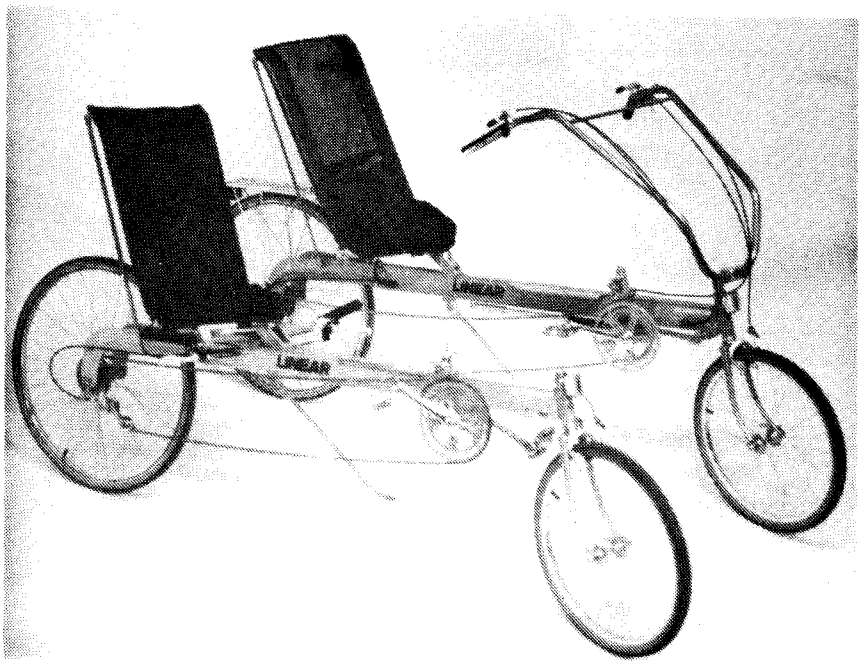
LINEAR

ALUMINUM RECUMBENT BICYCLE

OWNER'S MANUAL



KANN MANUFACTURING CORP.

TELEPHONE 319-252-2035
TELEFAX 319-252-3069

414 NORTH THIRD STREET
BOX 400, GUTTENBERG, IOWA 52052

OWNER'S RESPONSIBILITY

IT IS THE OWNER'S RESPONSIBILITY TO:

(1) Be certain that all assembly instructions have been followed.

(2) Make all necessary adjustments.

(3) Carefully read and follow safe riding rules.

(4) Check out your bicycle before riding.

(5) Perform all required maintenance.

(6) Know how to operate all standard and accessory equipment on your bicycle.

(7) Make certain that anyone using the bicycle has been fully instructed in its operation.

(8) Conform to all applicable traffic, registration and equipment laws. Only you will be responsible for any damage to the bicycle or injury to the rider if these rules aren't followed.

SAFE RIDING RULES

Every bicycle rider should know the difference between the right way of riding and the wrong way. Too often the inexperienced bicycle rider uses unsafe riding techniques or tries stunt riding, and the usual result is a fall along with possible injury. Your bicycle is designed for enjoyable use in normal riding conditions, not for stunts or experimentation. Also, remember that proper clothing is necessary for safe riding. When riding, always wear shoes, avoid loose fitting clothing, and wear light colors when riding in the evening hours. Use only accessories suited for your bike. The following rules are required by law in many areas. Check your local law enforcement agency regarding these and any additional rules that may apply to you.

1. Obey all applicable vehicle operation laws, traffic regulations, signs, signals, and markings.
2. Whenever you ride alone, ride on the right hand side of the road. When riding in pairs or large groups, ride single file along the right hand side of the road. Set up a sensible distance between yourself andthe rider in front. Don't weave in and out. Don't tailgate.
3. Be extremely careful at all intersections. Walk your bike across busy intersections, and watch for cars when making a turn.
4. Watch out for car doors opening or for cars pulling out into traffic from streets, alleys, and driveways.
5. Use proper hand signals to indicate turns or stops. Get in the habit of always signaling so it will become an automatic reaction. Keep both hands on the handlebars except when giving hand signals.
6. Watch out for drain grates, soft road shoulders, and other road hazards.
7. Be aware of riding conditions when operating your bicycle on or off the road. Be extra cautious when riding on wet pavement, gravel, or leaf-covered pavements. It will take more distance to stop your bicycle when riding on these types of surfaces, and your bike may skid in a turn.
8. Never carry passengers - except in a protective child carrier properly mounted to maintain safe control of bicycle.
9. Never carry packages that interfere with your vision or control.
10. Always give pedestrians the right of way. Always ride on marked bikeways where available. (Check local ordinances regarding riding bikes on roadways and sidewalks.)
11. Most accidents happen at dusk. Be doubly careful when riding during these hours. Make certain your bicycle complies with local equipment laws for night operation.
12. Drive a safe bike. Always keep your bicycle in good mechanical condition. For instructions on Operation, Adjustment and Maintenance, see the appropriate section of this manual.
13. Ride your bike defensively; watch out for other vehicles.
14. After riding a long time or in bad weather you will naturally be tired. This is the time when the reactions of your mind and your muscles will slow down; the time when you're wide open for accidents. If you're tired and must keep going, be more careful and allow more time and distance for brakes to work.
15. Always wear an approved helmet, even on short rides. Helmets can greatly reduce the chances of injury in many types of accidents.

PROPER SIZING

LINEAR bicycles are sized according to trouser inseam measurements. The following chart reflects the proper frame size with the rider's measurements:

Inseam Measurement	Recommended Frame Size
22" - 26"	36"
25" - 29"	39"
28" - 32"	42"
31" - 35"	45"
34" & over	48"

These are recommended frame sizings. The LINEAR is very adjustable and can accommodate a wide range of individual sizes. (For example: a person with a 28" inseam can fit on a 45" frame.)

SAFETY CHECKLIST

Frequently review the items listed below. To correct problems noted, refer to the proper section in the Operation, Adjustment, and Maintenance areas of this manual. If adjustments cannot be made satisfactorily, take your bicycle to the nearest Authorized Service Center for assistance.

1. **STEERING**
   a. Make sure components are correctly assembled and properly tightened.
   CAUTION: Positive locking safety pins must be securely installed in the draglink tube (see photo #1-A) and in the underseat steering attachment block (see photo #2) (on underseat steering model only), and in the seat clamping block (all models) (see photo #1-B).

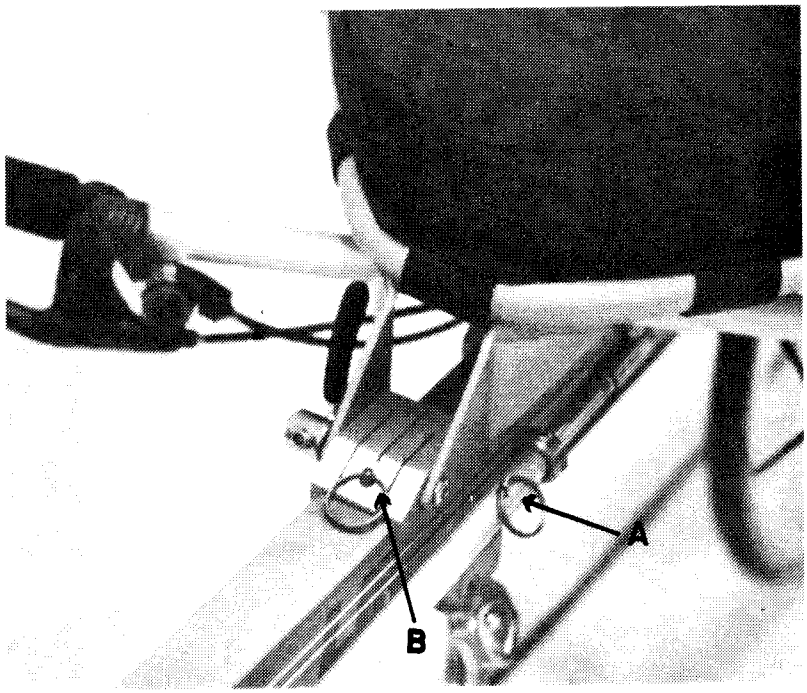


Photo 1

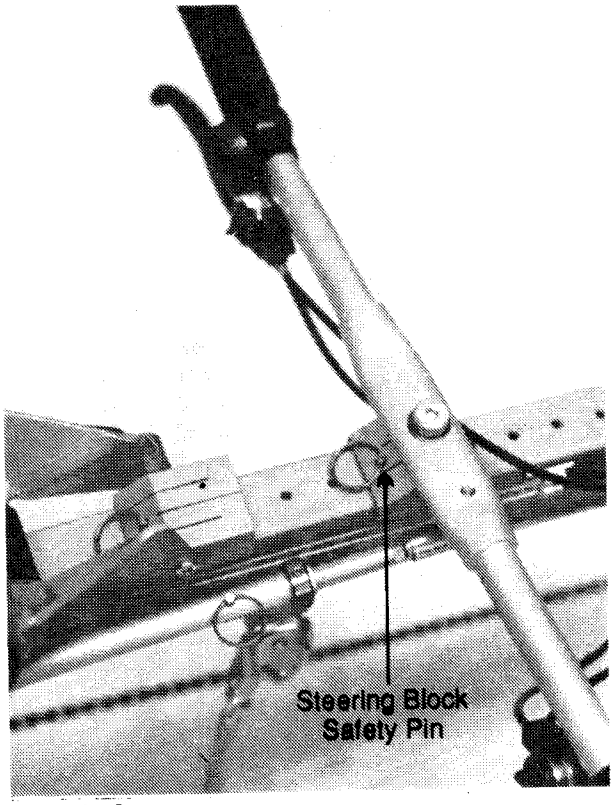


Photo 2

b. Check fork for excessive play in the head tube of the bicycle.
c. Replace, don't repair or straighten a bent fork. Keep headset bearings adjusted and lubricated.
d. Replace worn or damaged hand grips and plugs.

2. BRAKES

a. Apply brake(s); bicycle should not roll when brake is fully applied.
b. Check for bent or damaged cables.
c. Check to make sure caliper brake shoes are properly aligned.

CAUTION: Brake shoes must never touch tire sidewall when braking force is applied. (see photo #3).

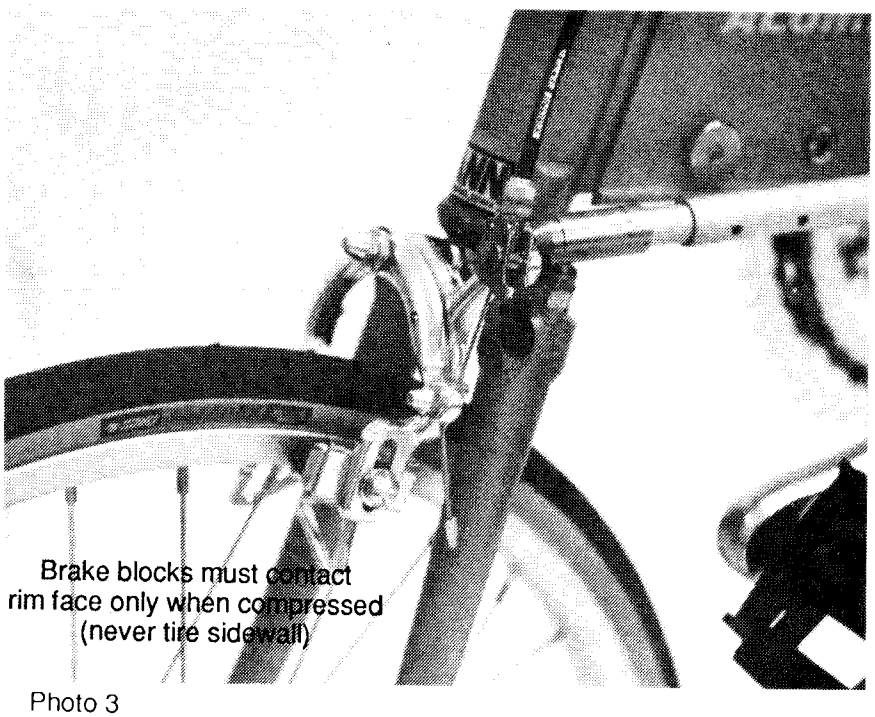


Photo 3

d. Brake shoes should **not** touch rim until brake levers are squeezed.
e. Make sure the rim and caliper brake blocks are clean, dry, and free of wax and oil.

3. **WHEEL ASSEMBLY:**
   a. Check to be sure rim is not bent or damaged.
   b. Check rims for moistness, oil, or wax.
   c. Check tires for proper pressure as indicated on the side of the tires.
   d. Check tires for proper seating, damage, or excessive wear.
   e. Check and correct loose spokes. (Spoke adjustments should be left to professional bike shops.)
   f. Check hubs for freedom of movement and correct any excessive side play.
   g. Check for proper positioning of front wheel.
   h. Check for proper wheel alignment.

4. **CHAIN:**
   Check for proper tension and cleanliness. When the chain is on the largest front and largest rear gear, the rear derailleur cage should be fully extended, while still allowing the chain to make two bends through the derailleur (see photo #4).

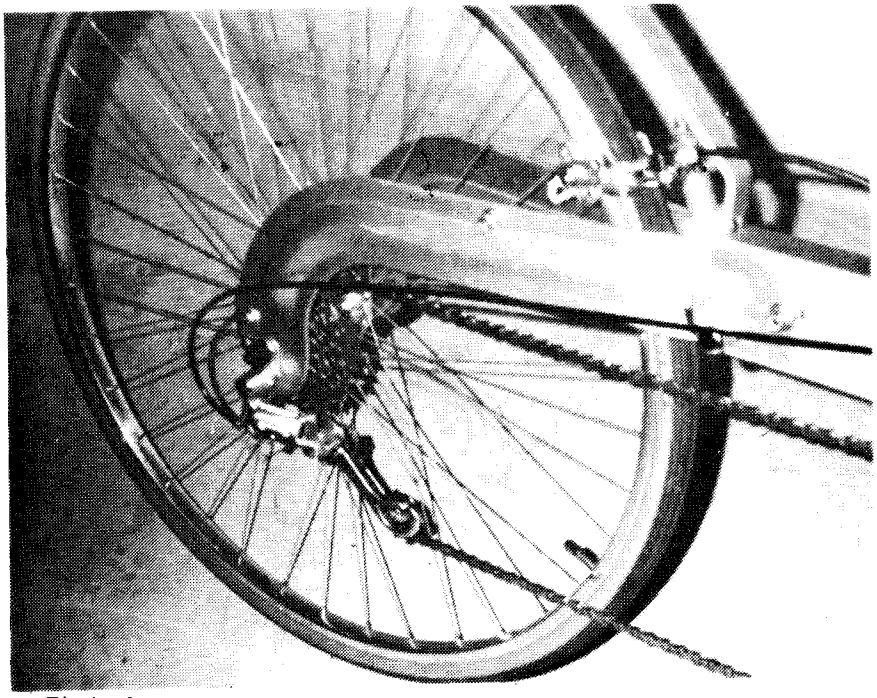


Photo 4

5. **SEAT AND SEAT STAYS:**
   a. Check for proper position of seat and determine that positive locking safety pin is fully inserted into seat clamping block.

b. Check to see that seat stay quick release joints are secure. (see photo #5 showing quick release joint open and photo #6 showing quick release joint secure).

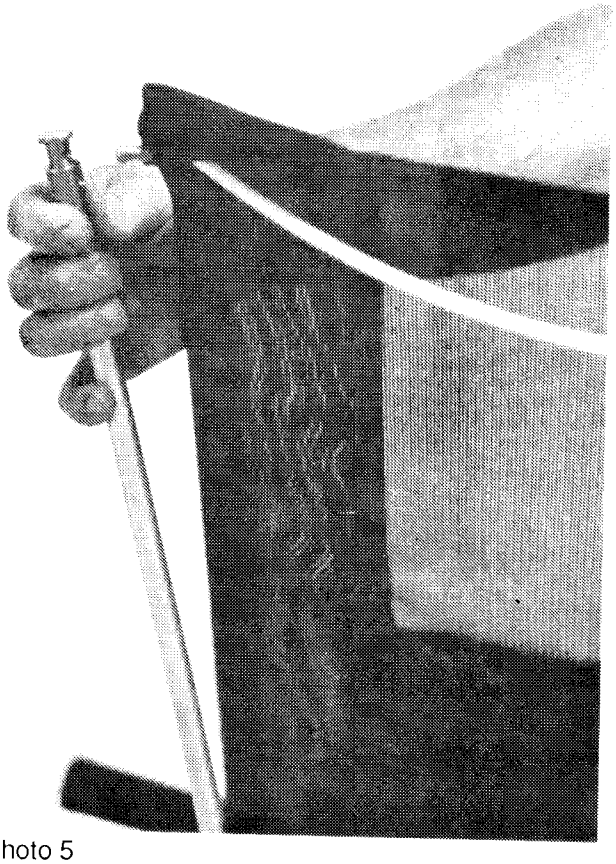


Photo 5

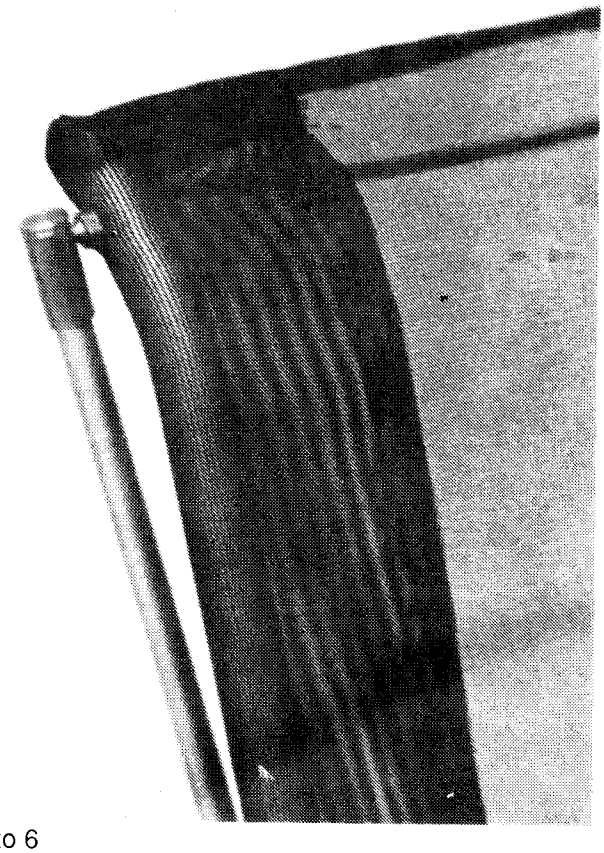


Photo 6

6. CRANK AND SPROCKET:

a. Check crank for freedom of movement and correct any excessive side play.
b. Check sprocket for worn or bent teeth.

7. PEDALS:

a. Check pedals for proper rotation on spindles.
b. Make sure pedal spindles are properly threaded in crank and securely tightened.
c. Check pedals for excessive wear and for missing or damaged reflectors.

8. FRAME:

Check for bent or broken frame.

9. SHIFTERS:

a. Make sure shifter mechanism moves freely, to all gears.
b. Check for bent or damaged cables.

10. REFLECTORS:

a. Be sure reflectors are clean, visible, and securely attached. Replace any missing or damaged reflectors.

b. **DO NOT** operate this bicycle without reflectors in place and in functional condition.

11. FOLDING JOINTS:

REAR: The chainstay is equipped with 2 Quick Release levers (see photo #7). To fold the LINEAR, the front Quick Release must be released **and** slid forward into the slot provided (see photo #8). The rear Quick Release acts as a pivot when released which will allow the entire chainstay assembly to fold under the main frame, (see photo #9). By swinging the chainstay back into its normal riding position, and by replacing the front Quick Release in the chainstay slot and locking **both** Quick Release bolts, the chainstay is again rigidly fixed in its riding position (see photo #7).

CAUTION: Proper operation of the quick release levers must be clearly understood **prior** to riding this cycle. Your Linear dealer or any competent professional bicycle shop personnel can demonstrate the safe operation of the quick release levers.

NOTE: See special section on proper adjustment of quick release levers on page 17.

CAUTION: Both Quick Release bolts must be tight to prevent unwanted movement in the joint during maximum pedaling effort. The front Quick Release must be properly engaged in the safety slot to insure a secure joint.

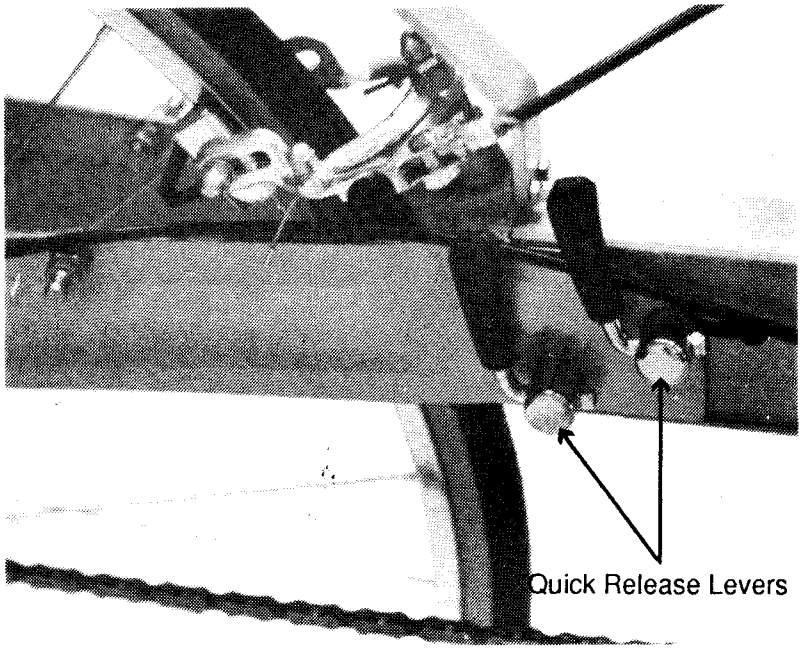


Photo 7

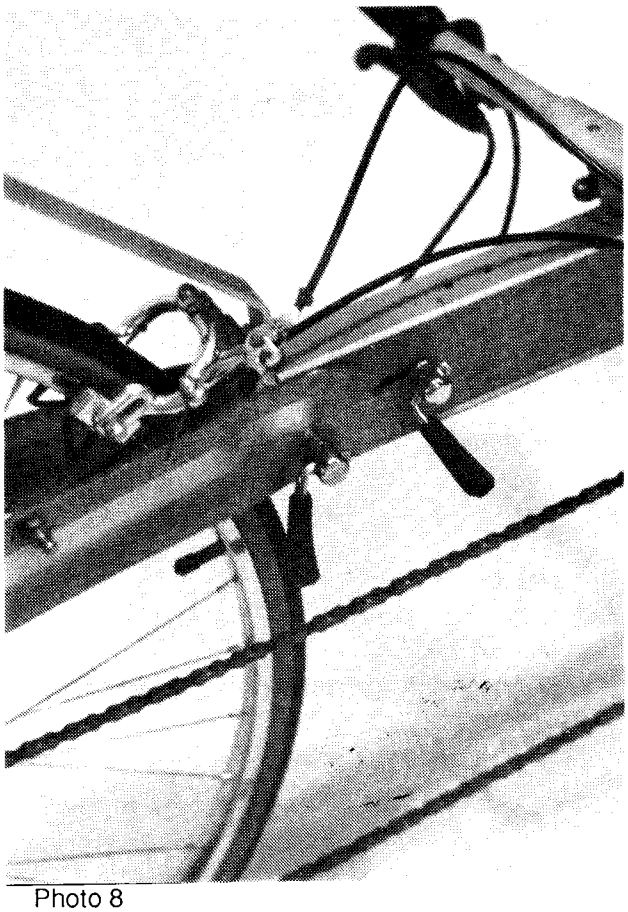


Photo 8

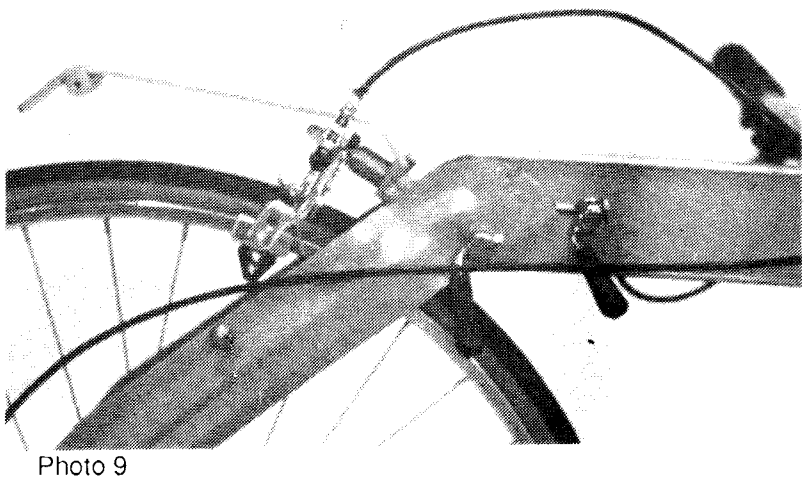


Photo 9

FRONT: The headtube may be folded by releasing a single Quick Release and pulling the entire headtube and fork assembly sharply forward to allow the internal safety tab to clear the locking bolt (see photo #10). The headtube will then pivot, allowing the fork to swing back under the main frame (see photo #11). To re-lock, the headtube/fork assembly should be returned to riding position, then slid firmly rearward into the frame (see photo #12). This will engage the internal safety tab. The Quick Release then needs to be firmly tightened and the headtube/fork assembly will be in its locked riding position.

CAUTION: The safety tab MUST be engaged and the quick release securely tightened prior to riding the cycle.

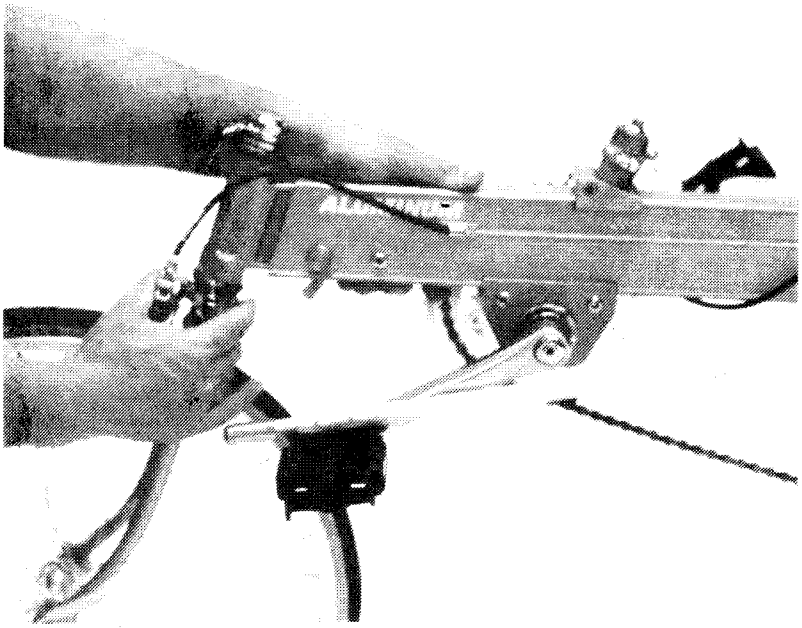


Photo 10

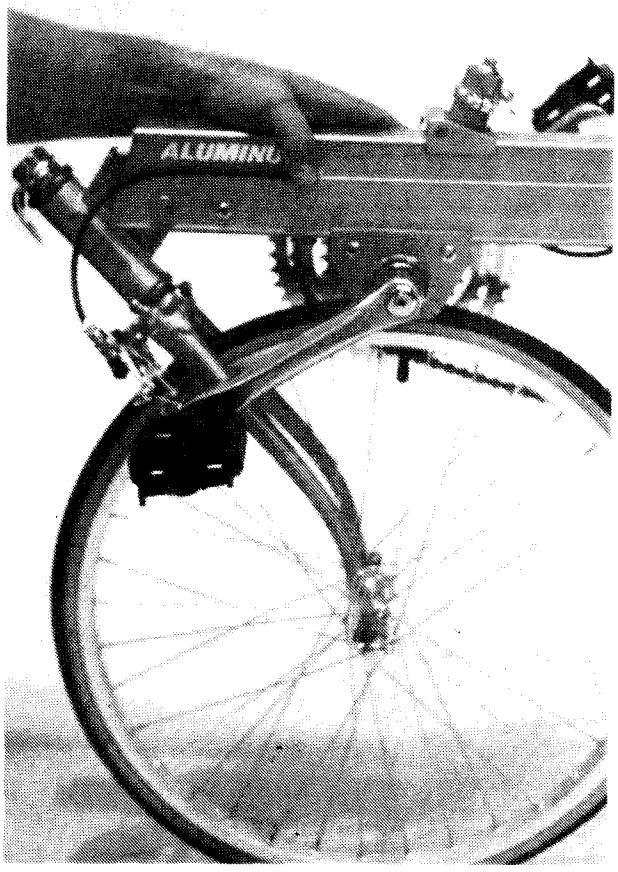


Photo 11

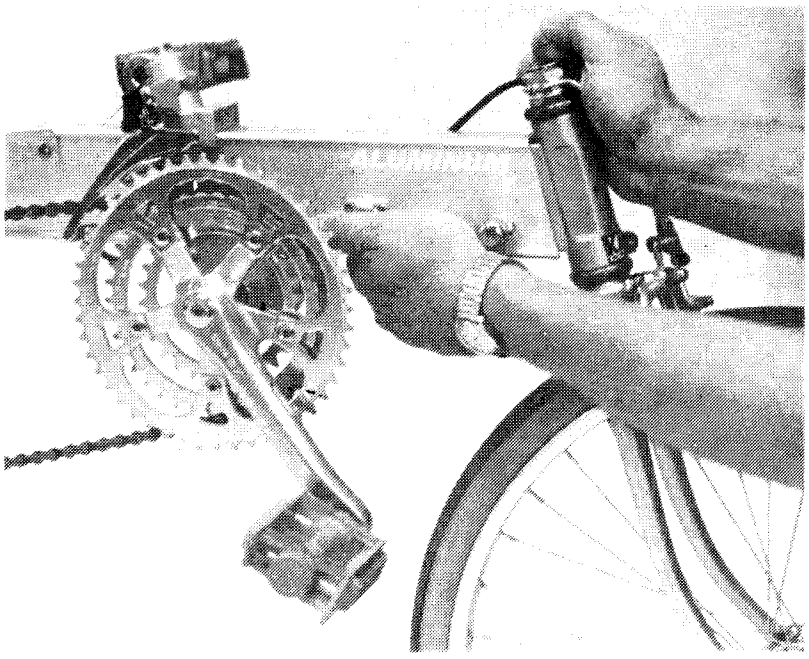


Photo 12

12. **DERAILLEURS:**
See manufacturer's instructions for proper safety check points.

OPERATION

Brakes

1. Operate caliper brake by squeezing the lever until braking action is felt.
2. Operate rear brake first and operate front brake gradually, especially on gravel or slippery surfaces.
3. Caliper brake shoes should begin to contact wheel rim as soon as brake lever is squeezed.

WARNING: When this bike is ridden for the first time, test the brakes by applying brakes at low speeds on a large, level surface. Remember that if you're making a turn or the pavement is wet or covered with sand or gravel, the wheels will lose traction more easily. In these conditions, start braking sooner and more gently than normal and avoid using the front brake only. This can cause loss of control. If brake shoes should become wet, exercise special caution when applying brakes, as it will take more distance to stop.

18-SPEED DERAILLEURS

The different speeds (or gears) of an 18-speed bike are obtained by changing the combinations of three front sprockets (or chain rings) and the six rear sprockets of the free wheel cluster. There are 18 different combinations, each resulting in a different gear or speed.

The left-hand lever controls the front derailleur that shifts the chain between the three front sprockets. The right-hand lever controls the rear derailleur that shifts the chain among the six rear sprockets. Thus the gear that you are in depends on two things. It depends on which front sprocket the chain is on and which rear sprocket the chain is on. The lowest gear (easier for climbing steep hills) is attained when the chain is on the smallest front sprocket and the largest rear sprocket. The highest gear (for high speed on level ground or moderate down hill grades) is attained when the chain is on the largest front sprocket and the smallest rear sprocket. The combinations of front and rear sprockets that determine each of 18 gears between low and high are dependent on the specific number of teeth of each of the front and rear sprockets and may vary with different bicycles. It is not necessary to remember all of these combinations. With a little experience, your legs will tell you when to shift gears.

When shifting gears, you should keep the crank turning, but don't exert pressure on the pedals. (This means the bike must be moving "faster than you are pedaling.") Simply move the desired lever in the proper direction until you hear the chain shift sprockets. If the chain continues to make a noise as you pedal along, move the lever that you shifted in one direction or the other slightly until the noise stops. Sometimes shifting the right-hand (rear derailleur) lever necessitates a slight movement of the left-hand (front derailleur) lever to allow quiet operation.

Operation of an 18-speed bike may seem complicated at first, but as you become familiar with the mechanisms involved, the procedure quickly becomes second nature.

ADJUSTMENT

STEERING: FORK

Through usage, the fork bearings may loosen. Proper adjustment should allow the fork to pivot freely with the tire held off the ground. The fork should never rattle or move vertically in the head tube. If adjustment is necessary, proceed as follows:

1. Loosen head locknut with large pliers or large adjustable wrench.
2. Tighten the inner nut until there is no looseness remaining, but the fork still rotates easily and smoothly inside the headtube.
3. Tighten head locknut. Re-check fork for proper adjustment.
4. If further adjustment is necessary, repeat procedure.

DRAGLINK

LINEARS with underseat steering have a zero end play feature incorporated into the draglink to prevent any looseness or play in the steering. This feature may need adjustment from time to time. Adjustment is accomplished by simply turning the nylon tipped set screw (found on either end of the draglink) (see photo #13) clockwise to tighten them until all play is removed. The steering should be checked to insure that it still pivots freely after the adjustment.

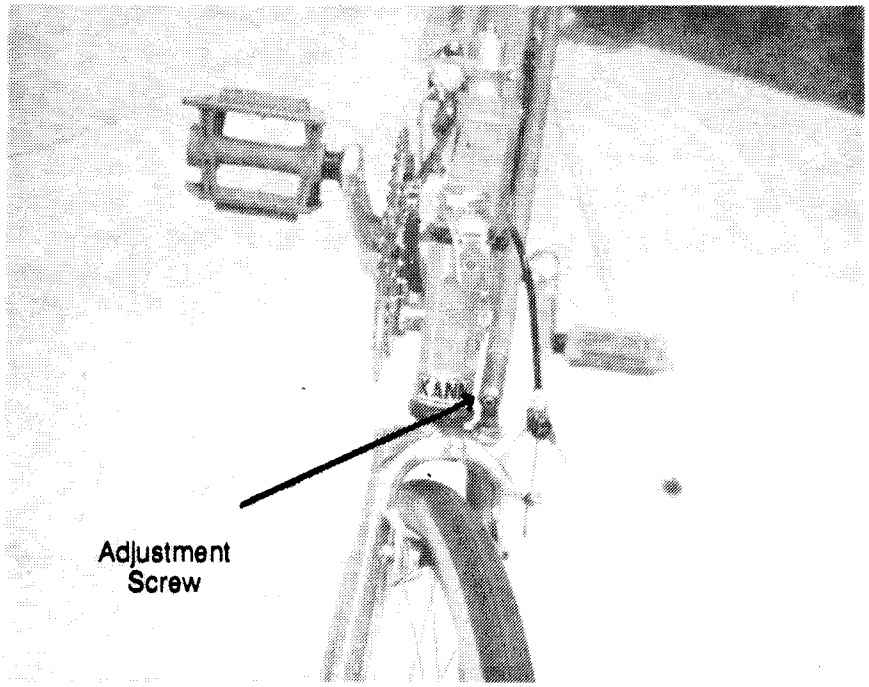


Photo 13

HANDLEBAR MODEL

If your handlebar becomes loose and tends to rotate in the clamp or stem, adjust to desired angle and tighten the handlebar clamp bolts or the stem expander bolt.

WARNING: Be sure stem indicator line is not visible above head locknut. For easy alignment or removal of stem, first loosen expander bolt. Turn bolt 1/4" out of the stem, then strike it down into stem (strike with something that won't damage bolt head). This loosens the wedge nut on bottom of stem, allowing easy stem movement. To assemble the stem, line up handlebar with the front wheel, insert the stem to the tube past the indicator line, and securely tighten the expander bolt.

CAUTION: Proper tension on the expander bolt is essential to insure control of the unit. However, over-tightening may result in damage to the fork or stem causing the loss of proper steering control.

NOTE: Always secure professional help from your local bike shop to insure all adjustments are correct.

CRANK

Try to wiggle crank from side to side in the bottom bracket; the crank should not wiggle, but should rotate smoothly. If adjustment is needed, proceed as follows:

1. Loosen the locking ring on the left side of the bottom bracket and tighten the adjustable cup.
2. Check adjustment. There should be no play (movement from side to side) in the crank and the crank should rotate freely.
3. Securely re-tighten locking ring.
4. If further adjustment is necessary, repeat procedure.

CAUTION: FAILURE TO KEEP CRANK TIGHT WILL CAUSE SERIOUS DAMAGE REQUIRING REPLACEMENT OF THE CRANK BEARINGS.

ADJUSTMENTS

BRAKES:

1. Squeeze the brake lever and check the position of the brake blocks. When the brakes are applied, the entire rubbing surface of the brake block must rest squarely against the side of the rim (see photo #14). No part of the brake block should ever touch the tire. To adjust the block(s), loosen the block mounting nut and move the block (by either sliding or rotating in the slot) to the correct position. Tighten the block mounting nut while holding the block in this position.

   NOTE: A large adjustable wrench can be slipped over the brake block to keep it from rotating while tightening the nut.

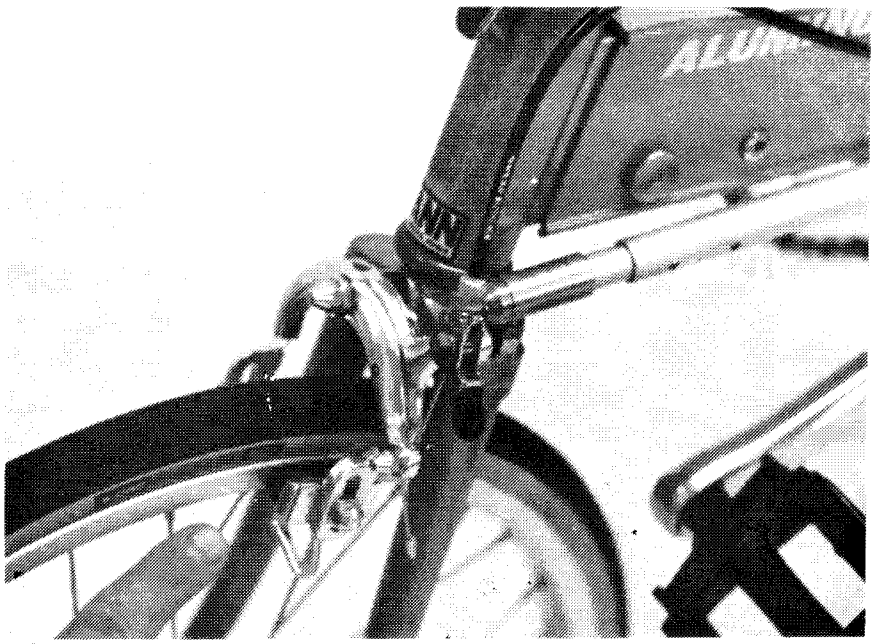


Photo 14

2. Squeeze the brake lever and note if the cable forces the caliper legs smoothly and evenly inward so that the brake blocks are tightly against the wheel rim, and the lever has 25.4 mm (1 inch) or more clearance from the handlebar. If not, proceed as follows:

    a. Loosen the adjusting barrel locknut and turn the adjusting barrel clockwise until it is in the lowest position. Re-tighten the adjusting barrel locknut.

IMPORTANT: The adjusting barrel is placed in the lowest position to provide for minor brake adjustment as blocks wear. Left (counterclockwise) rotation of the barrel will move the blocks closer to the rim for better braking.

    b. Loosen the cable anchor nut. The caliper legs will spring apart. Squeeze the caliper legs with your hands so the brake blocks are touching the wheel rim, then pull the cable end tight. Tighten the cable anchor nut. Check the brake lever as in STEP 2.

CAUTION: Make sure the other cable end has not become unhooked inside the brake lever.

    c. Release the caliper legs and spin the wheel. The brake blocks should clear the rim and permit the wheel to spin freely. If it does not, loosen the cable anchor nut while holding the brake pads together and carefully release the brake pads to allow them to open for a maximum of 1.5 mm (1/16 inch) clearance between the brake block and the rim. Re-tighten the cable anchor nut.

d. If both brake blocks are not the same distance away from the rim, tap down on the return spring on the side which is out too far. This may be done by using a screwdriver and tapping it carefully with a hammer (see photo #15).

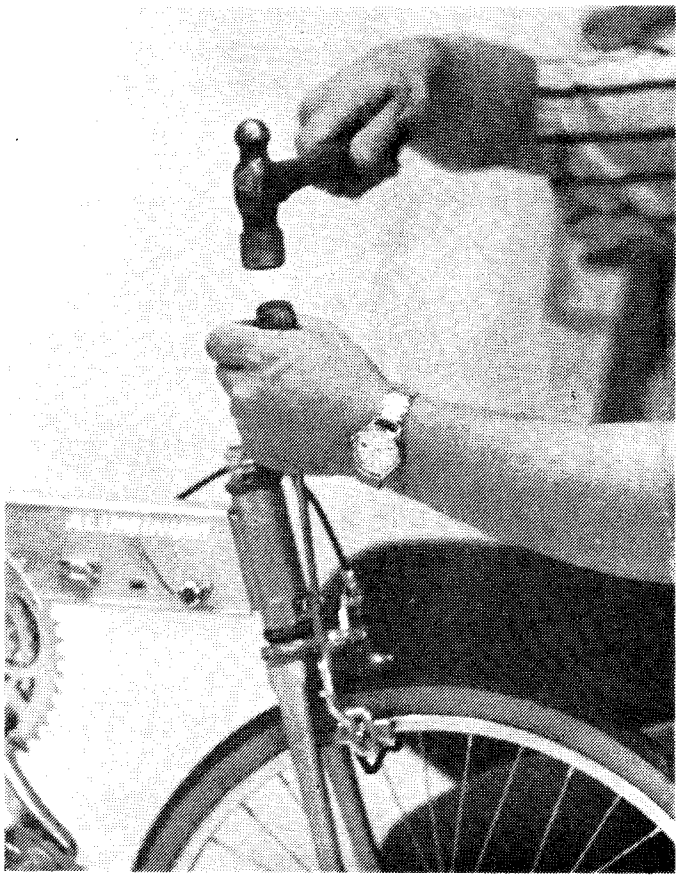


Photo 15

e. If the brake does not release properly, put a few drops of light oil in the casing at the hand lever end to aid the operation of the cable. Do not over-lubricate as some oil may get on the brake blocks. If lubrication does not help, the cable and casing have been damaged and must be replaced.

f. Check the cable and casing for sharp bends, kinks, cable fraying, dirt, or corrosion inside casing, or cable abrasion (especially at casing ends) any of which may cause binding. If necessary, replace cable and/or casing. If the cable and casing are in good condition and the brake still fails to release properly, take the bike to your authorized service shop for repairs or replacement.

HOW TO ADJUST DERAILLEURS

If the gears do not change correctly, adjust the derailleur per derailleur manufacturer's instructions. This can sometimes be a touchy adjustment. If you have completed all the adjustment steps correctly and are still having problems, take the bicycle to your LINEAR dealer.

NOTE: Look at the manufacturer's illustrations and the procedures enclosed. Select the procedure that best describes your type of derailleur.

WHEEL MAINTENANCE

FOR ANY PROBLEM NOT COVERED IN THIS MAINTENANCE SECTION, TAKE THE BIKE TO AN AUTHORIZED LINEAR DEALER.

FRONT WHEEL REMOVAL:

1. Release the Quick Release bolt and brake calipers.
2. Remove the wheel from the fork.

FRONT WHEEL INSTALLATION:

1. Slide the wheel into fork dropouts.
2. Center the wheel in the fork.
3. Reinstall the Quick Release and tighten securely.
4. Check the brake for proper adjustment.

CAUTION: Quick Release must be properly tightened to prevent possible loss of front wheel.

REAR WHEEL REMOVAL:

1. Loosen the Quick Release and rear brake calipers.
2. Slide the wheel rearward until the axle is out of the slots in the frame.
3. Remove the wheel from the frame. (Note routing of the chain around the sprocket and derailleur pulleys.)

REAR WHEEL INSTALLATION:

1. Hang the chain on the smallest rear sprocket. Shift the derailleur to this position if it is out of line.
2. Install the wheel in the frame with the sprocket cluster on the right side (same side as front sprocket).
3. Reinstall the Quick Release but do not tighten the Quick Release at this time.
4. Center the wheel in the frame and securely tighten the Quick Release.
5. Check the brakes for proper adjustment.

CAUTION: Quick Release must be properly tightened to prevent possible loss of rear wheel.

WHEEL BEARINGS:

Lift the front wheel off the ground. Try to move the wheel rim from side to side. There should be no side play. The hub bearings need to be adjusted if there is side play. Adjust the front wheel bearings as follows:

1. Loosen the Quick Release bolt and remove the front wheel from fork dropouts. Remove outer nuts and spacer washers from wheel hub.
2. Adjust inner nut until there is no trace of side play at wheel rim.
3. Replace the spacer washers and outer nuts in their proper order and tighten.
4. Center the wheel in the bike fork and **securely re-tighten the Quick Release bolt.**
5. Check to insure that the wheel rotates freely with no side play.

NOTE: Rear wheel adjustments should be performed at your authorized LINEAR bicycle service shop.

WHEEL ALIGNMENT:

Lift the wheel off the ground and rotate. If the wheel rubs on the fork or frame on either side, the axle may be crooked in the fork. Loosen the axle Quick Releases and center the wheel in the fork. Re-tighten the axle Quick Release bolt securely. If the wheel is not perfectly centered, return unit to your authorized dealer for repairs.

DERAILLEUR MAINTENANCE:

All derailleur parts and controls should be lubricated frequently. Aluminum derailleur parts can corrode and prevent free, easy movement. Steel will, of course, rust if not properly protected and lubricated. Control cables and housings are susceptible to rust which can prevent smooth shifts. Cable wear may make it necessary to adjust the cable before all gears can be engaged. Many parts of the derailleurs may be obtained and installed individually. However, it may be more desirable and sometimes less expensive to install a completely new derailleur assembly.

NOTE: IF YOU HAVE ANY PROBLEMS OR QUESTIONS CONCERNING PROPER OPERATION, ADJUSTMENT AND MAINTENANCE FOR YOUR LINEAR RECUMBENT BICYCLE, PLEASE CONTACT YOUR NEAREST AUTHORIZED SERVICE CENTER FOR ASSISTANCE.

Simple Guidelines For Proper Adjustment of Quick Release Levers

1. **Manufacturer's Recommendation**
   No matter who made the device, always follow, and instruct your customers to follow, the advice given in owner's manuals regarding its products. Most QR axles will, however, operate safely and securely under the below guidelines.
2. **Embossing the Ends**
   When properly tightened, the metal of the QR device should emboss (make a visible impression in) the metal of the fork end or rear end it is clamped to.
3. **Curved Levers**
   Almost all QR devices have curved levers and the concave side should face the bicycle when it is in the closed position.
4. **Tightening the Device**
   The wheels' axles should be inserted up to the top of the slots in the fork end and rear end with the levers on the left side (opposite the derailleur side) of the bike. With the lever in the open position, tighten the cone-shaped nut at the opposite end of the axle so that when moving the lever towards the closed position, you feel some resistance to motion when the lever is a bit past the center of its full travel. Close the lever all the way to the end of its travel.
5. **Tightening Forces**
   While the lever should close tight, do not overtighten: too tight and you could stretch or otherwise cause damage. Do not exert more than 45 pounds force (lbf.) when closing the lever. More than this, and you will overstress the parts.
6. **Releasing Forces**
   Although the release is called quick, opening should not be too easy. The lever must not release until at least 12 lbf. is exerted. If the lever opens with less than 12 lbf., open the lever and tighten the cone-shaped bolt some more. Repeat the process until the minimum opening force is achieved.
   Do not allow the lever to become so tight it takes more than 25 lbf. to open the QR device; damage could result if the lever needs that much force to open.
7. **Measuring Necessary Force**
   You don't need complex testing equipment to measure your exertion of force on the QR lever. To "educate" yourself on how much 12 lbf. feels, push on a bathroom scale or a supermarket produce scale. When the scale reads 12 pounds, you'll know how much force you will need. Remember: the lever requires at least 12 pounds of opening force to assure adequate tightness and safety, but should require no more than 25 pounds of opening force, nor should the closing force be greater than 45 pounds.
8. **Final Checks**
   Pick up the wheel off the ground by holding the frame with one hand and give the top of the tire a sharp downward blow with the other hand; the wheel should not come off or be loose. Repeat the tightening process if uncertain.
   While the final position of the lever has little importance aerodynamically, it should be carefully placed to avoid interfering with other parts or accessories or with the operation of the bicycle. Many manufacturers suggest pointing the lever rearward to avoid snagging. This is particularly important off-road, where a snag on a vine, branch or other pr otruding object m ay pull over the lever, which may result in wheel detachment.
9. **Stressful Conditions**
   To prevent rear wheel pullover on severe climbs, tighten the QR device to its maker's load limit.
10. **Secondary Devices**
    Some bicycle makers equip their bicycles with a redundant or "secondary device" to secure the wheel. QR axles must be secured in the same manner as described above despite the presence of these "secondary" devices. Always follow the manufacturer's recommendations regarding how to attach wheels.

"Reprinted from American Bicyclist"