

R. L. HUB MECHANICS MANUAL

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AMERICAN CYCLE SYSTEMS
245 EIGHTH AVENUE
INDUSTRY CALIFORNIA 91746

AMERICAN CYCLE SYSTEMS, INC.
15004 E. ARROW HIGHWAY
BALDWIN PARK, CA 91706
(626)960-1470

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Section A-Description and Bike Test

1. Description

1.1 The R.L. Hub was designed to allow the rider to enjoy the benefits of a freewheel without the bother of having the pedals rotating when the rear wheel is moving backwards.

1.2 A special clutch system is used in the R.L. Hub which is basically a different mechanism than is found in a normal freewheel. In addition a strong friction spring is used to hold the pedals in place when the riders feet are removed.

1.3 In riding a bike with the R.L. Hub you must back peddle the crank 20-30 degrees to insure complete disengagement of the driver for coasting.

1.4 When back pedaling the hub, there will be some noise from the hub and a drag on the crank arms from the friction spring. This is normal and should not be a cause for concern.

2. Bike Test

2.1 Mount the bicycle on a bike stand that allows you to turn the pedals by hand and drive the rear wheel.

2.2 Rotate the right pedal clockwise, the rear wheel should be driven forward in the normal manner. There will be some resistance from the friction spring. When the hub is new there will be a pedal force of from 5 to 8 pounds. After the bike has been ridden for a few hours this force will drop to 1 to 4 pounds.

2.3 Rotate the right pedal counter clockwise 20-30 degrees. The rear wheel should be in the coast mode with the pedals stationary. Stop the rear wheel with the hand brake. Rotate the rear wheel in reverse by hand. The wheel should rotate freely and the pedals should be stationary.

2.4 If the bearings require adjustment you must adjust using the jam nut and cone on the side of the hub opposite the sprocket only. Loosening the cone on the sprocket side may change the factory set adjustment on the drive assembly, causing the hub to malfunction. Refer to Section C 4.3 for detail instructions on bearing adjustment.

3. Hub Construction

3.1 Referring to the R.L. hub assembly drawing (Figure 1) note that there are four basic component assemblies: (1) Axle assembly; (2) Drive assembly; (3) Hub shell and (4) Hub shell bearing assembly.

3.2 For complete details on dismantling, inspection, assembly and adjustment of the Hub refer to sections B and C.

Section B- Detail Instructions to Dismantle Hub

Numbers in brackets () refer to assembly drawing details Fig. 1

1. Remove the snap ring (24), the sprocket (23) and the sprocket shield (22).

2. Removal of Drive and Axle Assemblies

The drive and axle assemblies are removed from the hub shell as a unit, when the threaded retainer is unscrewed from the hub shell.

2.1 Clamp the hub in an axle vice, driver (7) side side down. Remove jam nut (21) and lock washer (20). Rotate the bearing cone (19) counter clockwise until the top face of it is flush

with the end of the axle (1). Remove the hub from the vise.

2.2. The drive and axle assembly will be removed with the threaded retainer (9). This must be done with the driver (7) side of the hub up. Place a wrench onto the threaded retainer (9). Grip the wheel so it can not rotate, turn the wrench counter clockwise to remove the threaded retainer (9) from the hub shell (15). When the threaded retainer (9) is free of the hub shell (15), turn the wheel over, keeping it high enough to allow the drive assembly to hang down out of the wheel. The cone (19) will prevent the drive assembly from falling out. While holding the wheel with one hand and retaining the cone (19) with your finger, rotate the axle (1) counter clockwise to remove the drive and axle assemblies from the hub shell (15).

3. Inspect Hub Shell Threads and Hub Shell Bearing Assembly

3.1 With your finger holding cone (19) turn the wheel so you can inspect the retainer threads in the hub shell (15). Remove any dirt or burrs from the threads and clean the inside of the hub shell (15). Put a light coat of oil on the threads. Place the wheel down on the threaded bore side of the hub shell (15).

3.2 Carefully remove the cone (19). Do not remove shield (17) unless cup (16) must be replaced. Count and inspect the ball bearings (18). There should be 9 of them. Replace any that are missing or damaged. Check the bearing cup (16), replace if cracked.

4. Removal of axle assembly from drive assembly.

Remove the axle assembly from the drive assembly by placing the axle (1) into an axle vise with the driver (7) up. Using a 16mm wrench to keep the drive cone (14) from rotating. Remove the 17mm jam nut (26) and the lock washer (25) from the axle (1). Remove the drive bearing cone (14) and the ball bearing retainer (13). Remove the drive assembly from the vise. Tap the driver (7) end of the axle with a soft hammer until the axle assembly falls out.

5. Disassembly of Drive assembly

5.1 Clamp the driver (7) in a vice (lightly). Remove the stop screw (12). NOTE: IT HAS A LEFT-HAND THREAD - TURN CLOCKWISE TO REMOVE IT. You will need a flat bladed screw driver with a 5/8" or wider blade. Insert the screwdriver down into the bore in the clutch nut (10), setting the screwdriver blade into the slot in the stop screw (12). Keep a good downward pressure on the screwdriver and rotate it clockwise to remove. There will be some shims (11) under the head of the stop screw (12). It is VERY IMPORTANT that all of them are saved. Look carefully for all of them. The number of shims determine the travel of the clutch nut (10) so all must be used when the drive assembly is reassembled.

Turn the clutch nut (10) clockwise and seat it into the tapered bore of the threaded retainer (9). Care should be taken when moving the drive assembly out of the fixture so that the clutch nut (10) and the driver (7) are not rotated. If they unscrew from each other the ball bearings (8) can fall out of the threaded retainer.

Turn the assembly, driver (7) side down, holding the threaded retainer (9) and the driver (7), rotate the clutch nut (10) counter clockwise 3/4 of a revolution and remove it. Turn the assembly driver side (7) up. Remove the driver (7) from the threaded retainer (9). Gather and inspect the ball bearings (8).

Replace any that are worn. There should be 13 balls.

5.2 Wash all parts in solvent and dry them. It is VERY IMPORTANT that the stop screw threads and the internal threads in the driver (7) are clean. Inspect all parts for burrs and excessive wear or other damage. The bores in the threaded retainer, especially the tapered bore in the threaded retainer (9) may have the black finish rubbed off, this is normal.

6. Axle Inspection and Adjustment

6.1 Clean with solvent until it is free of grease. Dry it off.

6.2 Inspect the axle (1) threads for damage. It is a 3/8-26 thread.

6.3 Inspect the spring retainer (2) and spring retainer cap (4) for damage. Look at the small fingers that retain the spring (3) into the grooves. If they are bent, the spring retainer (2) and the spring retainer cap (4) must be replaced.

Section C-Detail Assembly and Adjustment Instructions

Numbers in brackets () refer to assembly drawing details Fig.1

1. Drive Assembly

1.1 Place the stop screw (12), shims (11), clutch nut (10), threaded retainer (9), 13 ball bearings (8), and driver on a clean rag. Count the shims (11) and place them on the stop screw (12) and push them down until they rest on the screw head. Place the stop screw aside so that it won't get any grease on it or lose the shims (11). Put grease on the outside of the clutch nut (10) on the tapered area that goes into the threaded retainer (9). Set it down with the tapered side up. Grease the tapered bore in the threaded retainer (9). Turn it over and put plenty of grease into the bearing race (side with notches on it). Install 13 ball bearings (8) into the race and push them out against the side of the race. Pick up the driver (7) and put plenty of grease on the external thread and the outside bearing race. Prevent any grease from going down into the internal thread in the center of the driver (7). Place the driver (7) with the threads pointing down into the threaded retainer (9) race and seat it against the ball bearings (8) by pressing down and rotating it.

1.2 Pick up the threaded retainer (9) and the driver (7) as an assembly. Be careful that they don't separate and let any balls fall out. Look into the tapered bore of the threaded retainer, and on the rag to be sure that no balls were pushed through the bore when the driver (7) was inserted into it. Install the clutch nut (10) and with the tapered end towards the tapered bore in the threaded retainer (9), by rotating clockwise and threading on the external thread of the driver (7) until it seats into the tapered bore of the threaded retainer (9).

1.3 Carefully not allowing the clutch nut (10) or the driver (7) to rotate. Look into the clutch nut (10) bore and remove any grease in the bore or on the end of driver (7). Set it down on the clutch nut (10).

1.4 Coat the stop screw threads (12) with a liquid adhesive manufactured by Permatex Industrial called "Locks Nuts" or "Loctite 242". Apply to the first 5 threads from the end of the stop screw.

1.5 Install the stop screw by picking up the clutch nut (10), threaded retainer (9), and driver (7); placing the palm of your

hand over the driver (7) and gripping the threaded retainer (9) and clutch nut (10) and with your fingers lift it up with the clutch nut down, insert the stop screw (12) up into the clutch nut bore (10) until the slotted head is up into the bore. Keep it from falling out with your finger tips. Using a wide bladed screwdriver install the stop screw (12) by rotating it counter clockwise until it is tight against the driver end. (The reason for putting the stop screw into the clutch nut (10) bore this way is to prevent any possibility of one the shims (11) falling down and preventing the stop screw (12) shoulder from seating on the end of the driver (7) correctly.)

1.6 Clamp the driver (7) in a vice (lightly) so the stop screw (12) can be tightened. Rotate it counter clockwise and torque the stop screw (10) to 14-15 ft.lbs. You may have to put a wrench on the screwdriver blade to get the torque.

1.7 Inspect the bore in the clutch nut (10) and remove any "Loctite" from the bore. Turn assembly over and remove any "Loctite" from the center hole and the bearing bore in the driver (7).

2. Axle Assembly

2.1 Install threaded spring retainer (2) on axle (1). Insert the spring (3) into the slot, slide spring retainer cap (4) on the axle and over the spring. Install the lock washer (5) and jam nut (6).

2.2 Adjust the location of the loose assembly so that the distance from the end of the axle (1) to the face of the spring retainer (2) is 2 and 15/16 inch.

2.3 Place the axle in a vice with the jam nut up. Carefully align the spring retainer (2) and the spring retainer cap (4) so that the spring moves freely. Hold the spring retainer cap (4) with a 5/8 wrench and tighten the jam nut (6) to 18 ft-lbs.

2.4 Check to make sure the spring still moves freely and the distance from the end of the axle to the jam nut face is between 2 15/16 and 3 inches. If not repeat steps 2.2 and 2.3.

2.5 Grease the spring (3), retainer (2) and cap (4) with a liberal quantity of grease.

3. Assembly of axle assembly and drive assembly.

3.1 Grease the bore in the clutch nut (10). Grease the bearing race in the driver (7). Grease the drive bearings (13).

3.2 Insert the axle assembly into drive assembly with the spring retainer (2) side of the axle (1) toward the clutch nut (10) until the spring (3) comes into contact with the clutch nut (10). Holding the drive assembly vertically with the clutch nut (10) on top, tap the end of the axle (1) with a soft hammer until the spring assembly stops against the stop screw (12).

3.3 Place the assembly into an axle vise with the driver (7) in the up position. Install the drive bearing (13) into the driver (7). Make sure the metal cage holding the balls is in the up position. Thread the drive cone (14) onto the axle (1) and using a 16mm wrench tighten it snugly into the driver bearings (13) to insure that the spring retainer (2) is against the stop screw (12).

IMPORTANT THE NEXT ADJUSTMENT MUST BE MADE CORRECTLY OR THE DRIVE ASSEMBLY WILL NOT FUNCTION CORRECTLY.

3.4 Using a 16mm wrench turn the drive cone (14) counter clock-wise 1 1/2 revolutions. Holding the cone so it can not rotate, install the lock washer (25) and jam nut (26), torque to 18 ft. lbs.

3.5 Remove the assembly from the vise with the drive cone (14) up. Look at the shield on the drive cone (14) and it will be a little above the top of the driver (7). Check to insure that the drive cone (14) will move approximately 1/32 of an inch by tapping on the end of the axle.

The reason for loosening the drive cone (14) 1 1/2 revolution is to allow 1/32" clearance between the head of the stop screw (12) and the spring retainer (2) insuring that they never contact each other.

4. Install Drive and Axle assemblies into the Hub Shell

4.1 Grease bearing cup (16) and install 9 bearings (18). Install shield (17) if it has been removed. Install the cone (19), rotating it to insure the balls are seated properly.

4.2 With your finger pressing down on the cone (19) hold the wheel so the drive and axle assemblies can be installed with the clutch nut (10) entering the threaded end of the hub shell (15). Push the assembly into the bore and thread the cone (19) onto the axle (1) until the face of the threaded retainer (9) is about 1/8" from the hub shell (15). Thread the threaded retainer (9) clock-wise into the thread in the hub shell (15). Be careful that it is not cross threaded. Thread it in until it is against the stop shoulder in the hub shell (15). No threads should be showing when the threaded retainer (9) is against the shoulder correctly. Torque threaded retainer (9) to 18 ft. lbs.

4.3 Turn the wheel over and lock into a axle vise with driver side up. Install sprocket (23) onto the driver (7). Hold the wheel and rotate the sprocket (23) counter clockwise at least one full revolution. This will make sure that the clutch nut (10) is totally disengaged from the threaded retainer (9). Remove the sprocket, turn the wheel over and lock the driver (7) side of the axle (1) into the vise. Using a 15mm wrench, thread cone (19) down until it seats the ball bearings (18) into cup (16) and has no end play. Rotate the wheel in both directions to seat the ball bearings. Continue to rotate the wheel and adjust the cone (19) until the wheel rotates freely. Move the wheel up and down to check for end play. If there is end play tighten the cone until end play is gone. Install lock washer (20) and jam nut (21) and hold the cone (19) with a 15mm wrench, torque the jam nut (21) to 18 ft. lbs. Remove the wheel and holding the axle (1) in both hands spin the wheel. It should turn smoothly and have no roughness as it rotates. If you feel roughness loosen cone (19) a small amount and check for end play and check rotation again. NEVER ADJUST CONE (19) WITHOUT TURNING THE SPROCKET ONE REVOLUTION COUNTER CLOCKWISE TO DISENGAGE THE CLUTCH NUT (10).

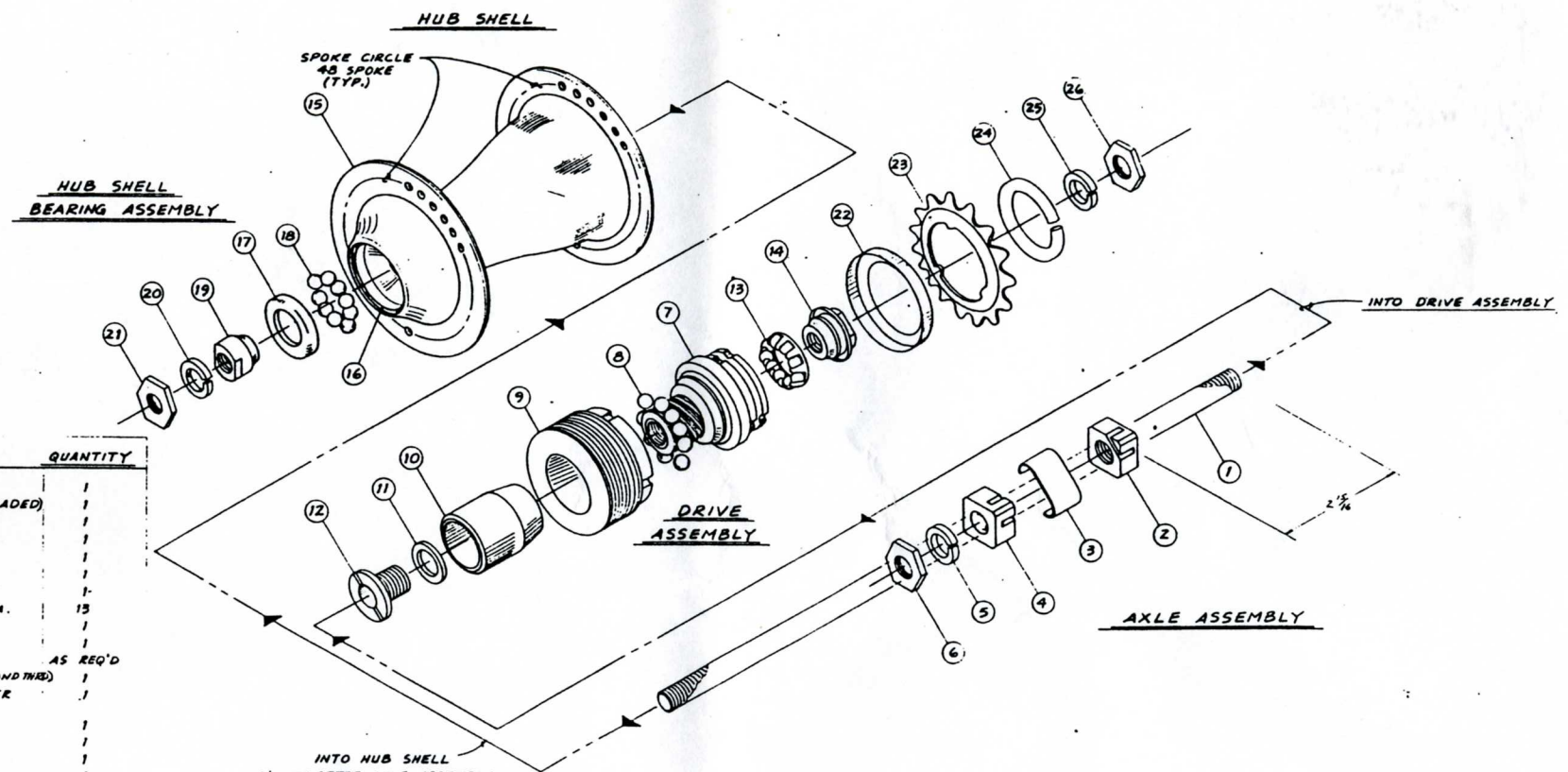
5. Test Hub for Proper Operation .

5.1 Place the wheel into an axle vise with the driver (7) side up. Install sprocket shield (22), sprocket (23) and snap ring (24). With the hub locked in the axle vise, hold the wheel and don't let it rotate. Place a reference mark on the hub by a spoke hole so that you can see it when you look directly down at the

sprocket. Mark the closest tooth on the sprocket for reference.

5.2 Holding the wheel so it can not rotate, rotate the sprocket COUNTER CLOCKWISE at least one full revolution and when the reference mark on the hub is directly below the marked tooth on the sprocket stop. If you go past the reference point on the hub, continue another revolution counter clockwise to line the marks up. Never turn sprocket clockwise to line up the marks. Keep holding the wheel, slowly turn the sprocket in a clockwise direction and count the number of teeth on the sprocket that pass the reference point on the hub until you feel the clutch nut (10) engage into the threaded retainer (9) driving the wheel. The number of teeth you counted should be $1 \frac{1}{2}$ to $2 \frac{1}{2}$ teeth. This is how far the 16 tooth sprocket (23) has to move to totally engage the clutch nut (10) to drive the wheel. It is also how far the sprocket must be back-pedaled to totally disengage the clutch nut (10) allowing the wheel to coast in either a forward or backward direction.

5.3 Rotate the sprocket at least $\frac{1}{2}$ revolution counter clockwise. The wheel should spin freely in both directions.



NOTE: AFTER AXLE ASSEMBLY HAS BEEN INSTALLED AND ADJUSTED IN THE DRIVE ASSEMBLY,

ITEM #	PART #	DESCRIPTION	QUANTITY
1	63327	AXLE	1
2	63387	SPRING RETAINER (THREADED)	1
3	63386	FRICITION SPRING	1
4	63388	SPRING RETAINER CAP	1
5	50839	LOCK WASHER	1
6	62997	JAM NUT	1
7	63333	DRIVER	1
8	50817	BALL BEARINGS 1/4" DIA.	13
9	63332	THREADED RETAINER	1
10	63331	CLUTCH NUT	1
11	63330	ADJUSTING SHIM	AS REQ'D
12	63329	STOP SCREW (LEFT HANDING)	1
13	50901	BALL BEARING+RETAINER (8-1/4" DIA. BALLS)	1
14	63334	DRIVE CONE & SHIELD	1
15	63326	HUB SHELL	1
16	63064	CUP	1
17	63061	SHIELD	1
18	50817	BALL BEARING 1/4" DIA.	9
19	63067	CONE	1
20	50839	LOCK WASHER	1
21	62997	JAM NUT	1
22	63337	SHIELD-SPROCKET	1
23	50903	SPROCKET	1
24	50904	SNAP RING	1
25	50839	LOCK WASHER	1
26	62997	JAM NUT	1

	AMERICAN CYCLE SYSTEMS, INC. 1408 Industrial Park Dr. Orem, Utah 84057	R.L. HUB ASSEMBLY 10874	1 of 1
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