, and the left end curves back toward a microswitch which is right at the top of the picture. This leverage is more obvious in Picture No. 83, which shows the smaller pump that drives the Little Scrambler.

The microswitch is located so that the electric motor cannot be started unless the pump pintle of the larger pump is in the neutral position. IMPORTANT: The smaller pump must also be in the neutral (stopped) position although there is no microswitch on that pintle. If the smaller pump is not in neutral, then the Little Scrambler would start to turn as soon as power was turned on. This is a safety measure that MUST NOT be overlooked. To repeat, BOTH RIDES MUST BE STOPPED, WITH THE PINTLES IN THE NEUTRAL, OR STOPPED, POSITIONS WHEN THE ELECTRIC MOTOR IS STARTED. A close view of the microswitch on the larger pump, and the large-headed adjusting bolt that actuates it, can be seen in Picture No. 84.

Starting the electric motor with a variable displacement pump not in the neutral, or stopped, position can cause expensive damage to the internal working parts of the pump.

In the earlier instructions for erecting the Little Wheel, turning the Wheel can be accomplished either by hand or under power. If you are using electrical power, the solenoid valve will not operate to release the brake unless both safety switches and the "charger" breaker are in the "on" position. This can be overlooked easily, so do not forget it. The electric motor and pump combination is powerful enough to drive the Little Wheel even with the brake set, but if you do the brakes will overheat, burn out the rubber seals, and the brake will start to leak oil. Oil can get on the braking surfaces when the rubber sealing members are damaged, and this will cause the loss of approximately half of the braking capability.

The brake is spring-set and hydraulically released by a solenoid valve. That

solenoid valve will not operate unless the loading platform is in the lowered position, so that it engages the microswitch shown in Picture No. 85. Also, the brake will not release unless hydraulic pressure has been built up in the accumulator when you first start the ride. To charge the accumulator, hold back on the Wheel as you advance the control lever of Picture No. 26. The pump will work against the load you put on the Wheel and the pressure developed will charge up the accumulator, after which the brake can be released. This should be necessary only when you first start up the ride. However, if you turn on the Wheel and let it turn slowly without passengers, the normal slight leakage of the hydraulic components can cause the accumulator to lose pressure slowly. If the pressure in the accumulator should drop below 180 pounds per square inch, which is the pressure required to release the brake, then the brake could start to drag or even lock up. If you are running slowly without passengers, put a 50 pound weight in one of the seats and this load should keep the pressure up in the accumulator sufficient to keep the brake released. This will be covered further in the hydraulic circuit section.

Power from the stereo breaker goes to the stereo amplifier and tape deck which are underneath the loading platform. They are shown in Picture No. 86.

Various kinds of stereo equipment are furnished, and yours may be somewhat different from what is pictured. This one is turned off and on at the point shown in Picture No. 87, and the volume is adjusted by pushing the button shown in Picture No. 88.

There is a speaker mounted at the top of each Little Wheel tower, and one is shown in Picture No. 89.

When the stereo breaker is turned on you will hear a humming sound coming from the amplifier enclosure. This is from a cooling fan that circulates air through the enclosure. The vent for the fan is shown in Picture No. 90.

Power from the T.L.S. (The Little Scrambler) sign and (The Little Wheel) tower lights breaker goes to the mechanical flashers controlling these lights. There is a flasher inside the "Little Scrambler" sign on the gooseneck of the trailer, shown in Picture No. 91, and details of the flasher itself can be seen in Picture No. 92.

The Wheel lights breaker controls all of the lights on the rotating Little Wheel. Power from the breaker goes through carbon brushes and electric rings on the main axle to two boxes mounted inside the Wheel on spokes as shown in Picture No. 93. Each box contains a flasher, and power is distributed from each box to the various lights. The lights surrounding the main axle are controlled by one of the boxes, and the other box controls all of the lights on the spokes and rims.

The Little Scrambler lights breaker provides power to carbon brushes and electric rings at the bottom of the Scrambler center pole. Power then goes up the center pole to a box near the top of the pole as shown in Picture No. 51. This box contains another flasher that controls all of the lights on the Little Scrambler.

The pole light breaker provides power to the tall, folding light between the two rides.

The charger breaker feeds power to the charger, which can be seen to the left in Picture No. 94. The 12-volt battery can be seen down below the charger. The solenoid valve controlling the brake is 12-volt DC operated, and the charger and battery are installed to provide power for the solenoid. Solenoids in general cannot handle

high or low voltages, and the solenoid manufacturers recommend this procedure for greatest reliability of solenoid operation. Incoming power, even so, needs to be as close to 220 volts as possible, because a voltage surge or drop could pass through the charger and damage the solenoid coil.

Incoming power should be 5-wire, with grounding being carried back to the generator. If this is not possible, then grounding locally at the ride should be done, following the procedures established by the National Electrical Code as follows:

250-81. WATER PIPE. A metallic underground water piping system, either local or supplying a community, shall always be used as the ground electrode where such a piping system is available. Where the buried portion of the metallic piping system is less than ten feet (including well casings bonded to the piping system) or there is some likelihood of the piping system being disconnected, it shall be supplemented by one or more of the grounding electrodes recognized in Sections 250-82 and 250-83.

250-82. OTHER AVAILABLE ELECTRODES. Where a water system as described in Section 250-81 is not available, the grounding connection may be made to any of the following:

(a) The metal frame of the building, where effectively grounded.

(b) A continuous metallic underground gas piping system.

(c) Other local metallic underground systems, such as piping, tanks, and the like.

250-83. MADE ELECTRODES. Where electrodes described in Sections 250-81 and 250-82 are not available, the grounding electrode shall consist of a driven pipe, driven rod, buried plate, or other device approved for the purpose and conforming to the following requirements:

(a) PLATE ELECTRODES. Each plate electrode shall present not less than 2 sq. feet of surface to the exterior soil. Electrodes of iron, or steel plates shall be at least 1/4 inch in thickness. Electrodes of non-ferrous metal shall be at least 0.06 inch in thickness.

(b) PIPE ELECTRODES. Electrodes of pipe or conduit shall be not smaller than of the 3/4 inch trade size, and where of iron or steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.

(c) ROD ELECTRODES. Electrodes of steel or iron shall be at least 5/8 inch in diameter. Approved rods of non-ferrous materials or their approved equivalent used for electrodes shall be not less than 1/2 inch in diameter.

(d) INSTALLATION. Electrodes should, as far as practicable, be imbedded below permanent moisture level. Except where rock bottom is encountered, pipes or rods shall be driven to a depth of at least 8 feet regardless of size or number of electrodes used. Pipes or rods when less than standard commercial length shall preferably be of one piece. Such pipes or rods shall have clean metal surfaces and shall not be covered with paint, enamel, or other poorly conducting materials. Where rock bottom is encountered at a depth of less than 4 feet, electrodes shall be buried in a horizontal trench, and where pipes or rods are used as the electrode they shall comply with Paragraph 250-83 (b and c) and shall be not less than 8 feet in length. Each electrode shall be separated at least 6 feet from any other electrode, including those used for signal circuits, radio, lightning rods, or any other

purpose.

250-84. RESISTANCE. Made electrodes shall, where practicable, have a resistance to ground not to exceed 26 ohms. Where the resistance is not as low as 25 ohms, two or more electrodes connected in parallel shall be used.

Continuous metallic underground water or gas piping systems in general have a resistance to ground of less than 3 ohms. Metal frames of buildings and local metallic underground piping systems, metal well casings, and the like, have, in general, a resistance substantially below 25 ohms. It is recommended that in locations where it is necessary to use made electrodes for grounding interior wiring systems, additional grounds, such as connections to a system ground conductor, be placed on the distribution circuit. It is also recommended that single electrode grounds when installed, and periodically afterwards, be tested for resistance.

HYDRAULIC CIRCUITRY

The enclosed hydraulic circuit for the Kiddie Kombo has each component identified by a code number. Those components are as follows:

CODE NUMBER	QUANTITY	NAME AND PART NUMBER	MANUFACTURER
1	2	Reservoir, approximately 30 gallon	Eli Bridge Company
2	2	Sump strainer, #10-1-100-RV-3	Flo-Ezy
3	2	Filter, 1" NPT female, #TF-1-1A10-P-D	Schroeder
4	1	Brake, #33200; 3,800 in-lb rated torque, fail-safe, 180 psi release pressure, external shaft 1.000" diameter, internal shaft SAE 6B (1.000" O.D.) parallel side spline	Ausco
5	1	Hand pump, #914-8D27	Republic
6	1	Solenoid, operating cartridge valve, 2-position, #85005030 - 12V, #3010102015 valve body	Delta
7	1	Motor, hydraulic, Series 2000, 1250 psi max. pressure, #104-1007-005, 18.7 cu. in./rev., 500 psi max. back pressure, 1" shaft dia., 7/8-14 SAE O-ring staggered ports	Eaton Char-Lynn
8	1	High pressure check valve, 3000 psi max. Series 453-½-D2-6	Republic
9	1	Needle valve, #151B-5-1/8B	Republic
10	1	Accumulator, Greerolator #847110, 30 cu. in., 2000 psig pressure max.	Greer Hydraulics
11	1	Hydura - Hydrostatic pump #PVW-15-RDFY-MS-TTR-05, clockwise rotation when viewed from end of shaft	Hydura

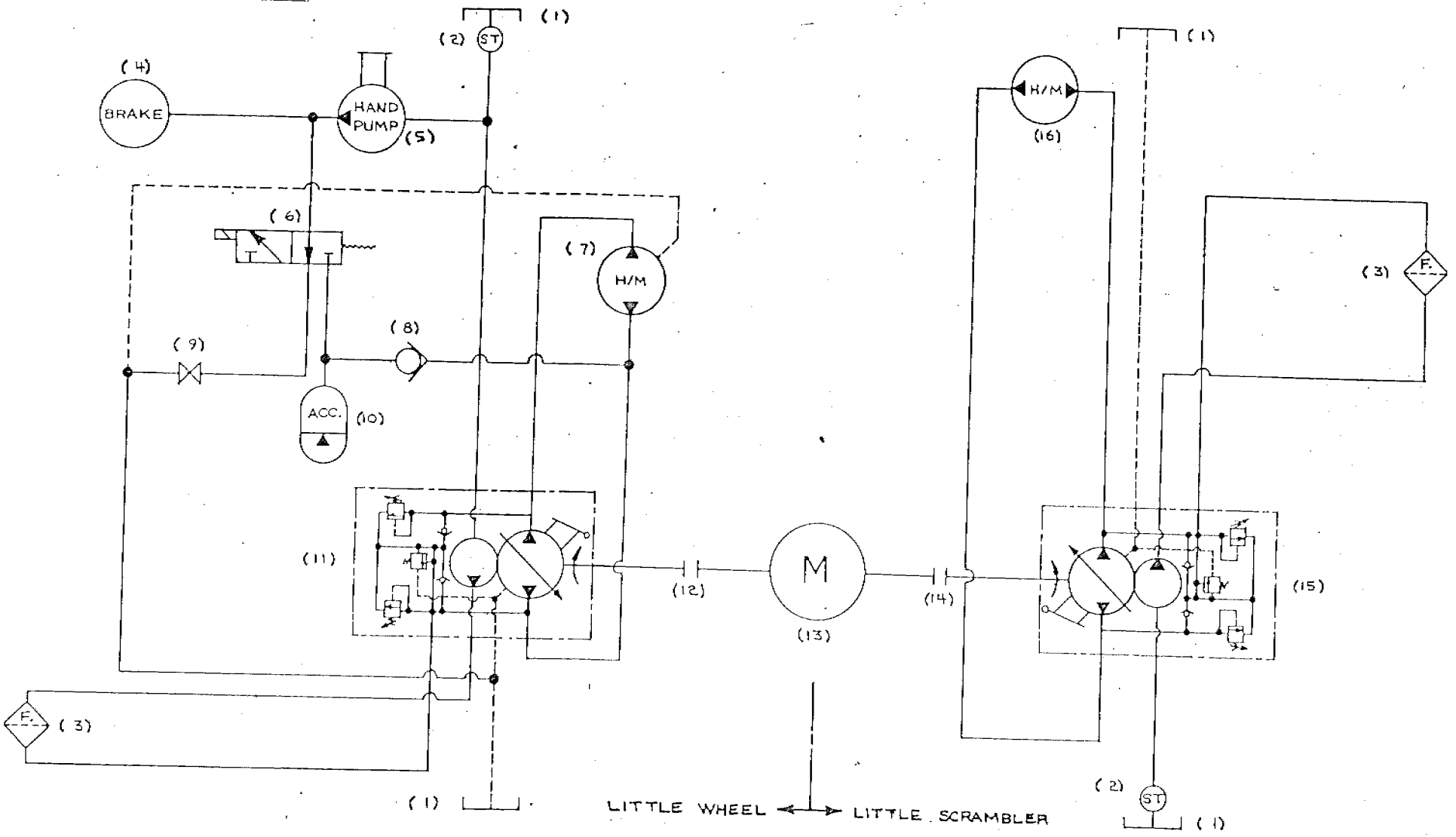
CODE NUMBER	QUANTITY	NAME AND PART NUMBER	MANUFACTURER
12	1	Coupling, L150, 7/8" shaft	Lovejoy
	1	Coupling, L150, 1-5/8" shaft	Lovejoy
13	1	Motor, electric, 230/460V, 3-phase, 60 Hz, 7.5 HP, 1200 rpm, DV-TESC, 254-T frame, with shaft on each end	
14	1	Coupling, L150, 1-5/8" shaft	Lovejoy
	1	Coupling, L150, 3/4" shaft	Lovejoy
15	1	Hydura - Hydrostatic pump, #PVW-06-LDAY-MS-TTR-05, counterclockwise rotation when viewed from end of shaft	Hydura
16	1	"H" Series hydraulic motor, #101-1032	Eaton Char-Lynn

The Little Wheel and the Little Scrambler are operated by two completely different hydraulic systems, even though both are driven by the same electric motor.

The Little Scrambler utilizes the simpler circuit, and so beginning with the electric motor (13) and going through a coupling (14), the variable displacement pump (15) (see Picture No. 83) powers a closed loop operating the hydraulic motor (16) that drives the Little Scrambler. The charge pump takes oil from the reservoir (1), through a sump strainer (2), to maintain the charge pressure in the pump. Each reservoir has a filler cap and cover plate as shown in Picture Nos. 95 and 96. By-passed oil is filtered (3) before returning to the reservoir (1).

The Little Wheel is powered by electric motor (13) through coupling (12) to drive the variable displacement pump (11). See Picture No. 25. It involves the same kind of closed loop to drive the hydraulic motor (7), shown in Picture No. 97, with a small difference. When pressure builds up in the closed loop, oil pressure flows through check valve (8) to charge up the accumulator (10). When the pressure in the closed loop drops, the check valve prevents the pressurized oil in the accumulator from draining back into the closed loop. The accumulator, then, becomes the power source for releasing the brake (4), shown in Picture No. 98. In Picture No. 25, the upper hose making a turn in the right foreground is connected to the check valve (8) on the left and the solenoid valve (6) on the right. The accumulator (10) is not shown, but the hose leading out of the upper right corner of Picture No. 25 is connected to it.

As was described in the Electrical Circuitry section, pressure must be maintained above 180 pounds per square inch in the accumulator or the brake will not release properly. If there is no load on the closed loop, as might occur when turning the Wheel slowly without passengers, there will be no pressure peak to flow through the check valve (8) to charge up the accumulator (10). As mentioned before, put a 50 pound weight in one of the seats and this will keep up the pressure in the accumulator. Solenoid valves are expected to produce slight leakage, and this can bleed off pressure slowly from the accumulator, and so you must use a procedure that will keep pressurized oil flowing continuously into the accumulator to maintain the


(1)
(2) ST
(4)
BRAKE
HAND PUMP
(5)
(6)
(7)
H/M
(8)
(9)
ACC.
(10)
(11)
(12)
M
(13)
(14)
(15)
(16)
H/M
(1)
(3)
F.
(3)
F.
(1)
LITTLE WHEEL
LITTLE SCRAMBLER
(2) ST
(1)

pressure level above 180 pounds per square inch.

The solenoid valve (6) is drawn in the unpowered position. Here, the brake (4) is connected to the reservoir (1) through needle valve (9). With no pressure going to the brake (4) the internal brake springs have the brake locked.

Powering the solenoid (6) shifts the valve spool so that pressurized oil from the accumulator (10) flows to the brake (4), releasing it. However, if that pressure is below 180 pounds per square inch the brake will not release completely.

In the assembly procedure for the Little Wheel it was mentioned that the Wheel could be turned by hand if the brake were released. This assumed that electrical power was not available at that time. To do this, close needle valve (9), which closes off the flow path back to the reservoir. The handle of the needle valve can be partially seen behind the solenoid valve (6) in Picture No. 25. This prevents oil from returning to the reservoir. Then pumping on the hand pump (5) will raise the pressure enough to release the brake. Pump until you can feel heavy pressure on the pump handle. When you are through using the hand pump be sure to re-open the needle valve.

LUBRICATION

OIL RESERVOIRS. These reservoirs are filled at the factory with Mobil 423 hydrostatic transmission fluid, and it is recommended for use.

PIVOTING JOINTS. All pinned joints are fitted with zinc-plated pins, but to insure free movement of all pivoting joints they should be oiled regularly. Those pins which are removed regularly during assembly or disassembly should be greased so that the pins can carry lubrication into the joints.

DRIVE CHAINS. All of the chain drives operate at relatively low speeds, and so working grease well into all parts of the chains and then wiping off the surplus should provide long life for the driving chains. Examination of the chains for wear or rusting will indicate whether or not the amount of lubrication you are using is adequate for the kind of service you are getting.

BEARINGS. The Little Scrambler has bearings on the center pole and unit poles which should be greased once a year. They are sealed bearings. The Little Scrambler casters likewise need re-lubrication once a year.

The Little Wheel has main bearings on the main axle, plus four pillow block bearings for the chain drives in each tower. These are sealed bearings, and should be re-lubricated once a year.

MAINTENANCE ADJUSTMENTS

SCRAMBLER V-BELTS. The Little Scrambler V-belts should be kept tight enough so that the belts do not slip.

SCRAMBLER CHAIN DRIVE. Tightening the driving chain on the Little Scrambler is accomplished by shimming out the hydraulic motor which carries the small chain sprocket.

WHEEL CHAIN DRIVE. On the Little Wheel the heavy chain drive for the main axle has an idler for taking up the slack, and this can be seen in Picture No. 99. However, in tightening the chain drives, the first one to check is the higher speed, lighter chain which is inside each tower. Leave the heavy chain idler of Picture

No. 99 loose at this time.

The drive shaft going clear through the main axle must clear the top and bottom of the hole through the axle. If it touches either the top or bottom, then the drive shaft may get bent, causing the hydraulic motor and/or the brake to wobble. This shaft was closely centered in the axle at the factory, so you should normally not have to be concerned about this.

To tighten the light chain drive, shim down the two pillow block bearings down inside the tower. Then, after the light chain has been properly tensioned, the heavy chain idler can be moved to tighten the heavy chain.

WHEEL LOADING PLATFORM. The loading platform is counterbalanced for easy operation, but for safe use it must engage the hook on each side. Improper adjustment or worn parts could cause this latching arrangement, shown in Picture Nos. 100 and 101, to fail. The spring on the grip release must not be broken, or it will not latch properly. The hooks mounted on the structure below the loading platform can be adjusted in and out as well as up and down for the best fit on the pivoting latch member which engages each hook.

OIL LEAK FROM BRAKE. If for whatever reason the brake fails to release, and the hydraulic drive continues turning the Wheel, the dragging brake will generate considerable heat that will damage the rubber O-ring seals. Oil will then begin to leak out of the brake. The Ausco Company informs us that even when this happens you will still have approximately half of the braking capability. Even so, you will want to stop the oil leak.

Until you can remove the brake and replace the O-ring seals, you may need to continue operating the Wheel. This can be done if some precautions are observed. First of all, disconnect the hydraulic hose going into the brake and cap it. You may prefer tracing this hose back to the other end, and removing that end of the hose from where it is attached requires simply the insertion of a pipe plug that would be available at any hardware store.

Next, disconnect the chain coupling connecting the brake to the long shaft going through the main axle.

This means that you have no mechanical brake operating, but there is a certain amount of hydraulic braking available to you which will get you by until the brake is repaired. The hydraulic motor driving the Wheel has slight normal leakage which will allow the Wheel to drift slowly if there is a substantial out-of-balance load. For example, if you have a seat heavily loaded on the same level as the main axle and you are trying to hold a seat at the loading platform you may notice the Wheel wanting to drift slowly, to the point that it may not be easy to get passengers off and on the ride. However, if you are careful to balance the loading during this time when the brake is disconnected you should be able to get the passengers off and on the Wheel safely.

We do not recommend operating the Little Wheel without the mechanical brake, but there are times when you must keep the equipment operating if at all possible, and this procedure has been described to help you in this kind of situation.