

SECTION/OPERATION

12

ENGINE

<u>COMPONENT</u>	<u>PROCEDURE</u>	<u>PRINT #</u>	<u>TEMPLATE</u>
ENGINE (E24-2000)	Install engine	E27-2000	E13-1
CLUTCH AND TORQUE LINK (E27-2000)	Upper engine mount Torque link Clutch Idler pulley	E27-2000	

NOTES

- ENGINE: Determine if the engine has to be shimmed up or down and cut out the appropriate shims. Allow clearance for the oil filter bracket and for the oil drain located on the pilot side valve cover.
- TORQUE LINK: Leave enough thread in the rod end for later adjustment.
- IDLER PULLEY: When installing the idler pulley, be careful to hold close alignment as the idler determines belt tracking.

ROTORWAY

TOOLS REQUIRED FOR OPERATION 12:

Allen wrench 1/4"	
Band saw	
Dial calipers	
Drill bits of the following sizes:	1/8"
	5/16"
	7/16"
Floor jack	
Grinder	
Hand drill (air or electric)	
Pliers	
Pop rivet gun	
Ratchet with sockets of the following sizes:	1/4"
	5/16"
	3/8"
	7/16"
	1/2"
	3/4"
	11/16"
	7/8"
Ruler	
Spring scale	
Tap: 5/16-24 (with handle)	
Welding equipment	
Wrenches of the following sizes:	1/4"
	7/16"
	5/16"
	3/8"
	1/2"
	11/16"
	3/4"
	7/8"

INTRODUCTION

The tail boom should be removed or supported before removing the airframe brace tubes. If not, the airframe will be damaged.

Before beginning any work with the engine, make sure the exhaust port holes have been taped over with duct tape. If this is not done and a washer or other object is accidentally dropped into the exhaust port, you will run the risk of ruining a valve the first time the engine is started.



Photo #1

Use Print E13-2000 and template E13-1 when constructing this assembly.

Parts as received from RotorWay International for the R.I. 162 Engine.



Photo #2

Place the engine mount support ring on a scissors jack and set the engine in it vertically, in a manner that will not allow it to slip off. The jack should be propped up to a height of approximately 15". Have someone help you hold the engine; a drop to the floor from this height could cause considerable damage to the engine.



Photo #3

Place the upper engine mount cup into the main drive pulley mounted on top of the engine. Rotate the bell in the pulley so that the half moon is toward the front of the engine.



Photo # 4

Fit the rubber strip so it covers the machined area on the inside of the cup. Glue the rubber to the cup with the 3M structural adhesive and rivet it in place, using the 1/8" washers on both pop rivets.

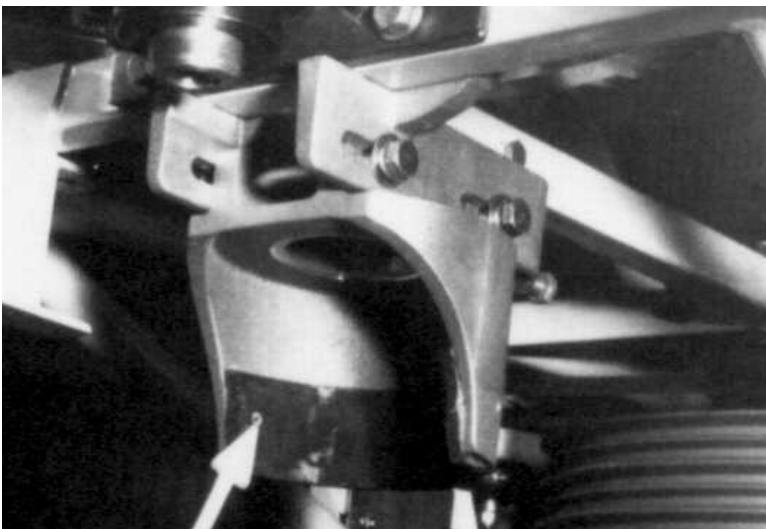


Photo #5

The cup is shown here bolted to the clevis for a better understanding of how they fit together.

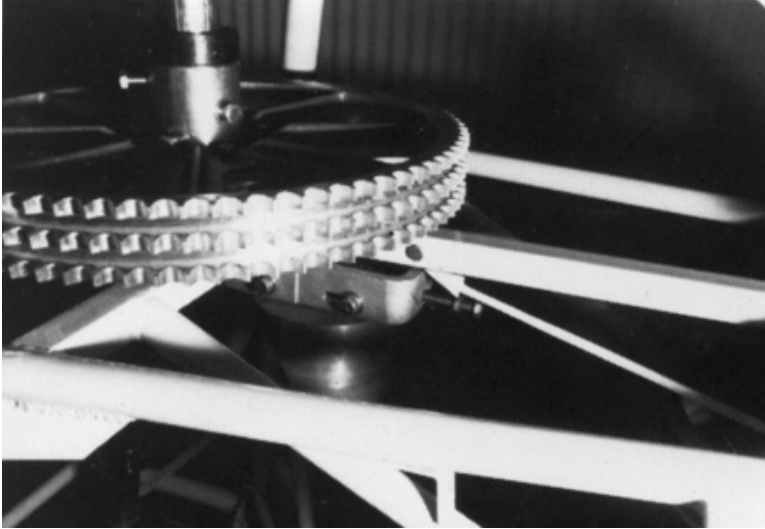


Photo #6

There should be a 1/8" gap between the rear of the upper frame clevis casting and the bottom of the square drive mount tubes. (See section 8 page 2, photo #3.)

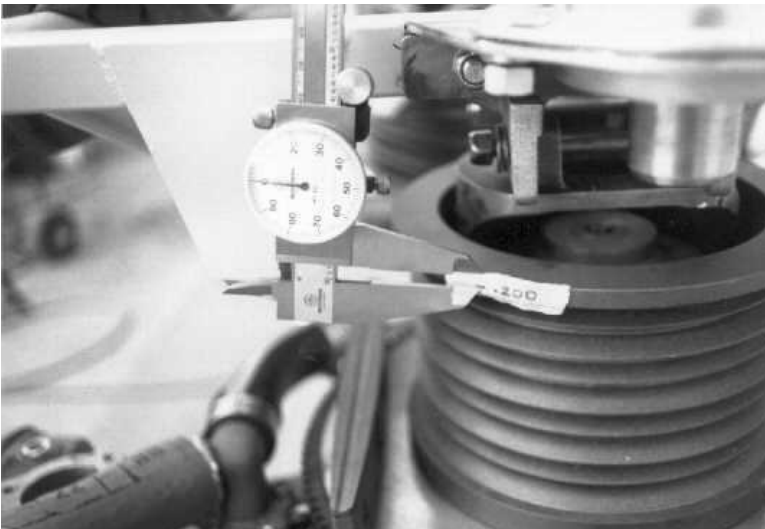


Photo #7

On the engine pulley, note that the distance from the top of the uppermost groove to the top surface is .200" greater than that of the secondary pulley. If the engine was installed with the top of the engine pulley at the same height as the top of the secondary pulley, the drive belt would be .200" lower at the engine pulley. For future alignment, place a piece of masking tape on the engine pulley as shown and mark a reference line .200" below the top. Raise the engine until the upper engine mount cup fits into the upper frame clevis casting. Install the three 5/16" bolts that hold the engine mount support ring to the engine mount weldment.

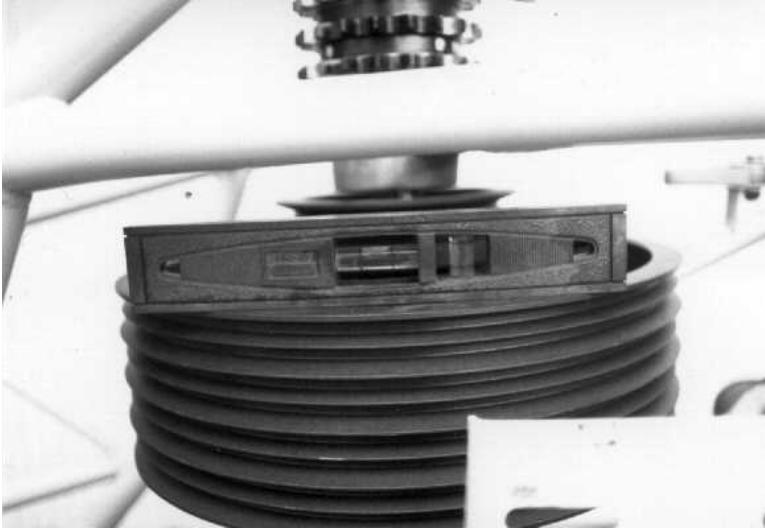


Photo #8

Place a level on the secondary pulley and shim under the skids until the bubble centers fore, aft and laterally.

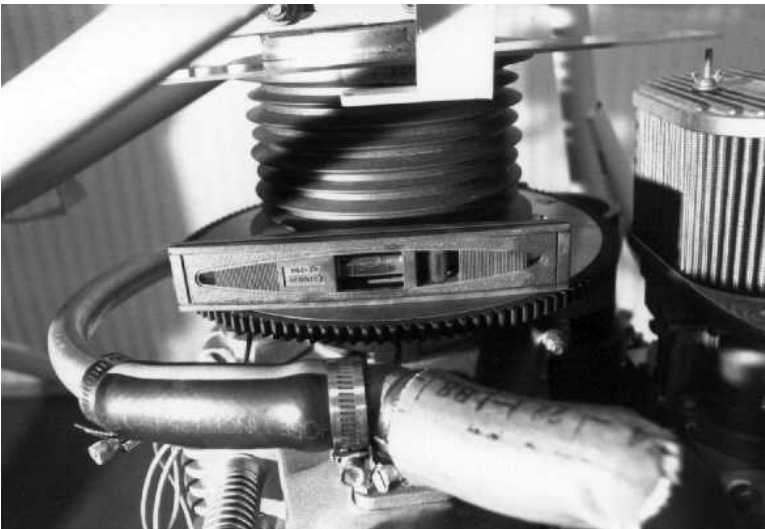


Photo #9

Place a level on the engine flywheel to check the fore and aft level. Move the top or bottom of the engine until the bubble centers.

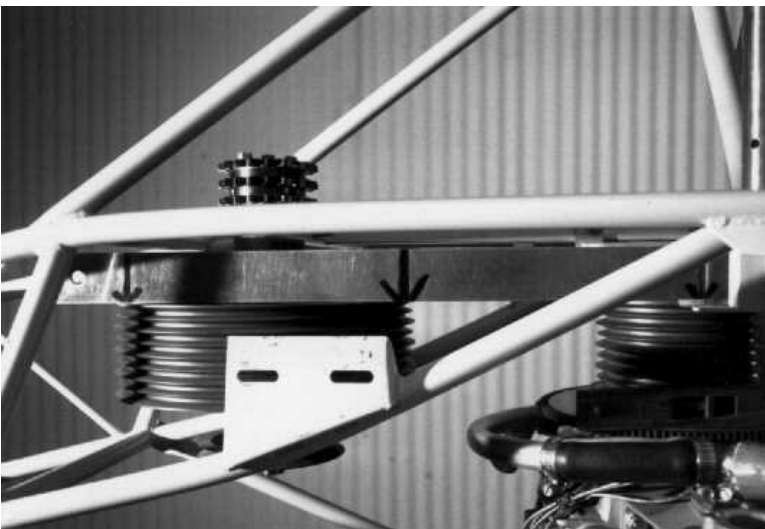


Photo #10

Check the alignment of the secondary pulley and the engine pulley. The straight edge should make contact with both sides of the secondary pulley and align with the mark on the masking tape that is .200" from the top of the engine pulley. Use shims on the lower engine mount to achieve the proper alignment, by either raising or lowering the engine.



Photo #11

Move the engine to the rear as far as the adjustment on the top and bottom will allow.

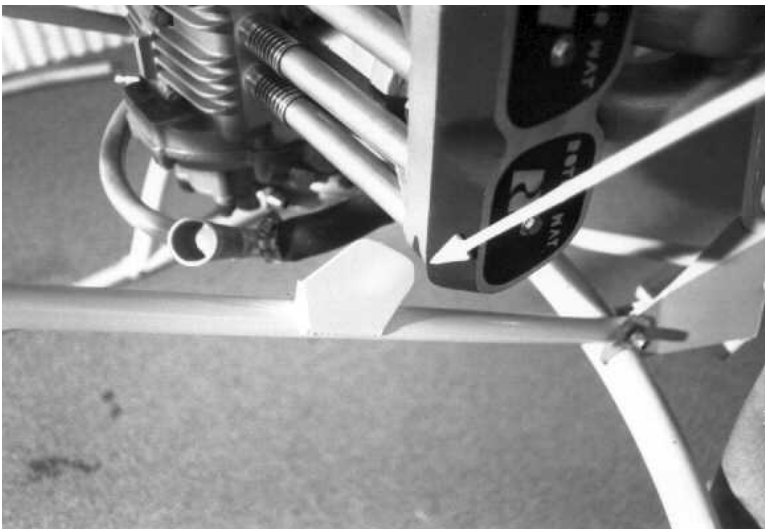


Photo #12

Check on the passenger side to see that the valve cover does not hit the oil filter bracket. (The oil filter should be mounted toward the rear of the bracket. This will allow excess material to be removed from the front of the bracket if necessary for valve cover clearance.) The engine may be rotated by adjusting the torque link.



Photo #13

Check on the pilot side to see that the valve cover drain does not hit the frame.

TORQUE LINK

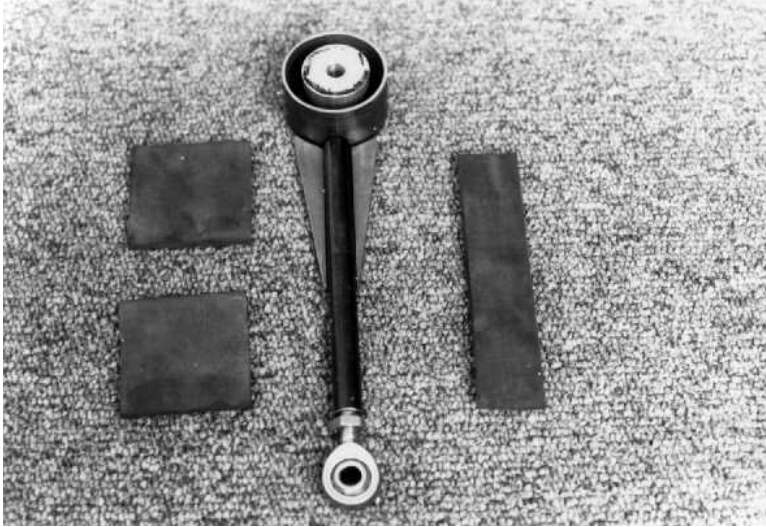


Photo #14

Cut out the torque link parts and thread the torque link arm with a 5/16-24 tap. The tubes should be welded together at an angle that gives the best fit. The long tube (torque link arm) may also be bent slightly to fit better.



Photo #15

Torque link assembly shown welded and painted.



Photo #16

Fit the torque link. (Note the bend in the torque link arm to align the rod end with the mounting ears on the engine.) When the engine is at the rear of the slots in the mounts, the rod end should not be screwed all the way in.

CLUTCH

Preface: The clutch applies a constant spring tension against the inside of the main drive belts. It is important that the centerline of the clutch idler pulley shaft be parallel to that of the secondary shaft in both the fore and aft and lateral planes. The top of the idler pulley should be installed in line with the top of the secondary drive pulley.



Photo #17

Use print E27-2000 when constructing this assembly. Parts as received from RotorWay International for the engine clutch.

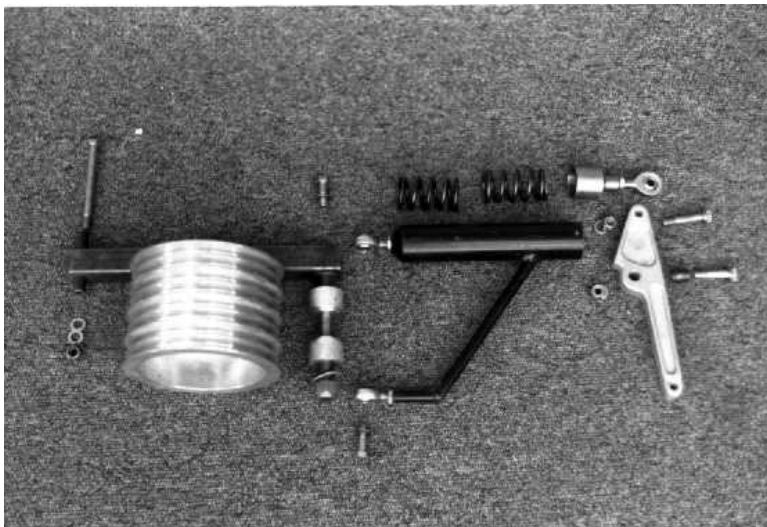


Photo #18

Exploded view of the clutch assembly.



Photo #19

Drill the 7/16" hole and fit the pivot bushing to the clutch arm casting. Drill 5/16" holes at each end of the clutch arm casting.

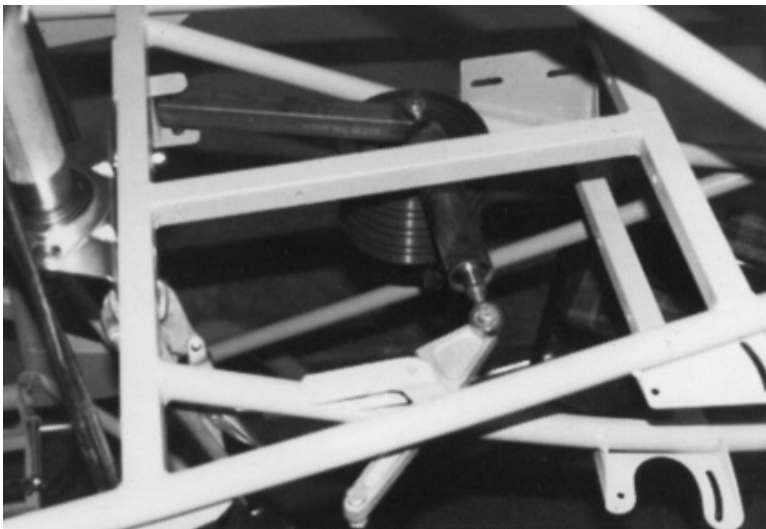


Photo #20

This is an overall view of the engine clutch and idler arm assembly installed in the airframe in the disengaged position.



Photo #21

Use a board with two 5/16" holes spaced 5-5/8" apart to hold alignment when welding the idler pulley brace to the clutch spring tube weldment.



Photo #22

Clean the inside of the clutch spring tube weldment so that the clutch tube piston will slide freely.

Note: Do not forget to grease the springs, piston and inside of spring tube on final assembly.

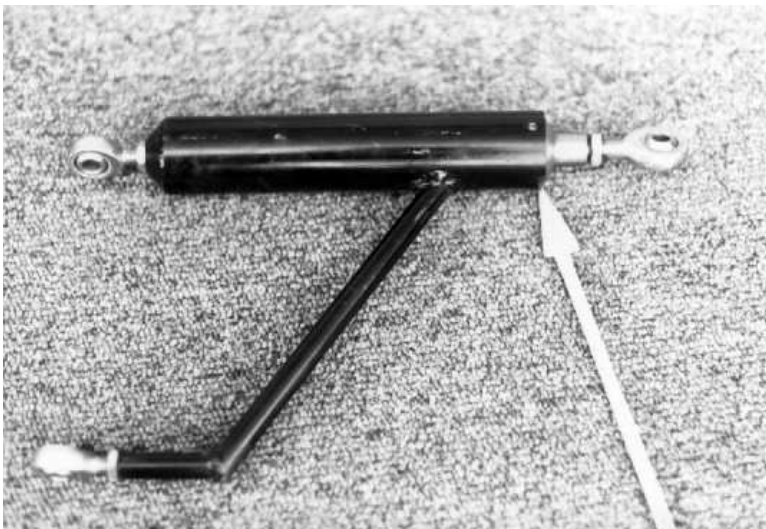


Photo #23

When the springs and piston are in the spring tube, the piston should be even with the end of the spring tube. When the pop rivets are installed, the assembly will have the correct pre-load.

Note: It may be necessary to remove part of the spring tube in the area shown by the arrow for clearance of the clutch arm casting.

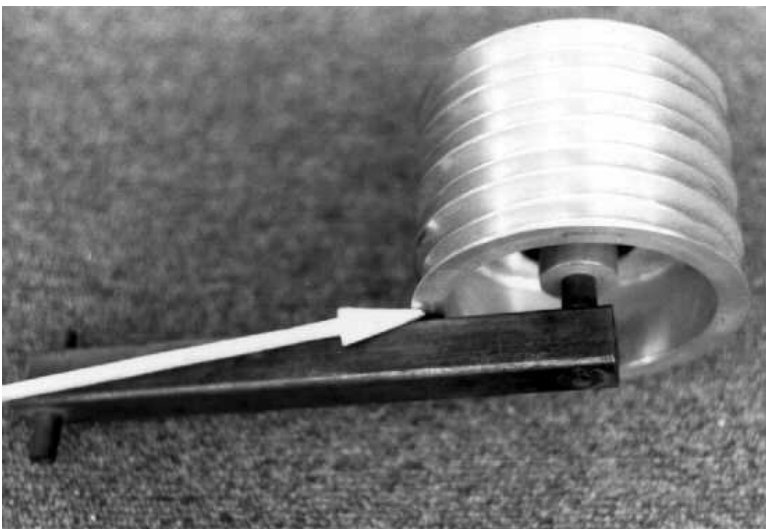


Photo #24

Install the idler pulley assembly on the idler arm weldment so there is 1/8" between the pulley and the square tube. Use washers to achieve this distance. Install the 3/8" nut on the idler arm weldment as shown in the photo above and secure the nut with blue Loctite.



Photo #25

Drill the hole in the idler arm weldment for a tight fit.
Note: Do not weld the bushing until after the secondary and engine is installed and correct position is determined. This will allow the assembly to be moved up or down as required.

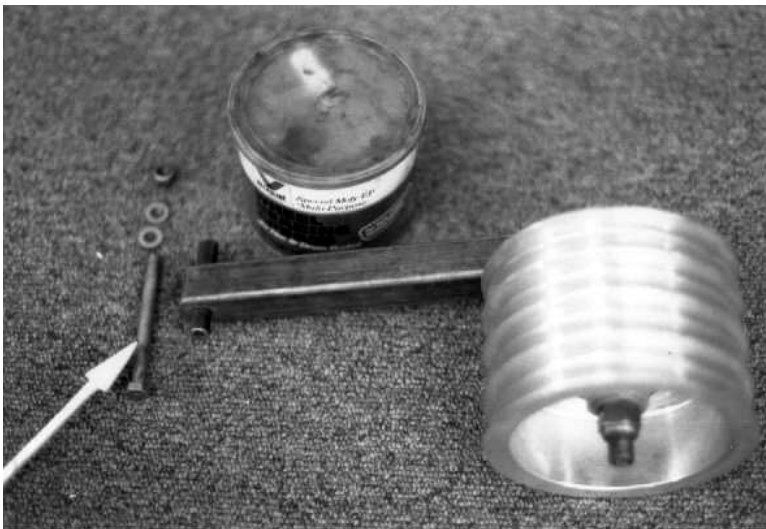


Photo #26

Grease the pivot bolt on final assembly.
Note: Install this bolt from the bottom or it will not be possible to remove it when the oil bath is installed.

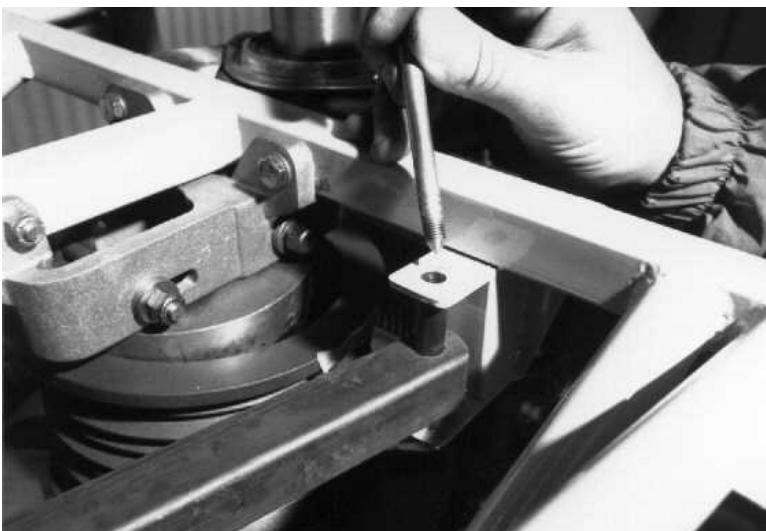


Photo #27

To fit the clutch idler arm weldment, drill a 5/16" hole through the top ear of the bracket only. Grind a 5/16" bolt to a point.

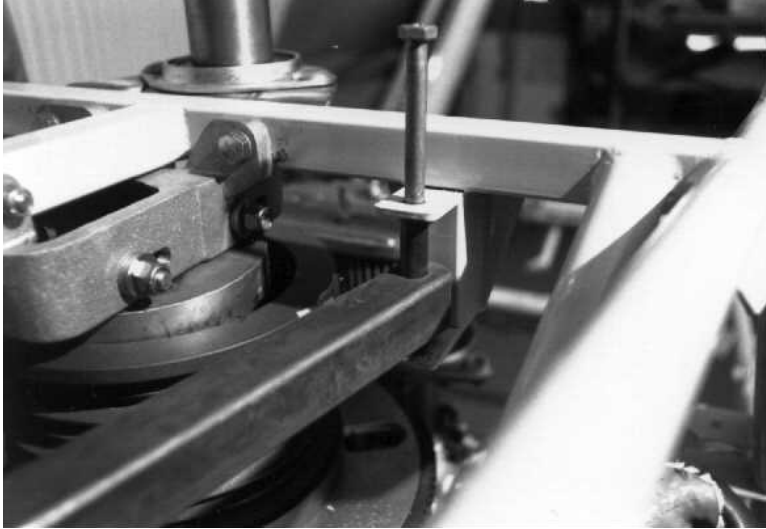


Photo #28

Install the pointed bolt in the hole and in the idler arm weldment bushing.

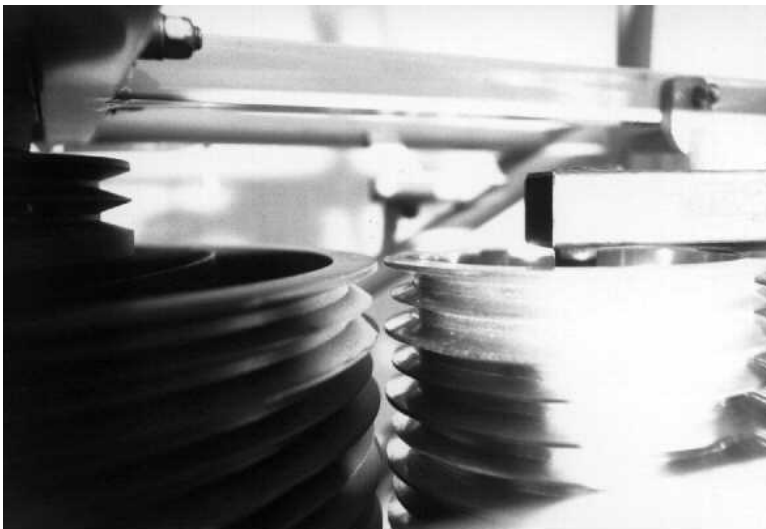


Photo #29

Slide the idler arm weldment up or down on the bushing to align the idler pulley with the secondary pulley.



Photo #30

Use a flat piece of material to check the lateral parallel of the idler and secondary pulleys.



Photo #31

Use a straight edge to check the fore and aft parallel of the idler and secondary pulleys.

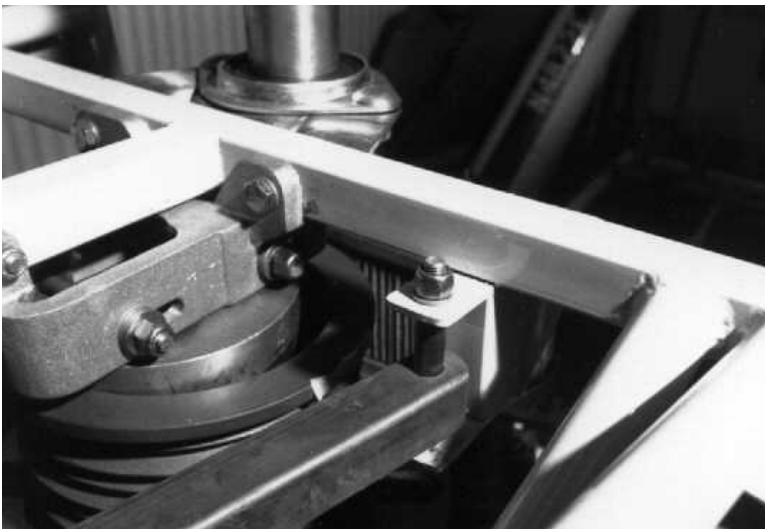


Photo #32

Tack weld the bushing and re-check position. Then final weld. Use the pointed bolt as a punch to locate the center of the 5/16" hole to be drilled in the bottom ear. Drill a small hole then open it to 5/16". Grease the 5/16" bolt and install it from the bottom. Check all alignments and freedom of movement.



Photo #33

On final installation, use Loctite on the threads of the bolts on the top and bottom of the idler pulley assembly. Safety wire the bolts to the rod ends.

Note: Be careful not to Loctite the bolts to the inner race of the rod ends. Excess bending stress can occur if the rod end moves outward when the bolts are removed.

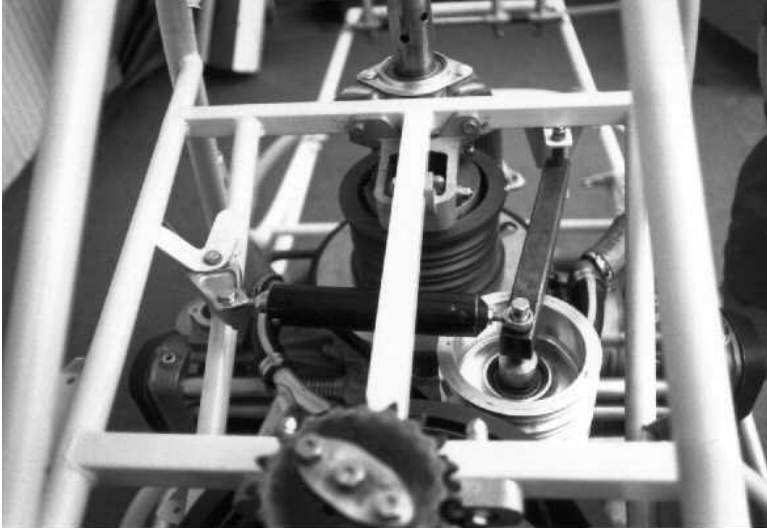


Photo #34

Install the remainder of the clutch assembly.

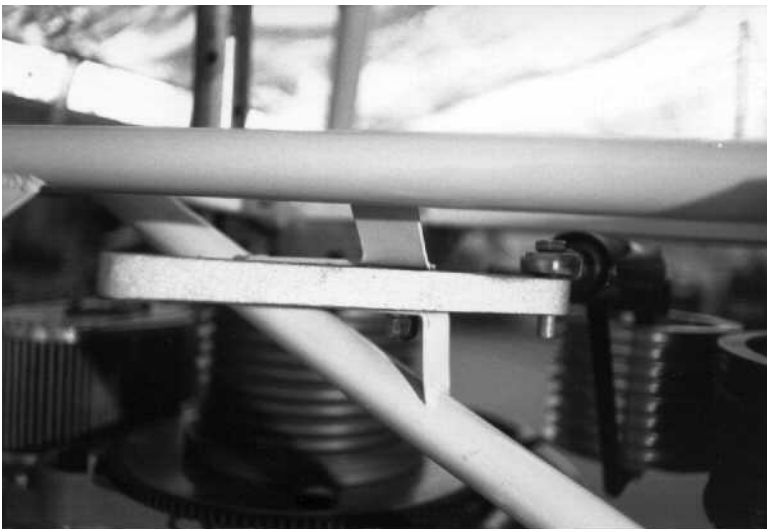


Photo #35

Check the clearance between the bottom of the square tube and the spring tube.

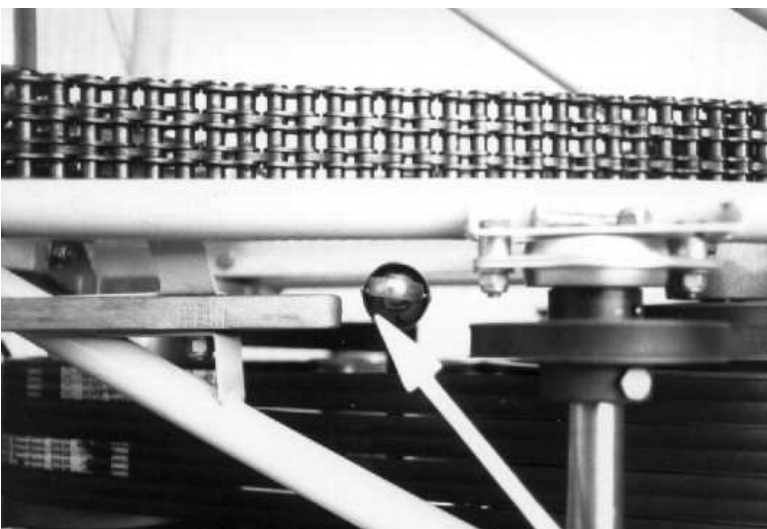


Photo #36

To achieve the correct main drive belt tension, disconnect the rod end from the clutch arm casting.

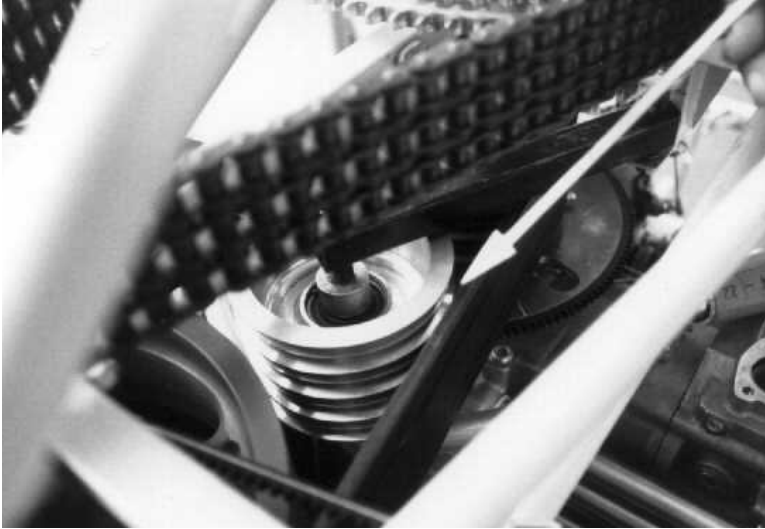


Photo #37

Make sure the idler pulley is not touching the drive belt.



Photo #38

Using a spring scale, pull seven pounds on one main drive belt. The belt should move 1/2". To change the tension of the main drive belts, move the engine. The top and bottom engine mounts are slotted for this reason. Remember, the secondary pulley and the engine flywheel must remain parallel and the same height. When the clutch is disengaged, the idler pulley should just touch the main drive belts on the passenger side. When the clutch is engaged, the piston should move 1".