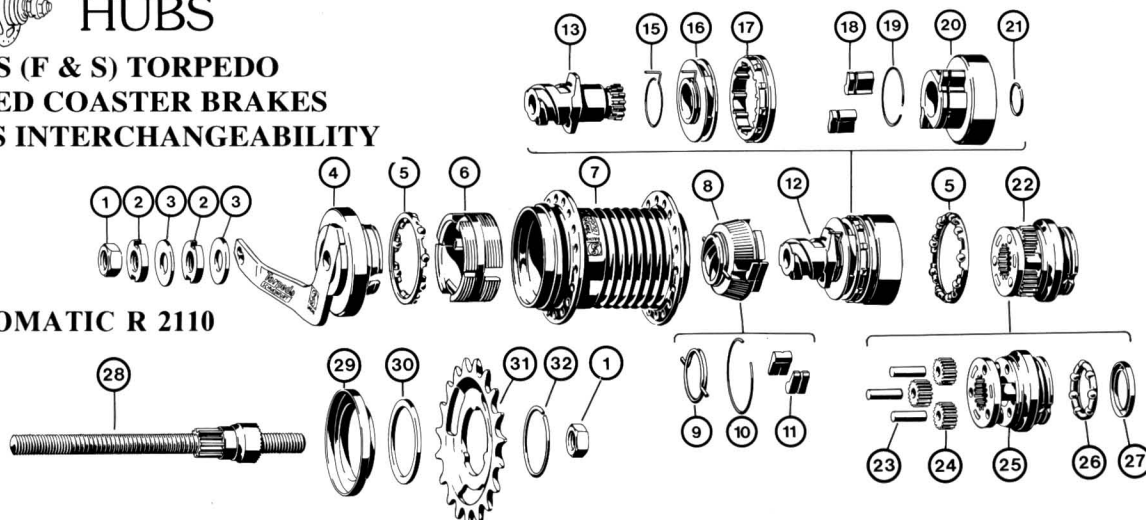


HUBS

**SACHS (F & S) TORPEDO
2-SPEED COASTER BRAKES
PARTS INTERCHANGEABILITY**

DUOMATIC R 2110



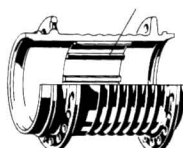
OLD STYLE

Hub shell with
10 trapezoidal teeth
36 holes - 0101 103 100
28 holes - 0101 103 101

Driving ring (dog ring)
with 10 trapezoidal teeth
0101 104 100

Driver bush
0102 107 000

Control bush -
brown, black or tan
0172 109 100
Install only in old style hubs



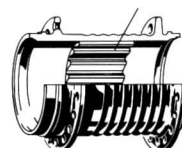
NEW STYLE

Hub shell with
18 teeth (saw-toothed)
36 holes - 0101 103 200
28 holes - 0101 103 201

Driving ring (dog ring)
with 9 teeth (saw-toothed)
0101 104 200

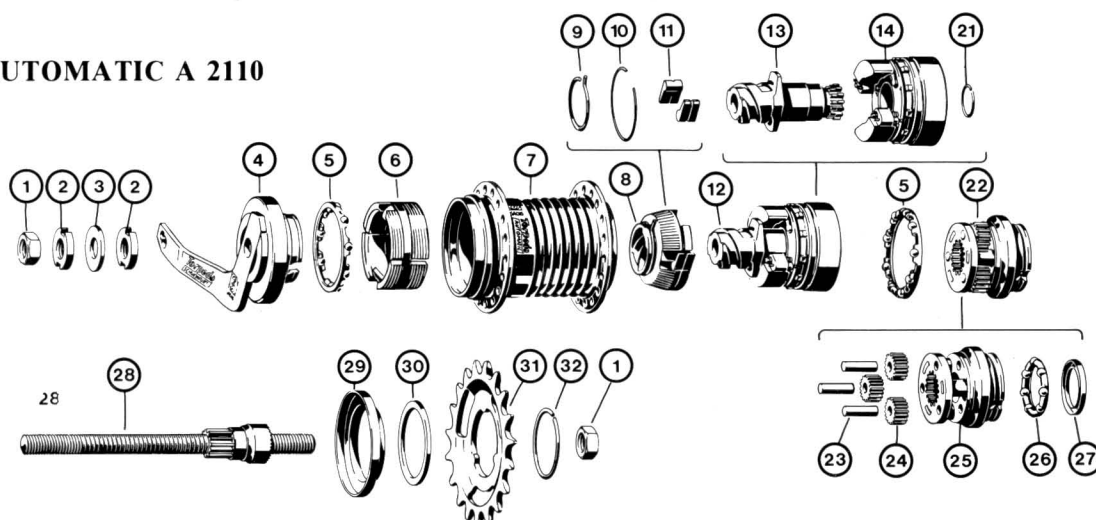
Driver bush with collar
0102 107 100

Yellow control bush with
modified internal section
0172 109 101



New driver bushes combined with new control bushes can be installed into hubs of old or new design.

AUTOMATIC A 2110



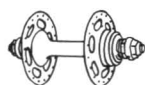
**SACHS (F & S) TORPEDO
2-SPEED COASTER BRAKES
PARTS INTERCHANGEABILITY**

	Torpedo Automatic A2110	Torpedo Duomatic R2110	Torpedo Duomatic 102	Torpedo Duomatic 101 without brake
1. Hex Nut	0316 061 004	0316 061 004	0516 003 000 ¹²³	parts in this column replace parts in the 102 column to make hub without brake
2. Lock Nut	1603 017 000	1603 017 000	0516 001 200 ¹²³	
3. Washer	2318 004 004	2318 004 004		
Fixing Plate			0517 102 000 ¹²³	
Lock Washer			0517 003 000 ¹²³	
4. Lever Cone Assembly	0174 103 000	0174 103 000	0174 101 000	0574 107 100
Lever Cone			0507 101 100	
Dust Cap			0521 103 100	
Brake Lever			0119 100 100	
5. Ball Cage	0576 104 100	0576 104 100	0576 104 100 ¹²³	
6. Brake Shell (Brake Cylinder)	0573 103 000 ²	0173 102 000	0173 100 000 ⁶	0173 102 000 ⁴
7. Hub Shell 36 holes	0101 106 000	see inset	0170 100 000	0101 100 000
28 holes	0101 106 001	see inset	0170 100 001	0101 100 001
24 holes			0170 100 002	0100 100 002
8. Brake Cone Assembly	0574 106 000 ¹	0174 101 100	0174 101 000	
9. Friction Spring	0513 102 000 ¹	0113 103 000	0113 101 000 ⁶	
10. Circlip	0512 102 000 ¹²	0512 102 000 ¹²	0512 102 000 ¹²	
11. Pawls (2)	0536 104 000 ¹²	0536 104 000 ¹²	0536 104 000 ¹²	
Brake Cone	0516 101 000 ¹²		0106 101 000	
12. Driver Bush Assembly for 24"-28" wheels	0172 113 000	0172 116 000		
(bare flyweight spring)				
for 20"-22" wheels	0172 113 001			
(galvanized flyweight spring)				
13. Driver Bush	0102 105 000	see inset	0102 101 000	
14. Gear Ring Assembly for 24"-28" wheels	0172 111 000			
(bare flyweight spring)				
Gear Ring Assembly hing for 20"-22" wheels	0172 111 001			
(galvanized flyweight spring)				
Pawl Carrier Assembly			0172 014 000	
Pawl Carrier			0104 100 100	
15. Friction Spring		0113 100 000	0113 100 000	
16. Control Bush		see inset		
17. Driving Ring (Dog Ring)		see inset	0101 101 000	
18. Pawls		0136 104 000	0136 100 000	
19. Circlip		0112 100 000		
20. Gear Ring		0181 100 000	0133 100 100	
Circlip (2)			0112 101 000	
21. Circlip	0112 103 000	0112 103 000		
Axle Circlip			0517 002 000 ¹²³	
Thrust Washer, small diameter			0518 106 000 ¹²³	
22. Planet Gear Carrier Assembly	0172 105 000	0172 105 000	0172 100 100	0172 100 200
23. Pivot Pins (3)	0114 101 000 ¹	0114 101 000 ¹	0114 100 000	
24. Planet Gears (3)	0533 103 000 ¹²³	0533 103 000 ¹²³	0533 103 000 ¹²³	
25. Planet Gear Carrier	0172 106 000	0172 106 000	0172 102 100	
26. Ball Cage S 2048	0576 102 000 ¹²³	0576 102 000 ¹²³	0576 102 000 ¹²³	
27. Dust Cap	0121 108 000 ¹²³	0121 108 000 ¹²³	0521 106 000	
Thrust Washer, large diameter			0118 101 000	
28. Axle 148 mm (5.821") 9.5 mm ϕ	0171 103 000	0171 103 000		
158 mm (6.221") 10.5 mm ϕ	0171 106 000	0171 106 000	0109 100 000	
Fixed Cone			0574 105 000	0508 102 000
29. Dust Cap (sprocket side)	0121 109 000 ¹	0121 109 000 ¹	0121 101 000	0121 108 000
30. Washer (spacer)	0518 018 000 ⁵	0518 018 000 ⁵	0518 018 000 ⁵	
31. Sprockets ⁵				
32. Circlip ⁵	0512 011 000 ⁵	0512 011 000 ⁵	0512 011 000 ⁵	
Adjusting Cone				0174 100 000
Locking Element				0172 103 000

¹ Interchanges with 3 speed H3111. ² Interchanges with 3 speed 515. ³ Interchanges with 3 speed 415.

⁴ Same as Brake Shell on Duomatic R2110. ⁵ See Sprocket Interchangeability at beginning of Hub section.

⁶ See Brake Shell Replacement on Duomatic 102 Hubs, page 3-16.

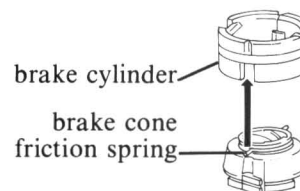
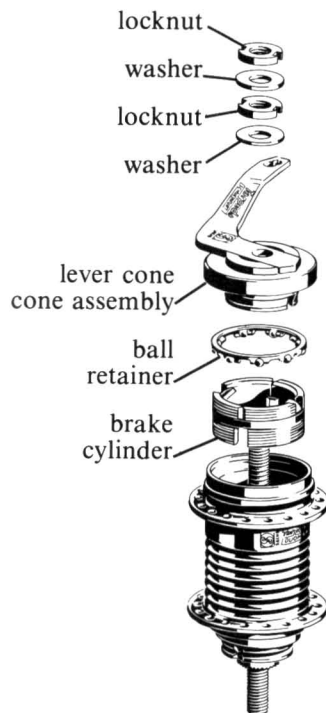


HUBS

SACHS (F & S) TORPEDO R 2110 DUOMATIC 2-SPEED COASTER BRAKE DISASSEMBLY AND ASSEMBLY

1 DISASSEMBLY

Remove locknuts, washers and lever cone assembly. The brake lever, lever cone and dust cap are press fit together and should not be forced apart. Lift out ball retainer and brake cylinder.



Install brake cylinder with internal tabs up. Rotate until slots in brake cylinder engage hooked ends of brake cone friction spring.

Install ball retainer flat side up. Install lever cone assembly. If brake arm, lever cone and dust cap were forced apart inspect carefully. If serviceable, press together with brand name on brake arm facing out. Install assembly with slots on lever cone engaging brake cylinder tabs. Install adjuster locknut, lockwasher and locknut. Adjust bearing, locking the first nut in place with the second.

Next Step



ASSEMBLY 3

2 DISASSEMBLY

Lift hub shell clear of remaining internal parts



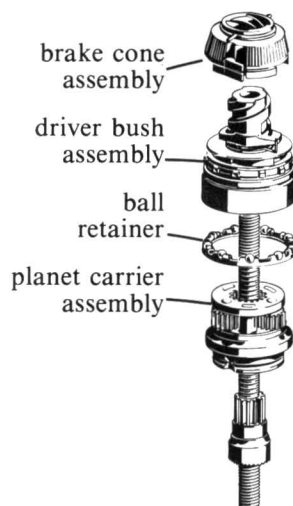
Position hub shell long end up and lower over assembly until it seats.

Next Step

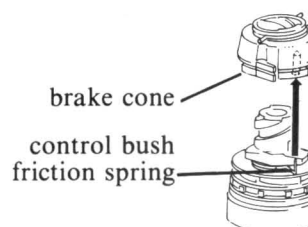
ASSEMBLY 2

3 DISASSEMBLY

Remove brake cone assembly, driver bush assembly, ball retainer and planet carrier assembly.



Assemble brake cone and driver bush. Be sure control bush friction spring fits in the hole in brake cone. Lower this assembly over planet gears.



Install ball retainer flat side down. Lower planet carrier assembly onto axle.

ASSEMBLY 1

SACHS (F & S) TORPEDO R 2110 DUOMATIC 2-SPEED COASTER BRAKE SUBASSEMBLIES

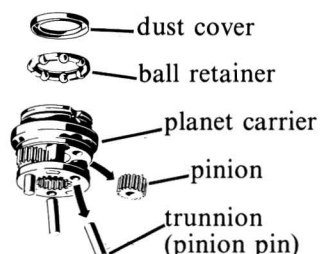


DISASSEMBLY

Planet Carrier

Remove dust cover with a thin-bladed screwdriver. Work slowly around cover to avoid deforming it. Lift out ball retainer.

Push out trunnions (pinion pins) and remove pinions.



Planet Carrier

Install ball retainer flat side up. Start dust cover straight and tap home with a soft hammer.

Position pinions and insert trunnions (pinion pins).

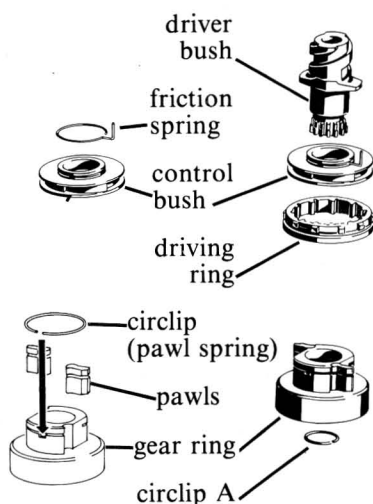
ASSEMBLY

DISASSEMBLY

Driver Bush

Remove circlip A only if it is necessary to disassemble driver bush assembly. Use an awl to ease circlip over driver bush gear.

Remove gear ring pawls and pawl circlip. Remove control bush friction spring only if necessary.



Driver Bush

Replace control bush friction spring if it was removed.

Install gear ring pawls under pawl circlip. Rotate circlip gap over indentation which closes circlip groove. Viewed as shown, pawls must point counter-clockwise.

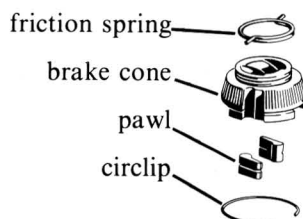
Position driving ring flange down and slip over gear ring. Install control bush, rotating counter-clockwise until it engages pawls. Install driver bush, invert assembly and replace circlip A.

ASSEMBLY

DISASSEMBLY

Brake Cone

Remove friction spring only if it is to be replaced. To remove pawls, pull outward until end of circlip clears groove, then ease circlip off the end of brake cone.

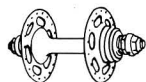


Brake Cone

Install friction spring if it was removed. Use *black* spring only with *bronze* brake cylinder. Use *copper plated* spring only with *steel* brake cylinder.

Install pawls under circlip. Rotate circlip gap over indentations that close circlip groove. Viewed as shown, pawls must point counter-clockwise.

ASSEMBLY



HUBS

SACHS (F & S) TORPEDO R 2110 DUOMATIC 2-SPEED COASTER BRAKE DISASSEMBLY AND ASSEMBLY (cont.)

CLEANING

Clean all parts, including outside of hub shell, in a suitable solvent. Be very careful not to introduce dirt or grit after cleaning.

POINTS TO CHECK

Numbers in parenthesis refer to parts chart and exploded drawing.

1. Driving edges of pawls (18) (11), driving ring (17) and hub shell (7) for worn or chipped corners
2. Teeth on driver bush (12), planet carrier (25), planet gears (24), sun gear (28) and gear ring (20) for wear and chipping
3. Circlips (19) (20) (21) and friction springs (9) (15) for shape and tension. Verify that brake cone has copper plated friction spring for steel brake shell or black friction spring for bronze brake shell. Manufacturer recommends replacing driver bush circlip (A) if it was removed.
4. Bearing surfaces of planet carrier (22), cones and hub shell (7) for wear and pitting. Replace bearing retainers at overhaul.
5. Serrations on brake cone (8) and brake shell (6) for wear
6. Threads on driver bush (13) and brake cone (8) for wear
7. Brake shell (6) and hub shell (7) for wear or glazing of braking surfaces

LUBRICATION

Lubricate ball bearings by filling the spaces between balls with grease. Lubricate hub shell and brake cylinder liberally with a high-temperature grease. Manufacturer strongly recommends *Sachs Gear Grease* for *bronze* brake shells with *black* friction spring and *Grease for Steel Brake Shells* for *steel* shells with *copper plated* friction spring. Lightly oil other internal parts with a *good* cycle oil. (WD-40 is too light for lasting lubrication, 3-in-1 Oil gums up with age.)

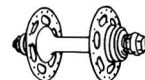
DUOMATIC 102 BRAKE SHELL REPLACEMENT

Bronze brake cylinder 0173 100 000 is no longer available. It has been superseded by steel brake cylinder 0173 102 000. *Always* use the correct friction spring and lubricant for the brake cylinder installed, as summarized below.

Brake Shell	Lubricant	Friction Spring (on Brake Cone)
1. Steel Brake Shell, Part 0173 102 000	Grease for Steel Brake Shells, Part 0369 135 100	Copper-Plated Friction Spring, Part 0113 103 000
2. Bronze Brake Shell, Part 0173 100 000	Sachs Gear Grease, Part 0369 111 100	Black Friction Spring, Part 0113 101 000

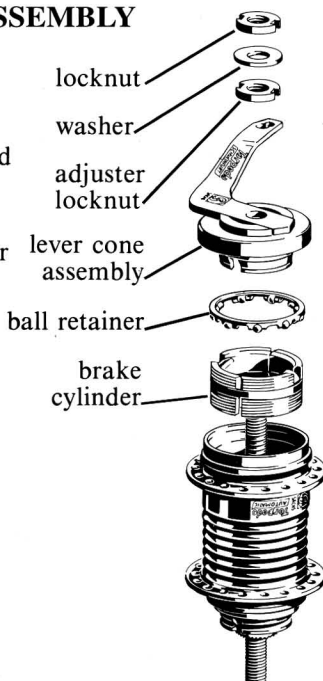
SACHS (F & S) TORPEDO A 2110 AUTOMATIC 2-SPEED COASTER BRAKE DISASSEMBLY AND ASSEMBLY

HUBS



1 DISASSEMBLY

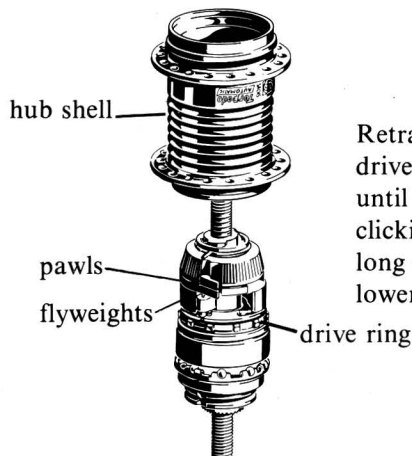
Remove locknuts, washer and lever cone assembly. The brake lever, lever cone and dust cap are press fit together and should not be forced apart. Lift out ball retainer and brake cylinder.



Next Step

2 DISASSEMBLY

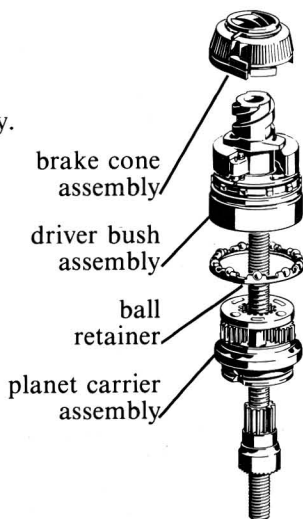
Lift hub shell clear of remaining internal parts



Next Step

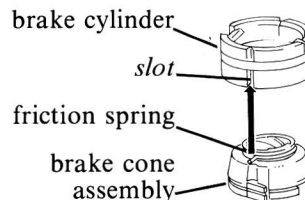
3 DISASSEMBLY

Remove brake cone assembly, driver bush assembly, ball retainer and planet carrier assembly.



Next Step

Install brake cylinder with tabs up. Rotate until brake cylinder slot engages hooked end of friction spring.



Install ball retainer flat side up. Install lever cone assembly. If brake arm, lever cone and dust cap were forced apart inspect carefully. If serviceable, press together with brand name on brake arm facing out. Install assembly with slots on lever cone engaging brake cylinder tabs. Install adjuster locknut, lockwasher and locknut. Adjust bearing, locking the first nut in place with the second.

ASSEMBLY 3

Next Step

Retract flyweights by turning drive ring counter-clockwise until it rotates freely without clicking. Position hub shell long end up and carefully lower over assembly.

ASSEMBLY 2

Lower planet carrier assembly onto axle. Install ball retainer *flat side down*. Slip driver bush assembly over planet carrier. Install brake cone assembly on driver bush.

ASSEMBLY 1

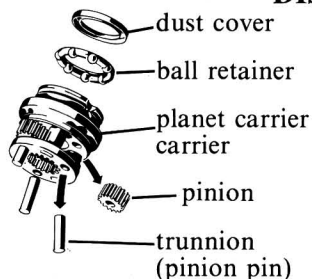


SACHS (F & S) TORPEDO A 2110 AUTOMATIC 2-SPEED COASTER BRAKE DISASSEMBLY AND ASSEMBLY (CONT.) SUBASSEMBLIES

DISASSEMBLY

Planet Carrier

Remove dust cover with a thin-bladed screwdriver. Work slowly around cover to avoid deforming it. Lift out ball retainer. Push out trunnions (pinion pins) and remove pinions.



Planet Carrier

Install ball retainer flat side up. Start dust cover straight and tap home with a soft hammer.

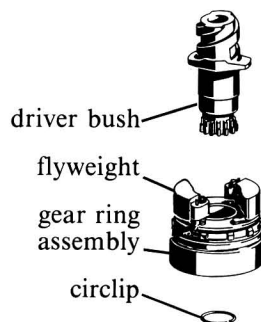
Position pinions and insert trunnions (pinion pins).

ASSEMBLY

DISASSEMBLY

Driver Bush

Remove circlip only to separate driver bush and gear ring assembly. Gear ring assembly is not designed to be disassembled.



Driver Bush

Assemble driver bush, gear ring assembly and circlip.

Flyweight spring rating is indicated by spring finish and a colored dot on one flyweight which should be the same color as the plastic band on the lever cone assembly:

- red for 20-22 inch wheels, spring galvanized;
- blue for 24-28 inch wheels, spring surface untreated.

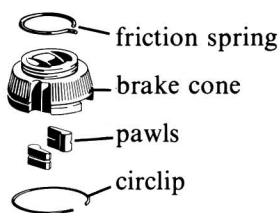
ASSEMBLY

DISASSEMBLY

Brake Cone

Remove friction spring only if it is to be replaced. Ease spring out of groove with a thin-bladed screw driver.

To remove pawls, pull outward until end of circlip clears groove, then ease circlip off the end of brake cone.



Brake Cone

Install friction spring with hooked end clockwise from gap. Incorrect installation will cause excess drag, wear and possible brake failure.

Install pawls under straight-ended circlip. Position ends of circlip near indentations that close circlip groove. Viewed as shown, pawls must point counter-clockwise.

ASSEMBLY

CLEANING

Clean all parts, including outside of hub shell, in a suitable solvent. Be very careful not to introduce dirt or grit after cleaning.

POINTS TO CHECK

Numbers in parenthesis refer to parts chart and exploded drawing.

1. Pawls (18) (11), driving ring (14), hub shell (7), driver bush (12), planet carrier (22), planet gears (24), sun gear (28) and gear ring (14) for worn or chipped driving surfaces
2. Circlips (19) (20) (21) and friction spring (9) for shape and tension. Manufacturer recommends replacing driver bush circlip if it was removed.
3. Bearing surfaces of planet carrier (22), cones and hub shell (7) for wear and

pitting. Replace ball retainers at overhaul.

4. Serrations on brake cone (8) and brake shell (6) for wear
5. Brake shell (6) and hub shell (7) for wear or glazing of braking surfaces

LUBRICATION

Lubricate ball bearings by filling the spaces between balls with grease. Lubricate hub shell and brake cylinder liberally with a high-temperature grease. Manufacturer strongly recommends *Sachs Gear Grease* for bronze brake shells with black friction spring and *Grease for Steel Brake Shells* for steel shells with copper plated friction spring. Lightly oil other internal parts with a good cycle oil. (WD-40 is too light for lasting lubrication, 3-in-1 Oil gums up with age.)