

SECTION 2 - CHASSIS

MERCURY

SNOWMOBILES

PART A - SKIS and STEERING



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SKIS and STEERING

SKI and SPRING ASSEMBLY

GENERAL

WARNING: ALL ski and steering components MUST BE tight and securely attached at all times.

Skis on all Mercury Snowmobiles are equipped with replaceable wear bars. Disassembly and reassembly of ski and

spring components require no special tools and can be accomplished by using Figures 1, 2, 3, 4 and 5 as a reference.

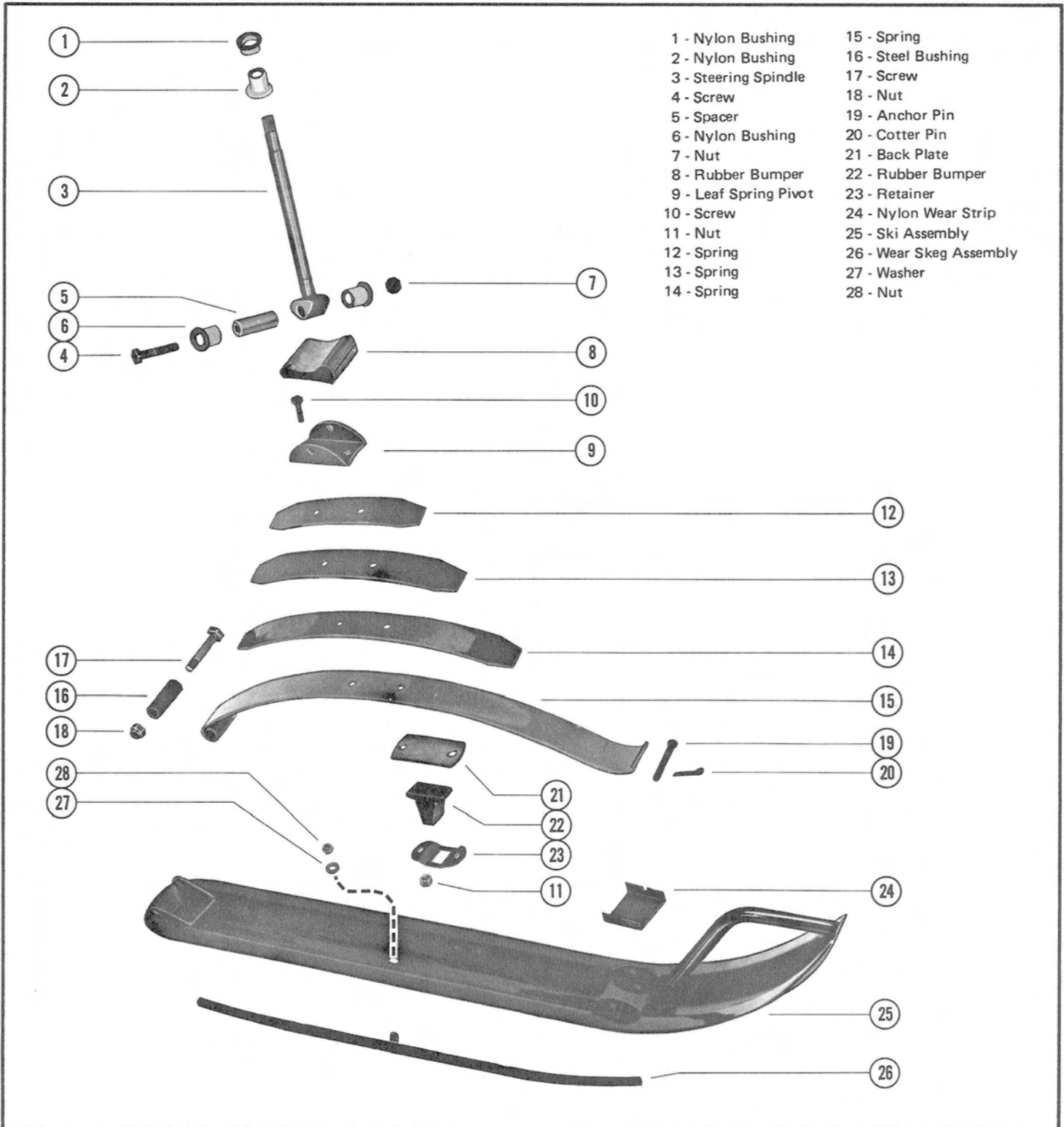


Figure 1. Ski, Spring and Spindle Components for 200-220-250, Rocket and Lightning Models(250 Model Shown)

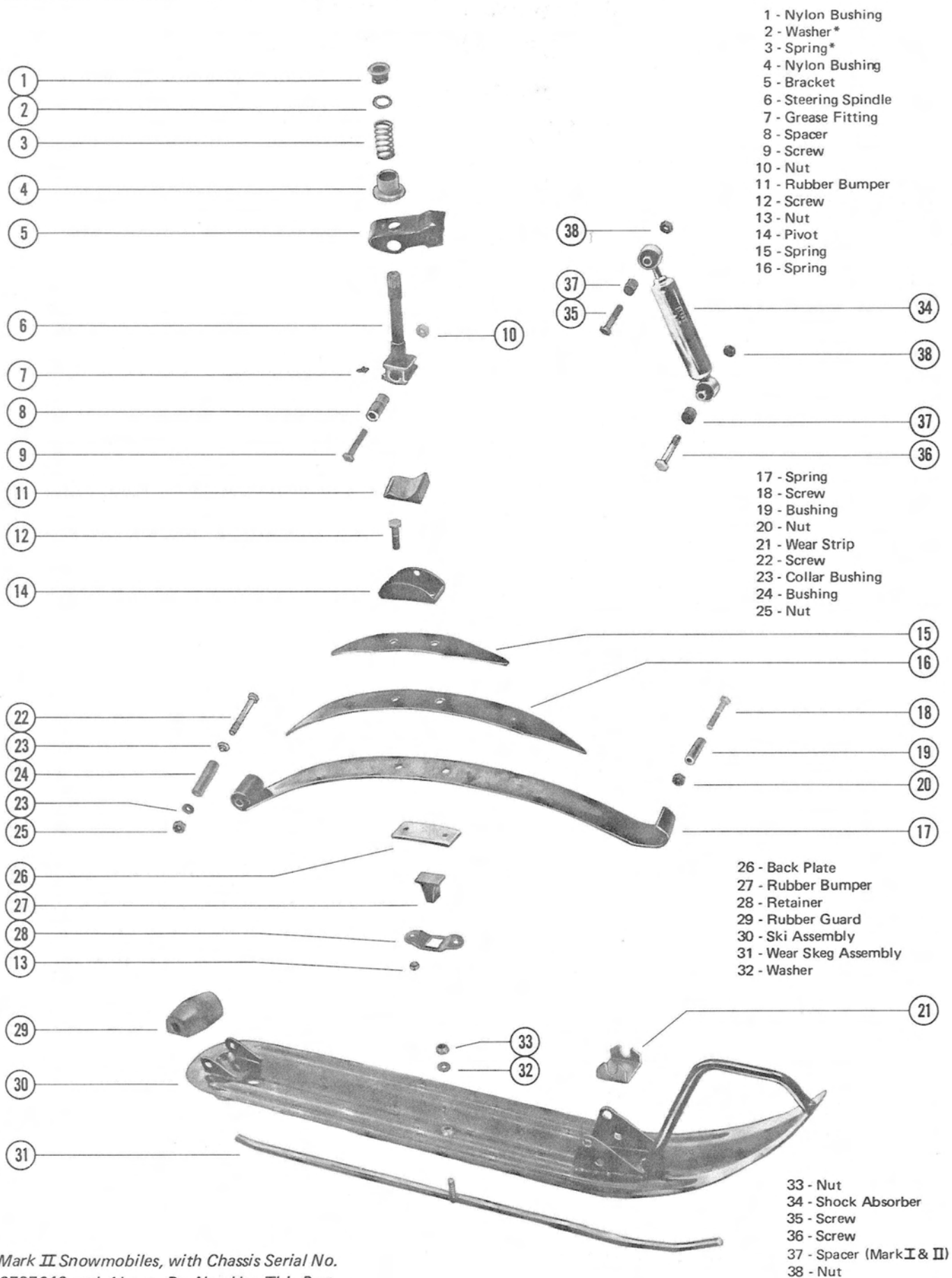


Figure 2. Ski, Spring and Spindle Components for Hurricane, Mark I and Mark II (644cc) Models

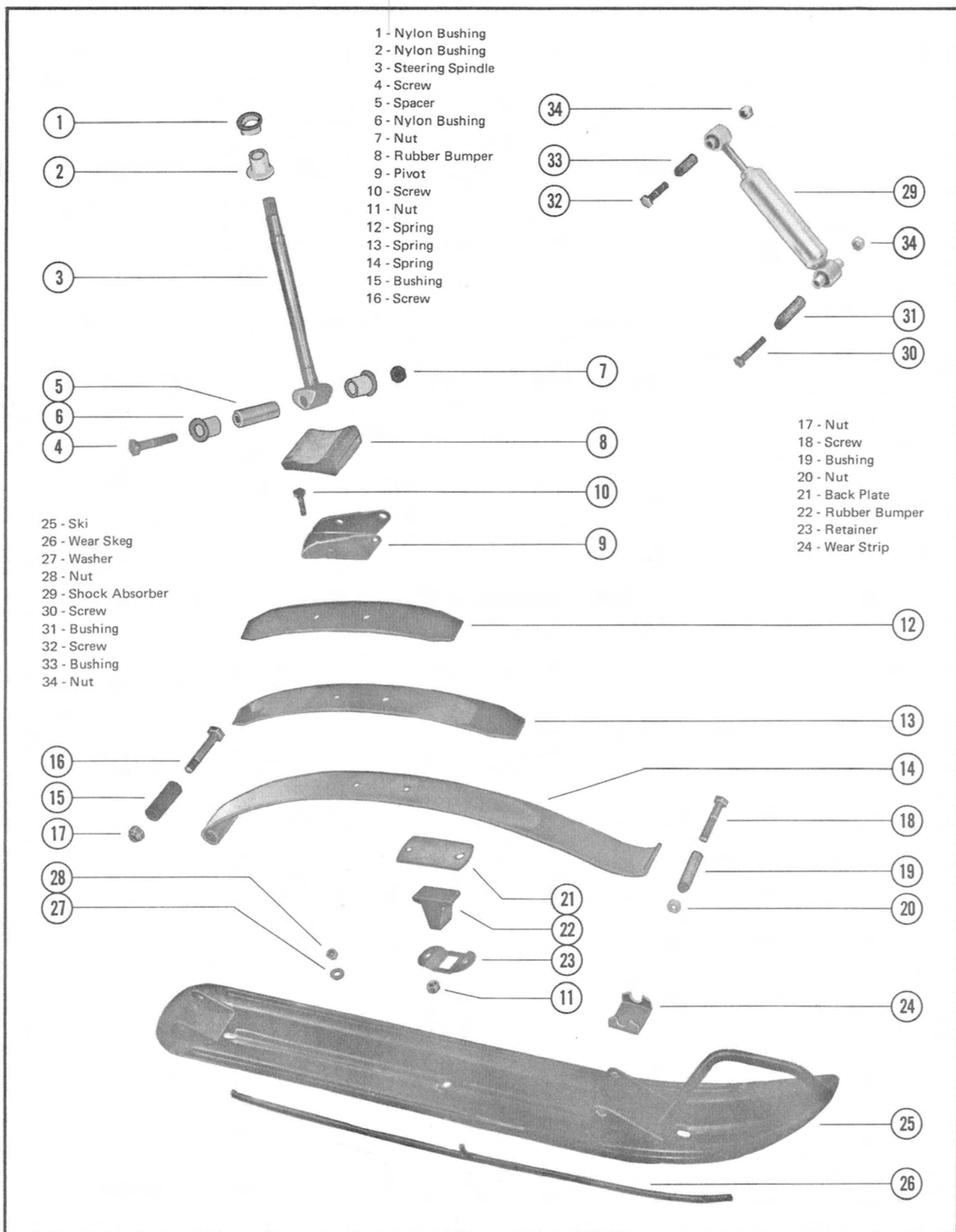


Figure 3. Ski, Spring and Spindle Components for 440 MAX Model with Chassis Serial No. 3447382 and Below

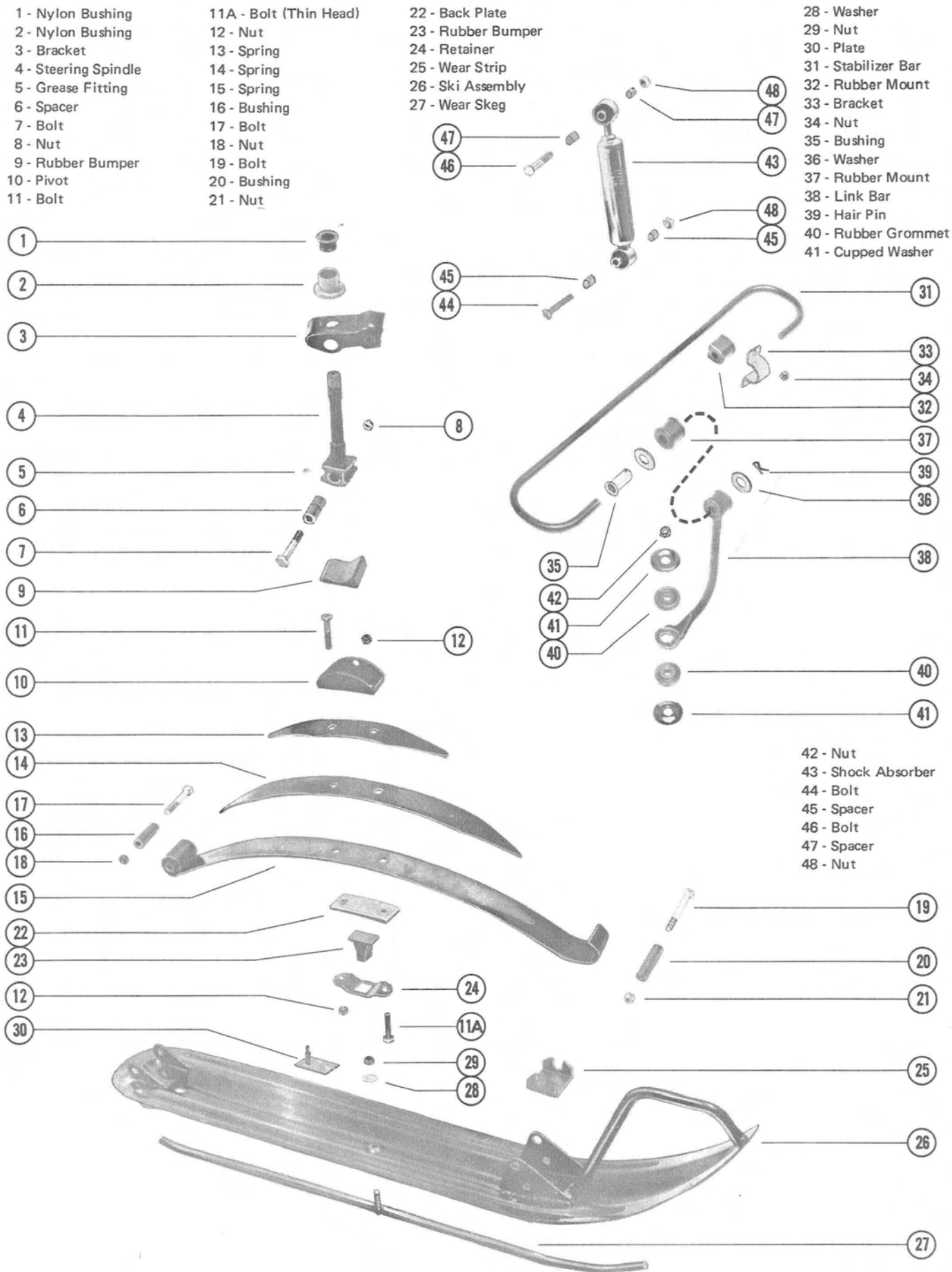


Figure 4. Ski, Spring, Spindle and Stabilizer Components for 440 MAX (Chassis Serial No. 3709838 and Above) and 440 S/R Models

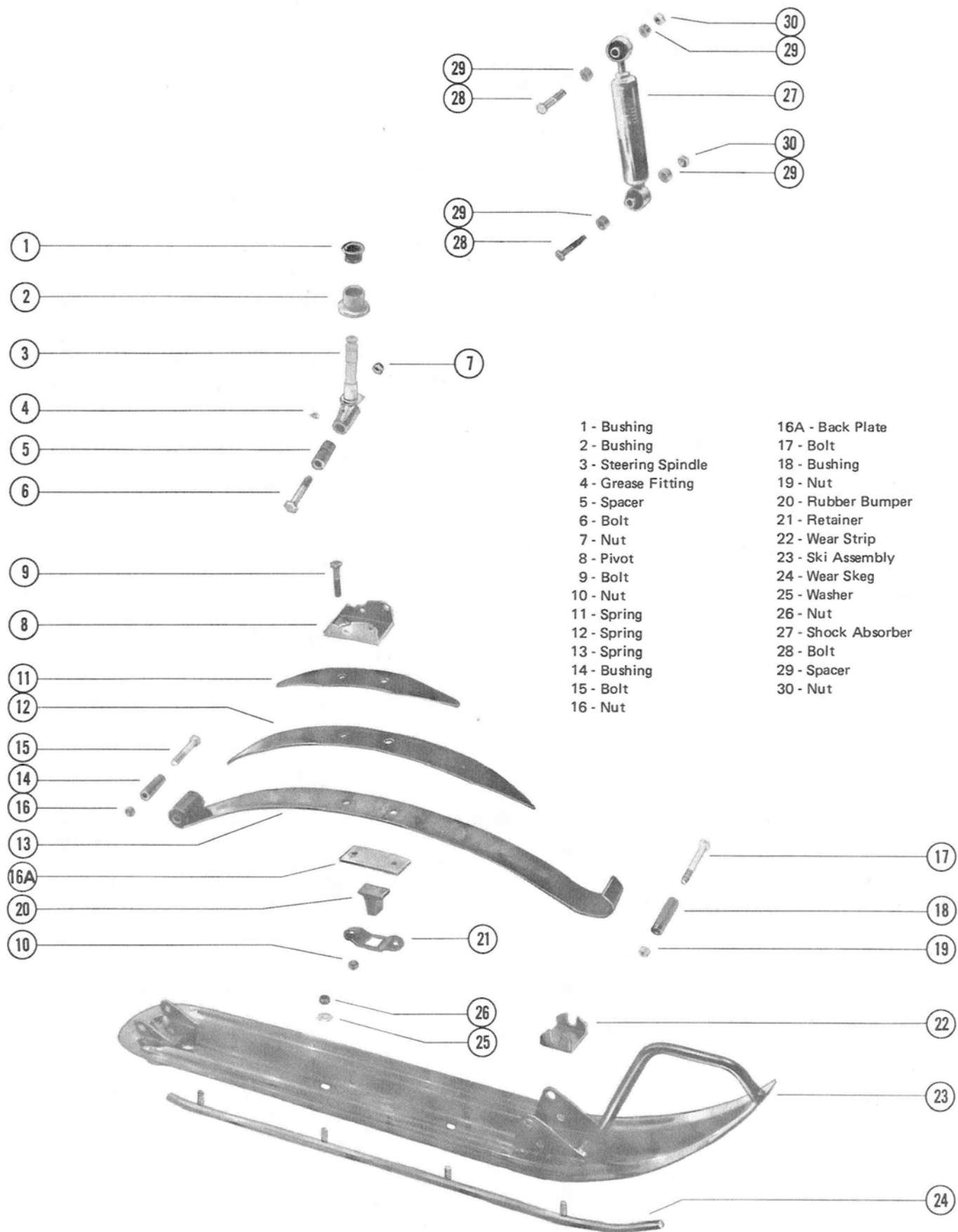


Figure 5. Ski, Spring and Spindle Components for Sno-Twister (400-D)

SKI ALIGNMENT

Skis on Mercury Snowmobile have been aligned at the factory to provide proper field service and should not require further adjustment, unless steering system or skis are damaged from extreme impact.

Ski alignment is correct when skis are parallel with each other and track (with handlebar in normal straight driving position).

SKI ADJUSTMENT

NOTE: On Hurricane models, if major tie rod adjustments are necessary, first try to correct ski alignment by adjusting left side tie rod only. If right side adjustments must be made, it will be necessary to raise engine to gain access to tie rod.

1. Raise cowl assembly.

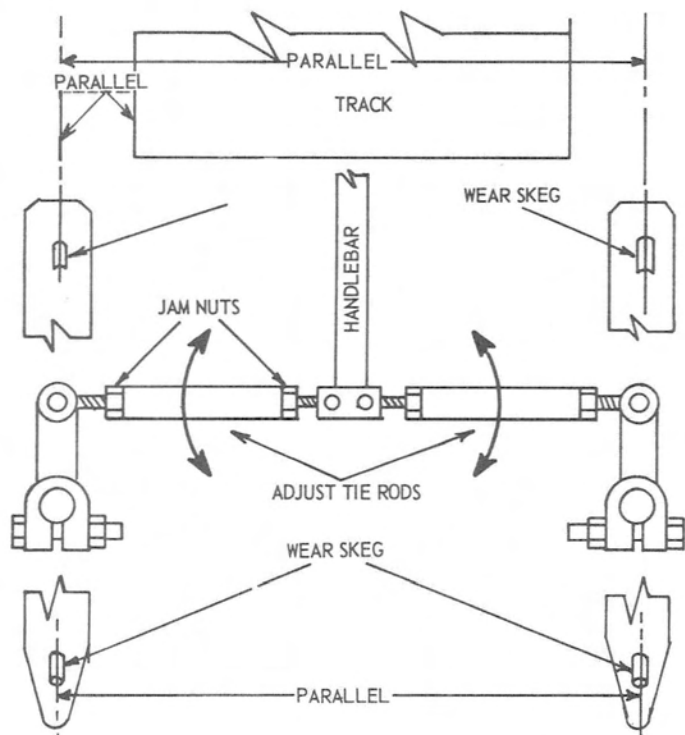


Figure 1. Tie Rod Adjustment - 200, 220, 250, Rocket, Lightning, Hurricane, 440 MAX and 440 S/R Models

2. Position handlebar in normal straight driving position.
3. Adjust either ski until it is parallel with track (Figure 1, 2 or 3).
 - a. Loosen both tie rod jam nuts (one right hand thread and one left hand).
 - b. Adjust tie rod until ski is parallel with track.
 - c. Retighten tie rod jam nuts.
4. With one ski parallel, measure distance between skis at front and rear on wear skag centerlines. Adjust opposite tie rod as necessary to maintain an equal dimension between skis, both front and rear.

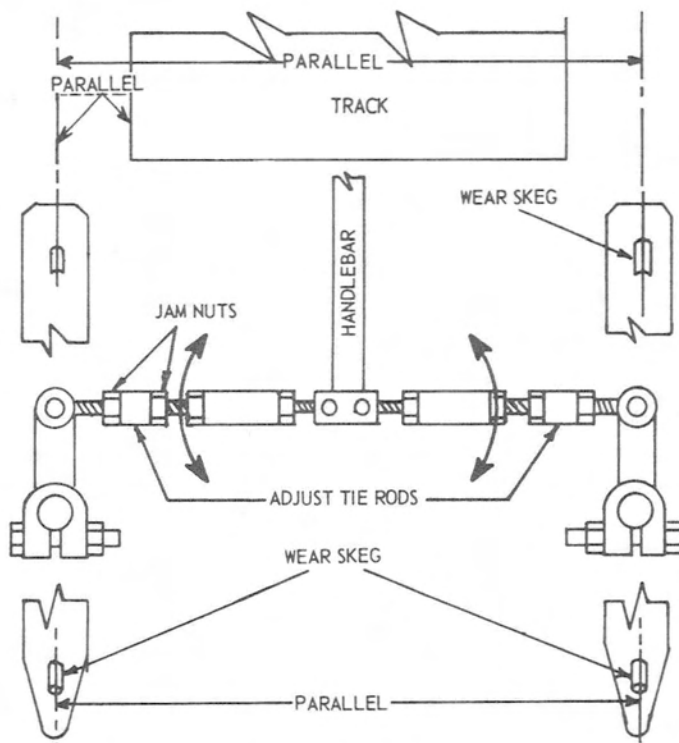


Figure 2. Tie Rod Adjustment - Mark I and Mark II Models

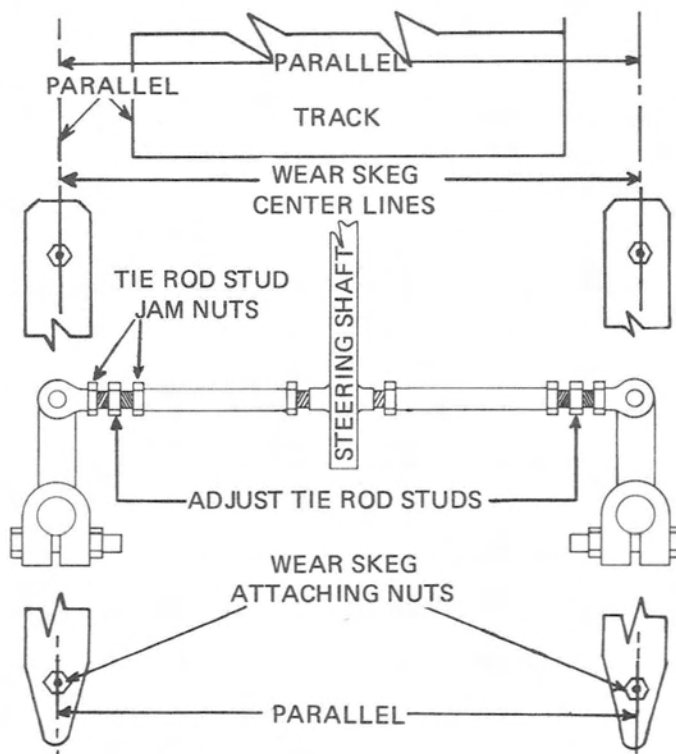


Figure 3. Tie Rod Adjustment - Sno-Twister (400-D) Model

IMPORTANT: Make sure that handlebar remains in normal straight driving position while making these adjustments.

STEERING ARM - SKI SPINDLE - TIE ROD REMOVAL

Components of steering system can be disassembled by simply referring to the illustrations in parts' list (typical of Figure 3, 4, 5, 6 or 7). No special tools are required.

1. On all Mercury Snowmobiles except Sno-Twister, tie rod ends are a tapered fit into steering arms and handlebar

pitman arm. To remove, reverse castle nuts on threads and tap with mallet.

2. Tie rod ends are left hand thread on one end and right hand on opposite end.
3. To remove ski spindle and bushings from front cross-member, it may be necessary to tap with mallet.

INSTALLATION

1. Lubricate upper and lower ski spindle bushings prior to assembly. Refer to Lubrication Chart, Section 7 "Miscellaneous".
2. Assemble steering arm and tie rod components and align skis as outlined in "Ski Alignment", preceding. (Figure 1, 2 or 3)

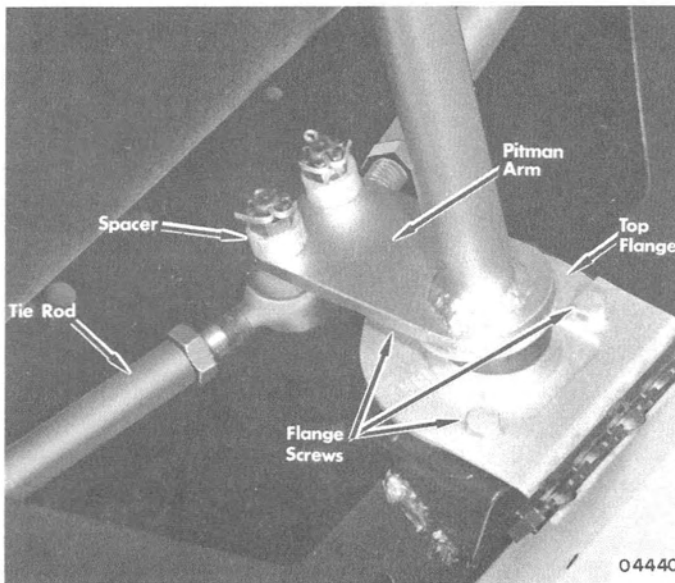


Figure 1. Lower Steering Support for 200-220-250, Rocket (339cc), Lightning (398cc), 440 MAX (438cc) and 440 S/R Models

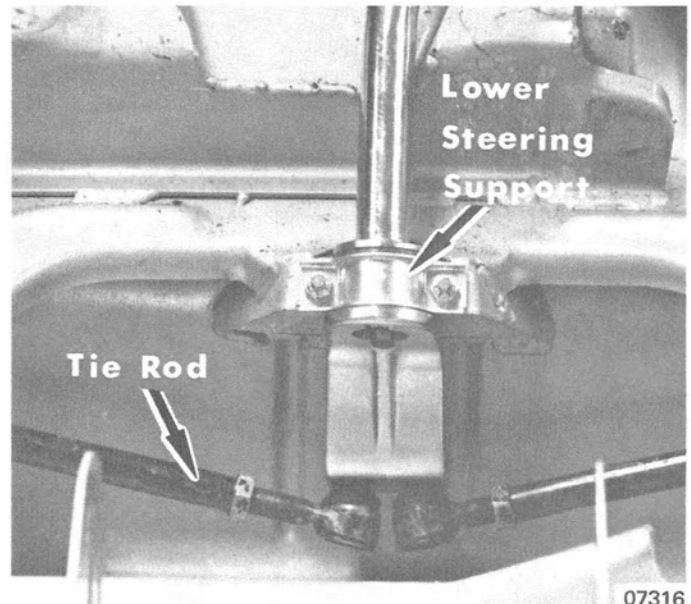
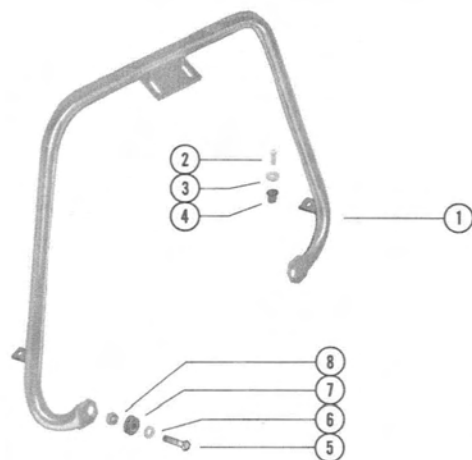


Figure 2. Hurricane (644cc), Mark I (644cc) and Mark II (644cc) Lower Steering Support

IMPORTANT: When installing steering arms on ski spindles, always make certain that retaining bolt is properly engaged in spindle recess. Approximately one-third diameter of retaining bolt must engage in recess of ski spindle. Replace steering arm, if adequate engagement cannot be attained.



- | | |
|-------------------------------|---------------------------|
| 1 - Steering Support Assembly | 20 - Nut |
| 2 - Screw | 21 - Flange |
| 3 - Washer | 22 - Rubber Bushing |
| 4 - Wellnut | 23 - Screw |
| 5 - Screw | 24 - Nut |
| 6 - Washer | 25 - Washer |
| 7 - Steering Support Grommet | 26 - Cotter Pin |
| 8 - Nut | 27 - Tie Rod End Assembly |
| 9 - Handlebar Assembly | 28 - Nut |
| 10 - Handlebar Grip | 29 - Spacer |
| 11 - Control Lever Assembly | 30 - Cotter Pin |
| 12 - Set Screw | 31 - Jam Nut |
| 13 - Control Cable Assembly | 32 - Tie Rod |
| 14 - Core Wire | 33 - Jam Nut |
| 15 - Control Cable Sta-Strap | 34 - End Assembly |
| 16 - Mounting Bracket | 35 - Nut |
| 17 - Rubber Bushing | 36 - Steering Arm |
| 18 - Screw | 37 - Screw |
| 19 - Washer | 38 - Nut |

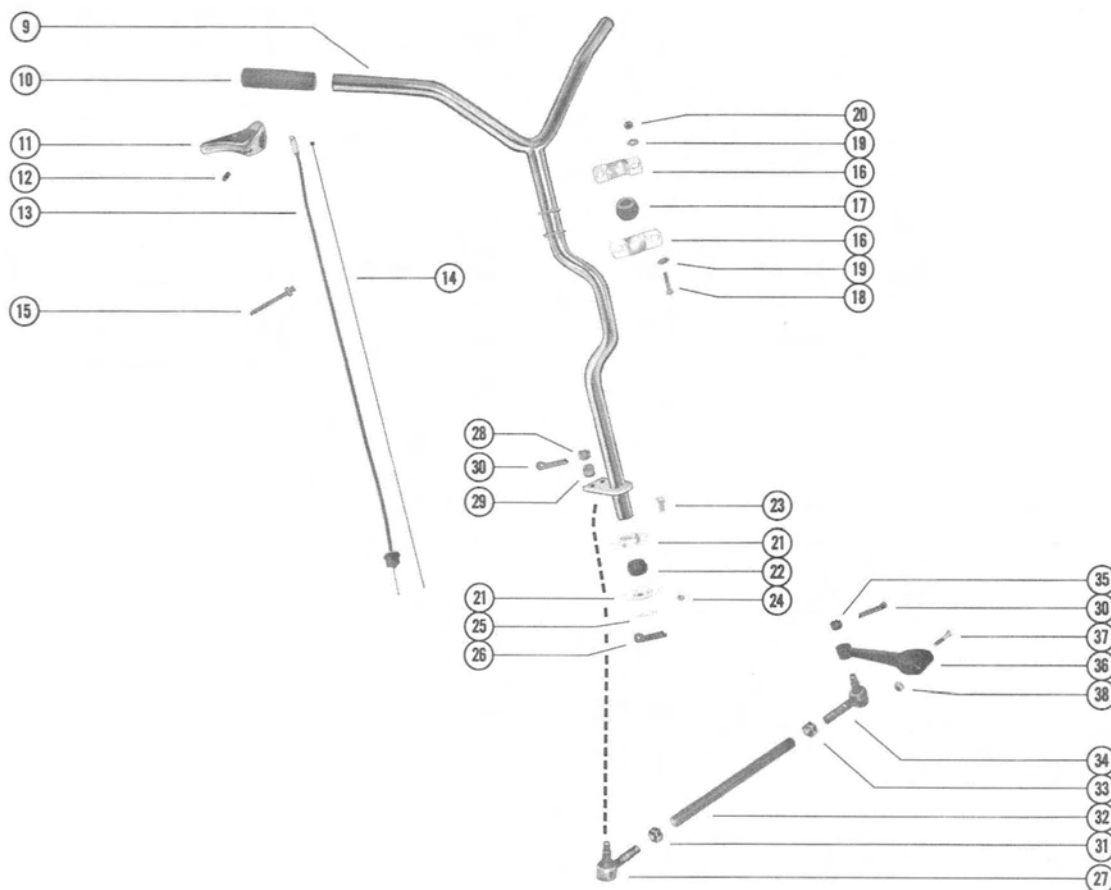


Figure 3. Tie Rod and Steering Shaft Components for 200-220-250, Rocket and Lightning Models

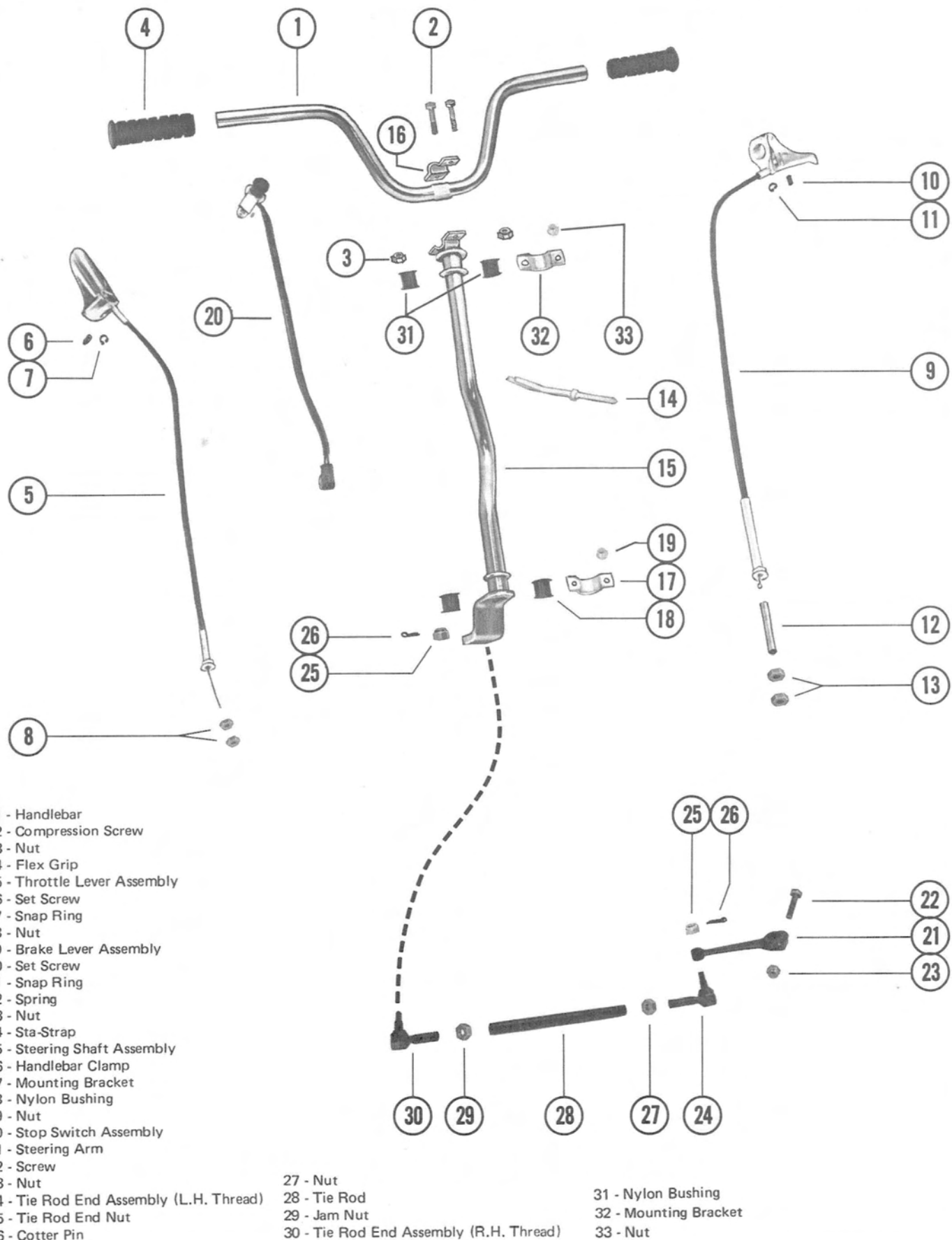


Figure 4. Tie Rod and Steering Shaft Component for Hurricane (644cc)

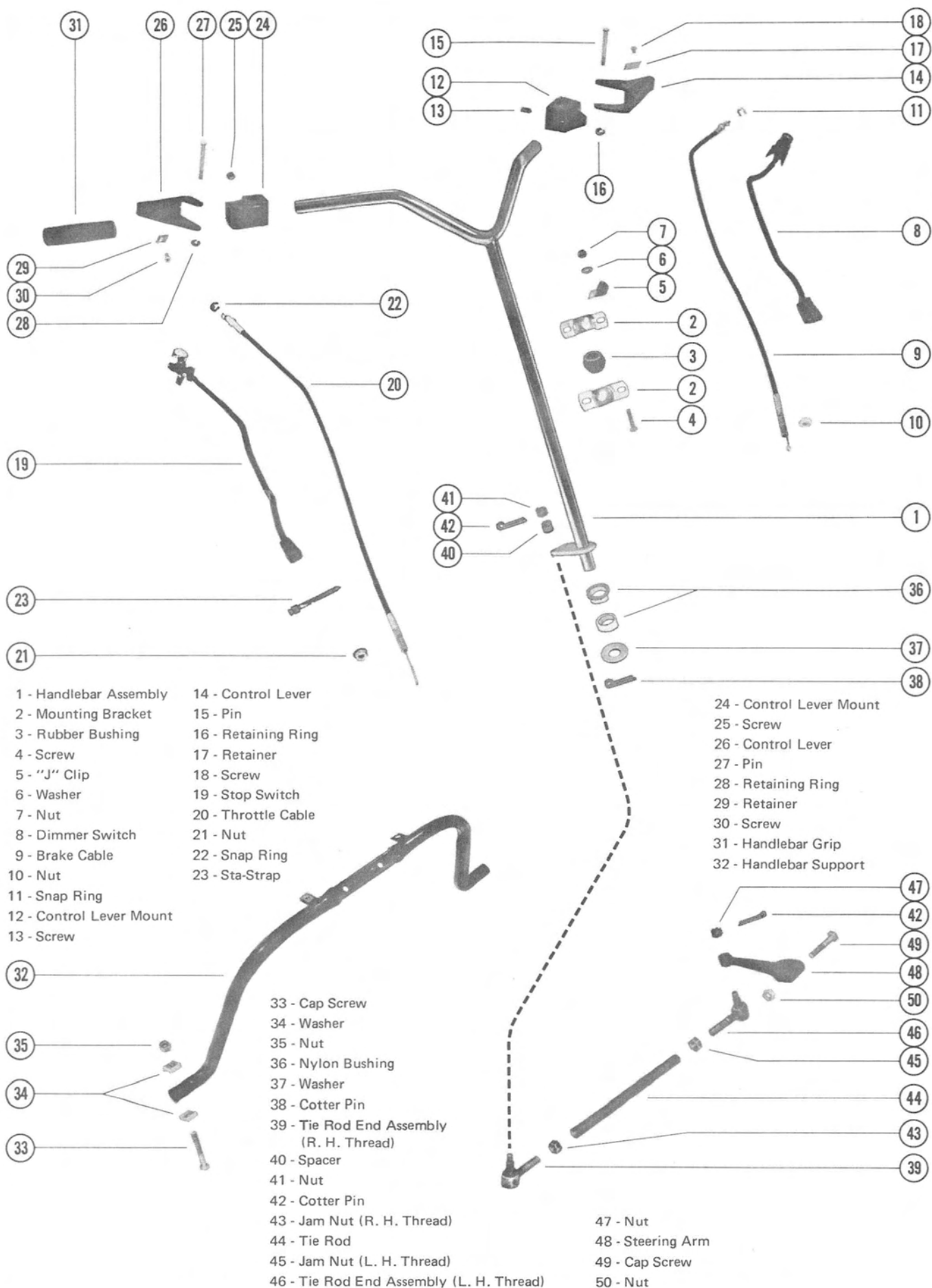


Figure 5. Tie Rod and Steering Shaft Components for 440 MAX and 440 S/R Models

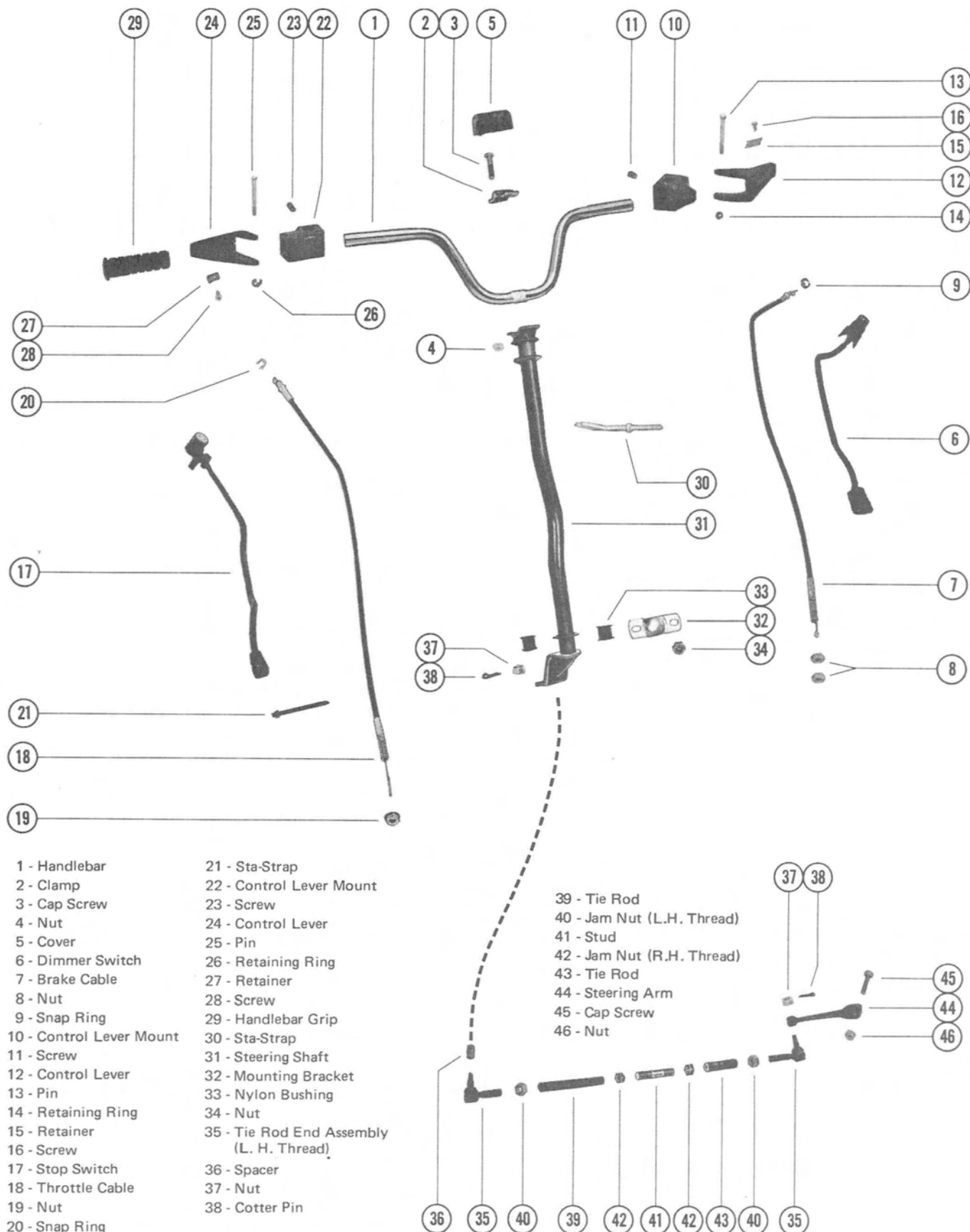


Figure 6. Tie Rod and Steering Shaft Components for Mark I and Mark II Models

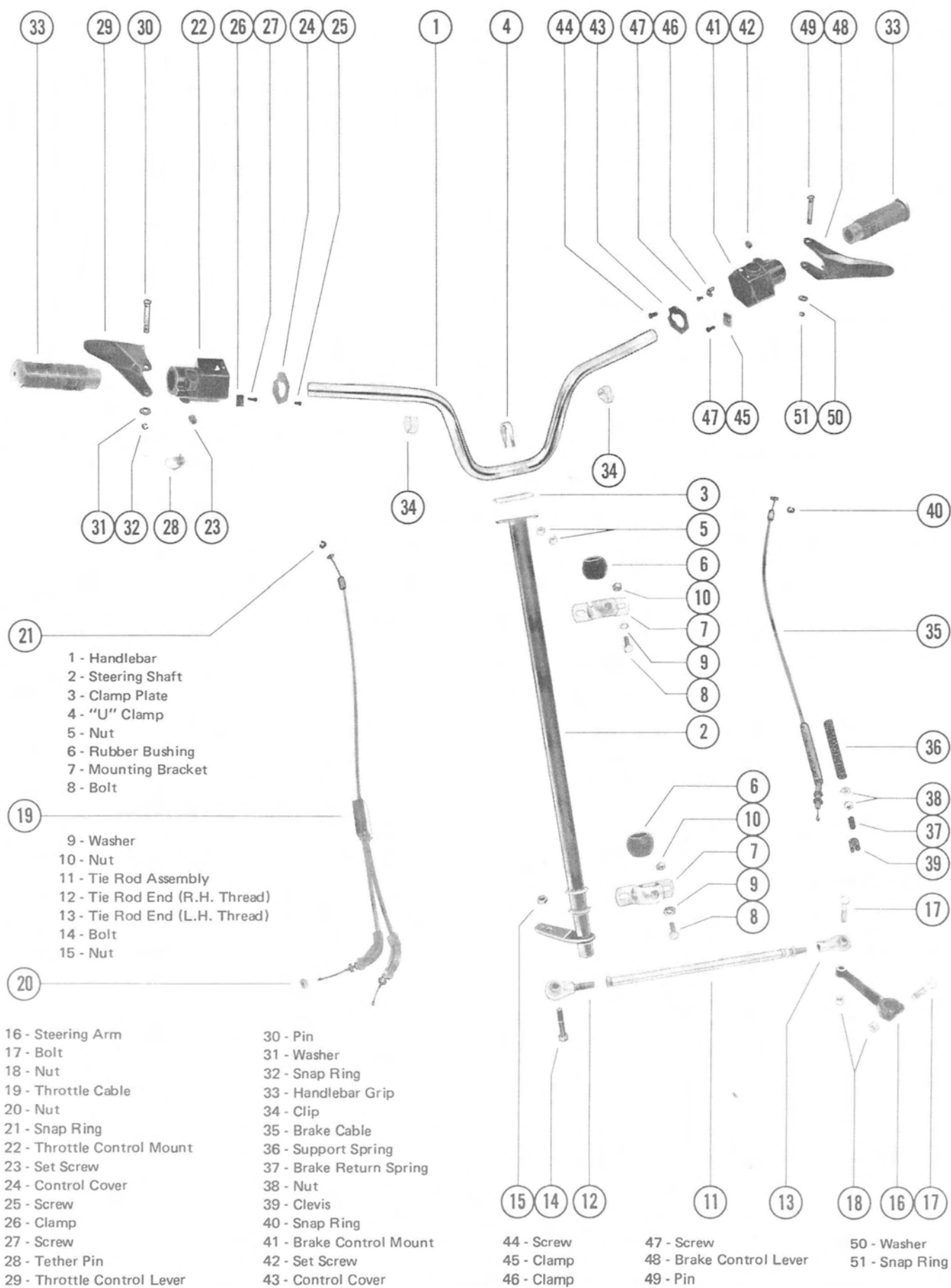


Figure 7. Tie Rod and Steering Shaft Components for Sno-Twister (400-D)

HANDLEBAR and STEERING SUPPORT

For 200-220-250, Rocket (339cc) and Lightning (398cc)

REMOVAL

1. Remove ignition cover (if so equipped).
2. Remove switch box and mounting plate from front crossmember (if so equipped).
3. Remove cotter pin and washer(s) from bottom end of handlebar. (Figure 1)

NOTE: Large, flat washer(s) (located on handlebar) are used as spacers to reduce vertical movement of handlebar assembly. On some vehicles, washers were located on both top and bottom side of handlebar mounting flanges. If interference is encountered between tie rod ends (in pitman arm) and chassis or solenoid mounting bracket, locate washers (as required) on bottom side of handlebar mounting flange only.

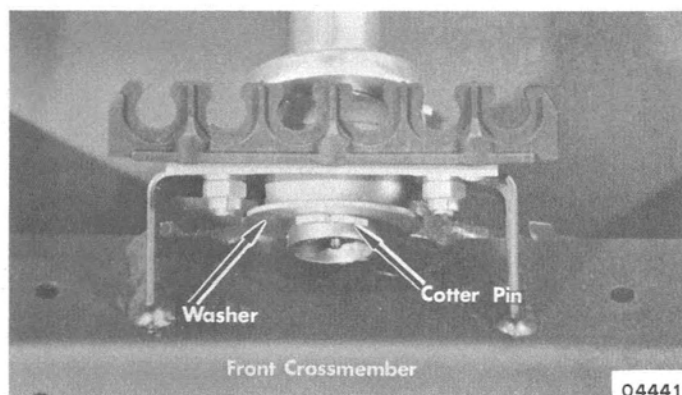


Figure 1. Cotter Pin Location

4. Disconnect tie rod ends from handlebar pitman arm. DO NOT alter tie rod adjustment, unless tie rods and components are to be serviced.
5. Remove three (3) screws which secure handlebar mounting flanges and high tension lead retainer to lower support bracket.
6. Remove two (2) screws from upper handlebar support bracket. (Figure 2)

NOTE: On Rocket and Lightning Models without optional steering support tube, steering support bracket attaches to engine.

7. Remove two (2) screws which secure dashboard to steering support bracket.

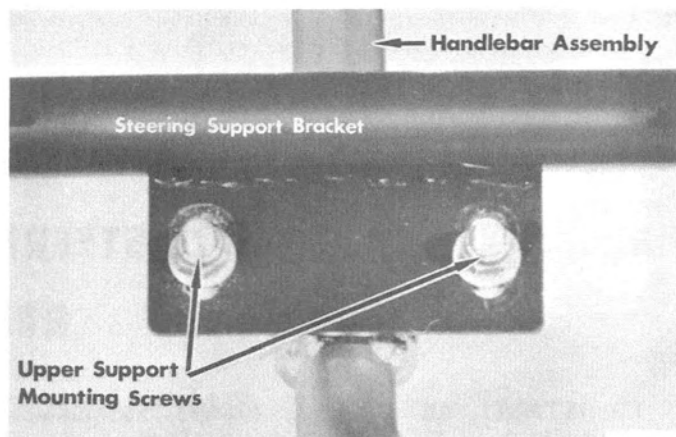


Figure 2. Upper Steering Support

8. Loosen set screw in throttle and brake control lever and slide levers against handlebar grips. (Figure 3) Pull grips and levers off handlebar.
9. Remove handlebar assembly from vehicle.
10. On 200-220-250 Models, perform the following:
 - a. Remove clevis pins which retain steering support bracket to chassis.
 - b. Remove any plastic retainers which attach wiring harness and cables to support.
 - c. Remove steering support bracket from vehicle.

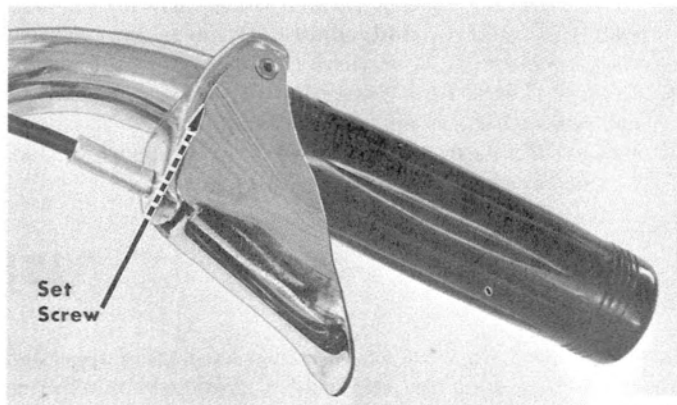


Figure 3. Throttle/Brake Control Lever

INSPECTION

Inspect all parts for wear. Check rubber bushings at upper and lower steering supports and rubber grommets in steering

support for cracks, cuts and deterioration. Replace as necessary.

INSTALLATION

1. Place steering support and handlebar in position on vehicle.
2. Secure support to chassis with clevis pins. Lock clevis pins with cotter pins.
3. Install throttle and brake control levers on handlebar in position desired. Reinstall handlebar grips.

4. Assemble lower support components on handlebar as follows:
 - a. Flange washer
 - b. Rubber bushing
 - c. Flange washer
5. Place bottom end of handlebar into front crossmember.

6. Align flange mounting holes. Place high tension lead retainer in position and secure to front crossmember with three (3) screws (if so equipped).
7. Install large flat washers (spacers) on handlebar (bottom side of handlebar mounting flange), as required, to eliminate vertical movement of handlebar. Insert cotter pin.
8. Assemble components of upper handlebar support and attach to steering support bracket. Do not tighten at this time. (Refer to Item 12.)

9. Secure dashboard to steering support bracket with two (2) screws.
10. Connect tie rods to handlebar.
11. Secure switch box and mounting plate to front crossmember. Install ignition cover (if so equipped).
12. Adjust upper handlebar support as necessary to obtain proper clearance between handlebar and top cowl and dashboard assembly. Tighten retaining screws.

HANDLEBAR and STEERING SHAFT - HURRICANE (644cc)

STEERING SHAFT

REMOVAL

IMPORTANT: All Hurricane (644cc) Snowmobiles (CHASSIS Serial No. 3202073 thru 3205072) must have the steering shaft replaced with steering shaft assembly (D-63472A2).

WARNING: Failure to replace the original steering shaft assembly could result in breakage of the steering shaft assembly and loss of steering control, with subsequent damage to the snowmobile, bodily injury and liability on the part of the selling dealer.

1. Remove engine and muffler assembly.
2. Remove handlebar and dash assembly and move to one side.
3. Disconnect tie rod ends from steering shaft pitman arm. DO NOT alter tie rod adjustment unless tie rods and components are to be serviced. (Figure 1)
4. Remove 2 nuts from lower steering bar support bracket and remove bracket and nylon bushing.
5. Remove 2 nuts from upper steering shaft support bracket. Remove bracket, bushing and steering shaft.

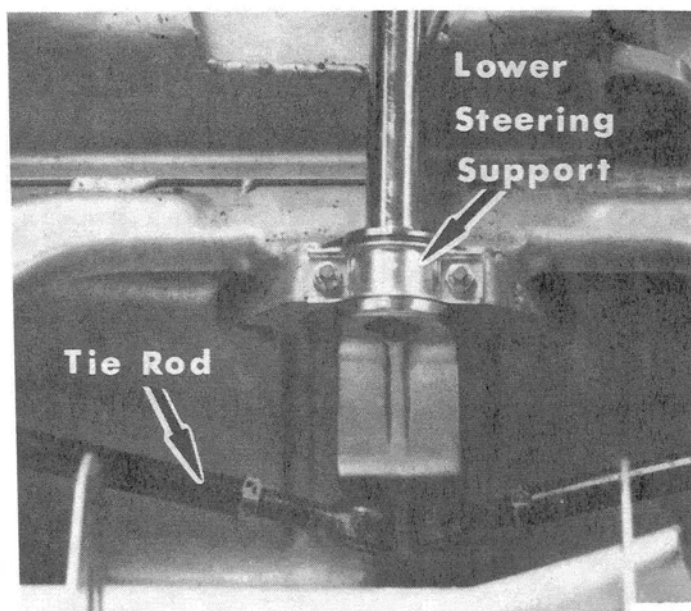


Figure 1. Steering Shaft Support

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INSPECTION

Inspect all parts for wear. Check rubber bushings at upper and lower steering supports and rubber grommets in steering support for cracks, cuts and deterioration. Replace as necessary.

Inspect steering shaft, brackets and steering supports for cracks, breaks, wear and stripped knurling. Replace as necessary.

INSTALLATION

1. Place steering shaft in position on steering supports.
2. Secure steering shaft to steering supports with bushings, support brackets and 2 nuts.
3. Attach tie rod ends.
4. Refer to "Ski Alignment" (this section, preceding) and check ski alignment. Adjust as necessary.
5. Install muffler and engine.
6. Install dash assembly.

7. Install handlebar and clamp with 2 screws. Torque to specification. Refer to "Specifications" Section 8.

WARNING: Handlebar must be torqued to specification following prescribed procedure (outlined following). Failure to adhere to this warning could result in loosening of handlebar.

HANDLEBAR INSPECTION

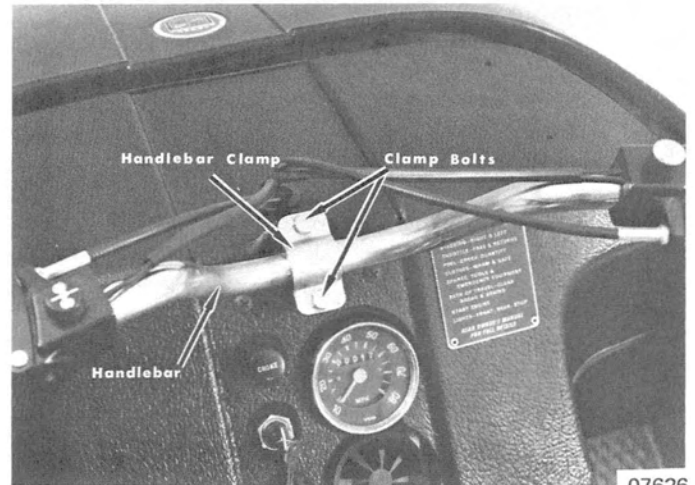
WARNING: The handlebar clamp bolts MUST be checked frequently for correct torque. The handlebar must be torqued to specification. (Refer to "Specifications" Section 8.)

Inspect handlebar, steering shaft and handlebar clamp for cracks, breaks and stripped knurling. Replace as necessary.

ADJUSTMENT

1. Remove handlebar clamp cover.
2. Loosen handlebar clamp bolts. (Figure 2).
3. Center handlebar at desired height.
4. Tighten handlebar retaining clamp evenly on both sides while maintaining an equal gap between clamp. Torque clamp bolts to specification. (Refer to "Specifications" Section 8.)
5. Snap cover over handlebar.

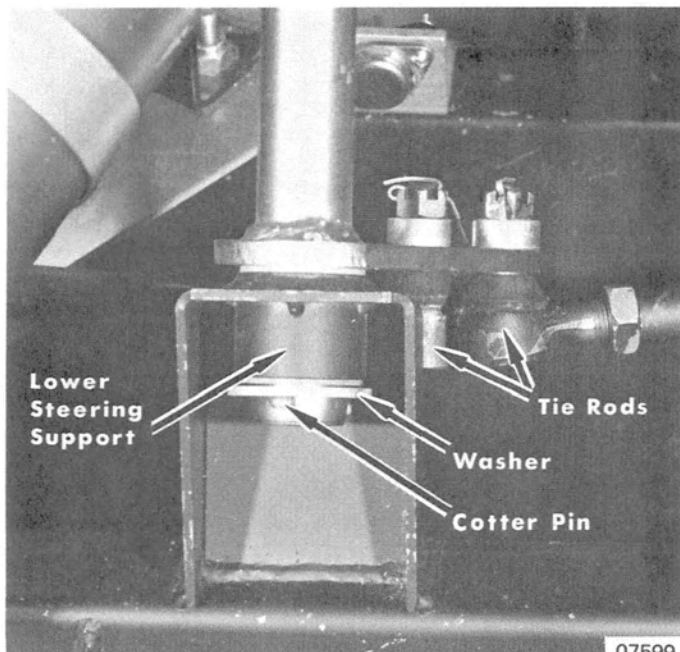
Figure 2. Handlebar Adjustment



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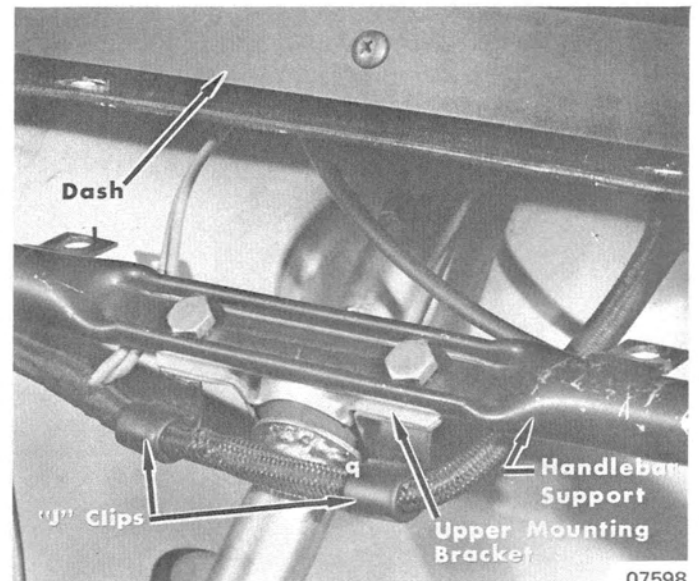
HANDLEBAR and STEERING SUPPORT - 440 MAX and 440 S/R REMOVAL

1. Open top cowl and dash cover.
2. Disconnect stop switch and dimmer switch wires. Remove handlebar grips, throttle lever and brake lever from handlebar. Refer to Section 7, "Miscellaneous", Part A.)



07599

Figure 1. Lower Steering Support



07598

Figure 2. Upper Steering Support

3. Remove tie rod ends from handlebar pitman arm. DO NOT alter tie rod adjustment unless tie rods and components are to be serviced. (Figure 1)
4. Remove cotter pin and washer from bottom end of handlebar (Figure 1)
5. Remove 2 screws which secure dash to handlebar support. Position dash as shown in Figure 2.

6. Remove 2 cap screws from handlebar support.(Figure 2)
Remove upper mounting bracket from steering shaft.
7. Remove handlebar assembly thru dash opening.

8. Pull bushings from lower steering support bracket. Remove rubber bushing from steering shaft.

INSPECTION

Inspect all parts for wear. Check bushings and grommets for cracks, cuts and deterioration.

Inspect steering shaft, brackets and steering supports for cracks, breaks or wear. Replace as necessary.

INSTALLATION

1. Install bushings in lower steering support. Place rubber grommet around steering shaft. Lubricate bushings and grommet with Multipurpose Lubricant (C-92-63250).
2. Place handlebar in position on chassis with bottom end in lower steering support.
3. Place upper mounting brackets around rubber grommet and secure to handlebar support.

NOTE: Position "J" clips and harness as shown in Figure 2.

4. Install large flat washer on handlebar bottom end. (Figure 1) Install cotter pin.

5. Secure dash to handlebar support with 2 screws.
6. Attach tie rod ends to handlebar pitman arm. Torque to specifications and install cotter pins. (Refer to "Specifications" Section 8.)
7. Install throttle lever, brake lever and handlebar grips on handlebar. Connect stop switch and dimmer switch wires to chassis harness.
8. Refer to "Ski Alignment" (this section, preceding) and check ski alignment. Adjust as necessary.
9. Close top cowl and dash cover.

HANDLEBAR and STEERING SHAFT MARK I (644cc) and MARK II (644cc) STEERING SHAFT REMOVAL

1. Open top cowl.
2. Remove engine and muffler assembly. (Refer to Section 5, Part D)
3. Refer to this section, Part F, and remove dash assembly.
4. Remove tie rod ends from steering shaft pitman arm. DO NOT alter tie rod adjustment unless tie rods and components are to be serviced. (Figure 1)

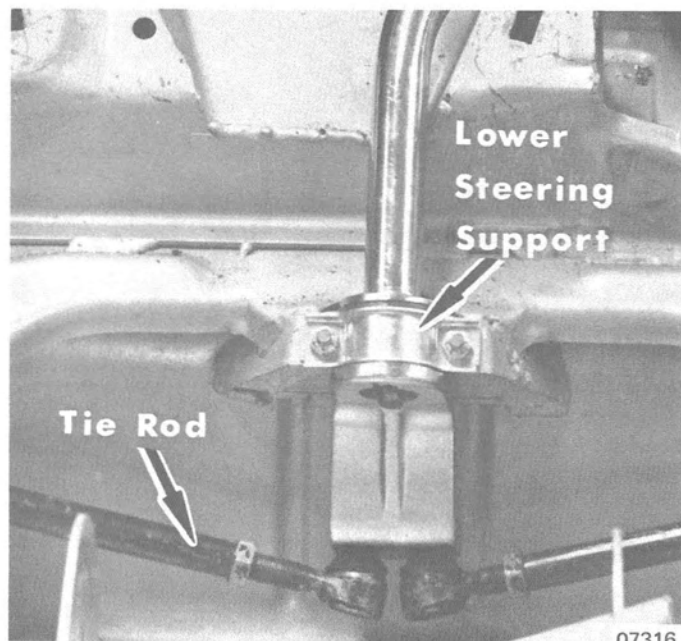


Figure 1. Steering Shaft Support

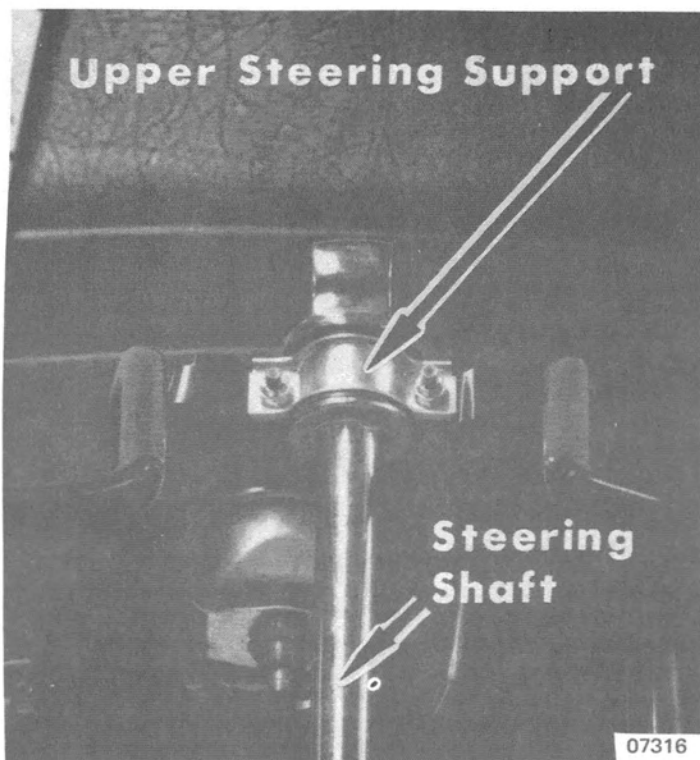


Figure 2. Upper Steering Support

5. Remove 2 nuts from lower steering shaft support bracket. Remove bracket and nylon bushings.
6. Remove 2 nuts from upper steering shaft support bracket. Remove bracket, bushings and steering shaft. (Figure 2)

INSPECTION

Inspect all parts for wear. Check nylon bushings for cracks, cuts and deterioration.

Inspect steering shaft, brackets and steering supports for cracks, breaks, wear and stripped knurling. Replace as necessary.

INSTALLATION

1. Place steering shaft in position on steering supports.
2. Lubricate bushings with a small amount of Multipurpose Lubricant (C-92-63250).
3. Secure steering shaft to steering supports with bushings, support brackets and nuts. (Figures 1 and 2)
4. Attach tie rod ends to handlebar pitman arm. Torque to specifications and install cotter pins. (Refer to "Specifications" Section 8.)
5. Refer to "Ski Alignment" (this section, preceding) and check ski alignment. Adjust as necessary.
6. Install engine and muffler assembly. (Refer to Section 5, Part D.)

7. Install dash and handlebar assemblies. (Refer to this section, Part F.).
8. Torque handlebar attaching cap screws to specifications. (Refer to "Specifications" Section 8).

WARNING: Handlebar clamp bolts MUST be torqued to specification following prescribed procedure (outlined, following). Failure to adhere to this warning could result in loosening of handlebar.

9. Close top cowl.

HANDLEBAR INSPECTION

IMPORTANT: Some Mark II Snowmobiles (Chassis Serial No. 3787640 thru 3788439) had handlebar clamp bolts which were too short. A service modification requires replacement of original clamp bolts and nuts with two (2) new bolts (C-10-62049) and two (2) new nuts (C-11-63525).

WARNING: Failure to replace the original handlebar clamp bolts and nuts on a Mark II Snowmobile with Chassis Serial No. 3787640 thru 3788439, may result in loss of steering control with subsequent damage and liability on the part of the selling dealer.

WARNING: The handlebar clamp bolts MUST be checked frequently for correct torque. The handlebar bolts must be torqued to specification. (Refer to "Specifications" Section 8.)

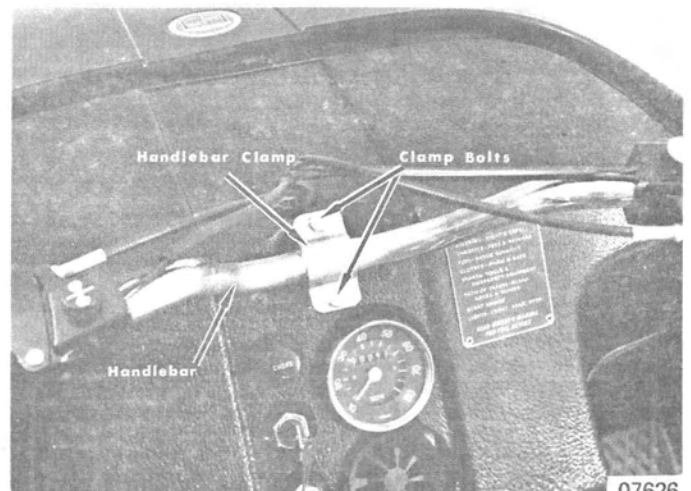
Inspect handlebar, steering shaft and handlebar clamp for cracks, breaks and stripped knurling. Replace as necessary.

ADJUSTMENT

1. Remove handlebar clamp cover.
2. Loosen handlebar clamp bolts. (Figure 3)
3. Center handlebar at desired height.
4. Tighten handlebar retaining clamp evenly on both sides while maintaining an equal gap between clamp. Torque clamp bolts to specification. (Refer to "Specifications" Section 8.)
5. Snap cover over handlebar clamp.

WARNING: Failure to adhere to this procedure and proper torque value could result in loosening of the handlebar.

Figure 3. Handlebar Adjustment



HANDLEBAR and STEERING SHAFT - SNO-TWISTER (400-D)

STEERING SHAFT

REMOVAL

1. Remove engine assembly. (Refer to Section 5, Part F.)
2. Refer to this section, Part F, and remove dashboard.
3. Remove handlebar clamp assembly and handlebar assembly from steering shaft and move to one side.
4. Remove tie rod ends from steering shaft pitman arm. DO NOT alter tie rod adjustment unless tie rods and components are to be serviced. Note holes in pitman arm where

- tie rods were attached. During installation, tie rods MUST be attached to same hole to maintain proper ski alignment.
5. Remove nuts, bolts and washers which attach steering shaft brackets to crossmember and to dash support. Lift steering shaft from chassis.
 6. Remove brackets and rubber bushings from steering shaft.

INSPECTION

Thoroughly clean all parts. Inspect all parts for wear. Check rubber bushings for cracks, cuts and deterioration. Inspect

steering shaft, brackets and dash support for cracks, breaks or wear. Replace parts as necessary.

INSTALLATION

1. Lubricate inside of rubber bushings with Silicone Compound (C-92-24108).
2. Install rubber bushings and brackets in position on steering shaft.
3. Place steering shaft in position on chassis and secure to crossmember and dash support with bolts, washers and nuts.
4. Attach tie rod ends to steering shaft pitman arm with bolt and nut and torque to specification. (Refer to "Specifications" Section 8.)

5. Refer to "Ski Alignment" (this section, preceding) and check ski alignment. Adjust as necessary.
6. Place handlebar assembly in position on steering shaft and secure with handlebar clamp assembly.
7. Torque handlebar clamp attaching locknuts to specification. (Refer to "Specifications" Section 8.)

WARNING: Handlebar clamp MUST BE torqued to specification following prescribed procedure (outlined, following). Failure to adhere to this warning could result in loosening of handlebar.

IMPORTANT: Tie rods must be reattached to same hole in steering shaft (hole which tie rods were attached to before disassembly) to maintain proper ski alignment.

8. Refer to this section, Part F, and install dashboard.
9. Install engine assembly. (Refer to Section 5, Part F.)

HANDLEBAR INSPECTION

WARNING: The handlebar clamp locknuts MUST be checked frequently for correct torque. The handlebar locknuts must be torqued to specification. (Refer to "Specifications" Section 8.)

Inspect handlebar, steering shaft and handlebar clamp assembly for cracks, breaks, stripped knurling and stripped threads. Replace damaged parts as necessary.

ADJUSTMENT

1. Loosen handlebar clamp attaching locknuts.
2. Center handlebar at desired height.
3. Tighten handlebar clamp attaching locknuts evenly on both sides of handlebar until locknuts are torqued to specification. (Refer to "Specifications" Section 8.)

WARNING: Failure to adhere to this procedure and proper torque value could result in loosening of the handlebar.