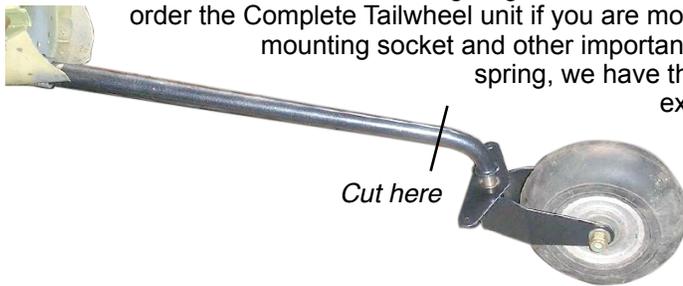


UPGRADING VAN'S BENT SPRING, NON-SWIVELING TAILWHEEL

Some of the earlier RV kits have an obsolete bent tailwheel spring design like the one pictured below. These bent spring models did not 360° full-swivel like newer units do. A full-swiveling tailwheel makes it much easier to push the plane backwards into your hangar, and makes ground handling easier in many situations, such as making a tight turn while parking.

Fortunately, it is possible to modify these bent spring setups to a full-swivel, modern functionality. While you're at it, you will need to replace the tailwheel fork and mount as well. We suggest installing the best full-swiveling tailwheel available, the **Screaming Eagle Complete Tailwheel**. The Screaming Eagle tailwheel will give you twice the obstacle clearance and much better handling than the Van's unit.

You can order the Screaming Eagle Tailwheel exclusively at FlyboyAccessories.com. Make sure to order the Complete Tailwheel unit if you are modifying your tail spring, as you will need the mounting socket and other important pieces that come with it. If you need a new spring, we have those also, but it is often cheaper to modify your existing bent spring.



There can be minor variations among homebuilts, but this procedure should be very close for nearly any Van's RV. In a nutshell, here's the procedure:

Spring Removal:

1. **Prop the tail up** on a sturdy crate or bench. Use some foam under the tail. Chock the wheels firmly.
2. **Remove the inspection covers** near the elevator bellcrank.
3. **Remove the chains** that connect the rudder horn to the tailwheel control arm.
4. **Remove the AN4 bolt and nut** that hold the tailspring to the weldment inside the fuselage. A long extension and 7/16" socket on your ratchet will help reach down through the inspection hole to the AN4 bolt. Another 7/16" socket will be needed to reach up through the nut access hole on the bottom of the fuselage (see photo). Note: Some builders do not drill the 1" nut access hole during construction. You may have to make one. Use a pin punch to pop the bolt out after you have removed the nut.
5. **Remove the spring** by twisting and pulling on the tailwheel. If the spring and weldment have rusted, spray it with some penetrating oil and keep working. Some come right out. Some are not so easy.

Spring modification:

1. **Cut off the bent portion of the spring** (see photo). Throw it away.
2. **Machine the taper.** Go to your favorite machine shop and have them put the spring in a lathe. The spring's taper may give a minor problem, but they can figure that out. Have them turn the last 2" of the spring to 0.635" diameter. Have the new tailwheel mounting socket on hand so they can get an exact fit! This is no time to hurry. Do this part right or you may end up buying a new \$95 spring which will then have to be matched to the existing bolt hole inside your fuselage!
3. Have the machinist blend the forward portion of the 0.635" cut into the rest of the spring by rounding off the front part of the cut. You don't want a square bottomed cut which might concentrate bending stresses and cause the spring to break later.
4. You should now have a nicely fitting spring and tailwheel mounting socket with no sloppiness.

Tailwheel installation:

1. **Reinstall the spring** into the plane. Installing a new nut and bolt is a good idea. Any slop here will simply get worse over time.
2. **Level the plane** across the cockpit longerons.
3. **Put the new tailwheel socket in place and mark for the two AN3-13A bolts** that will retain it. They are installed horizontally. These should be about 1/2" apart. Put one at 1/2" and 1" from the back end of

the spring. Don't over-analyze the measurement; just make sure to hit the spring! Make a punch mark where the holes will be and double check the placement.

4. **Remove the mounting socket and drill two 1/8" holes** through ONE side of the mounting socket (i.e. not the spring). Do NOT drill all the way through. You should now have 2 holes predrilled in the mounting socket. See the drilling notes below!
5. **Reinstall the mounting socket.** Using a torpedo level, make sure the socket is plumb. Use Vise-Grip pliers to clamp the front edge of the socket to the spring. It shouldn't move!
6. **Pause and recheck everything.** You should have two 1/8" pre-drilled holes. You should verify that those holes hit the spring inside the socket. Your socket should be plumb and firmly clamped. Step back about 10' behind the plane and eyeball that the socket is plumb.
7. Now, take a deep breath, and using a SHARP, preferably brand new, drill bit begin drilling the 1/8" hole HORIZONTALLY through the spring. Have your helper watch the drill so you don't vary from horizontal. Some will use a drilling jig here, but it's not necessary if you're careful. After the drill breaks through the other side, put an old 1/8" drill bit in the hole so nothing moves.
8. **Check the plumb** one more time.
9. **Drill the other hole** the same way.
10. You should now have two 1/8" perfectly level holes perfectly placed in a perfectly plumb tailwheel socket.
11. **Now, drill the holes to the proper size for AN3 bolts.** A #13 drill bit is 0.1850" diameter. An AN3 bolt is about 0.1860" diameter. A 3/16" drill bit is 0.1875" diameter. I would go to the local tool supply store and buy a couple #13 bits for this job (or get them from our webstore). 3/16" is simply too big and you'll have a sloppy fit. A sloppy fit will only get worse.
12. Drill one hole completely through and see if the bolt will go through it. Hopefully it will be very snug. Snug is good. If it simply won't go in, then grab your drill and run the #13 bit through again. We want a tight fit here. I usually can't hold the drill completely straight anyway and the undersize hole will actually end up about right.
13. Once you have both holes drilled, put the nuts and washers on, connect the rudder chains, put the tire back on and go fly. You'll immediately notice the better steering. The increased obstacle clearance won't be as noticeable...but you'll notice that your tailwheel isn't snagging on ruts, bumps, tiedowns, and potholes any longer!

Drilling Notes:

The key to successfully drilling tough spring or 4130 steel is to use a SHARP slow turning bit, a little cutting oil won't hurt, keep pressure on the drill, and keep it cutting! A bit that spins without cutting will almost immediately harden the steel and then you've got a problem. If this happens, IMMEDIATELY either sharpen the bit (a Drill Doctor is recommended, if you've got access to one) or use a NEW bit. You must cut through the hardened steel immediately so it doesn't get worse.

Keep these tips in mind and you'll have no problems!

Replacement parts: Replacement parts and service are available from Flyboy Accessories through www.flyboyaccessories.com or contact us via the info below.



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