

WIRE TENSIONING SYSTEM

Drilling a Path for the Wire Anchors

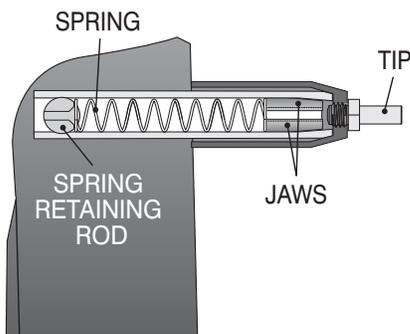
The wire anchor kit comes with two drill bits, one for drilling the wire path and a second for counter-boring the anchor. The counterbore drill bit has a pilot end that keeps it centered and also reams the first inch of the hole to the correct diameter. Use a board (or a chalk line) to mark the drilling angle and location on your frame to ensure the anchors and wire will be aligned.

Wire Tensioning Device

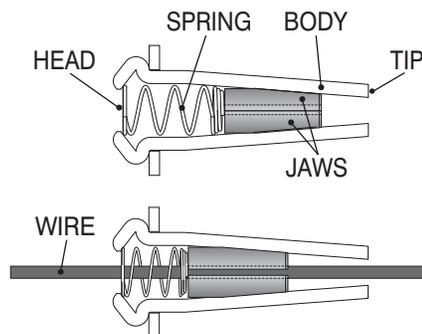
The wire tensioning device functions in the same way as a pop rivet gun. The tip is designed for wires between 0.078" and 0.082" in diameter (U.S. Steel Fence Wire Gauge size 14). Wire smaller or larger cannot be used.

Instructions

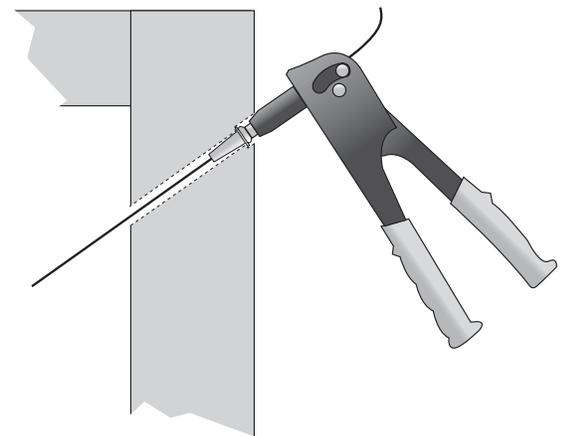
1. Drill holes for the wire path, install the anchors (head side out) and feed the wire into each anchor tip. Make sure the wire end extends out the head of the anchor by at least 1".
2. Slide the wire tensioning device onto the wire until it touches the head of the wire anchor.
3. Squeeze the handles to begin tightening the wire.
4. Once the wire has reached the desired tension (see *Avoiding Over-Tensioning Wire*), spread the handles apart and slide the wire tensioning device off the wire.



Cross-section of wire tensioning device. Tip fits only 14 gauge wire.



Cross-section of wire anchor. Fits 16, 14 and 12.5 gauge wire.



Useful Tips

- ▶ Bends in the wire could make it difficult to insert and tension. Bent wire can usually be straightened by hand or with a pair of pliers.
- ▶ For ease of inserting into anchors, always cut the wire at 90° and remove any large burrs or kinks.
- ▶ Always put your tensioning wire in the center of a framework to avoid causing any bowing of the framework that might result if the wire is off-center.

Examples of Wire Tensioning Applications

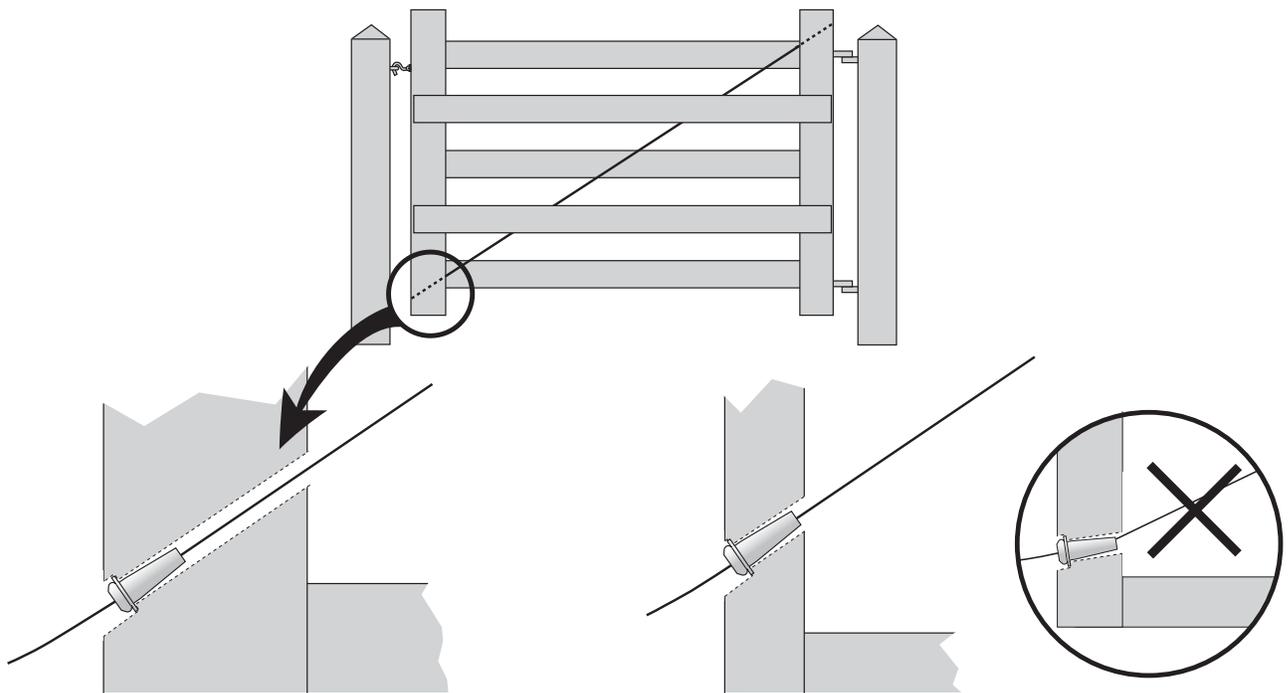
Stabilizing Structures

Wires and anchors can be used for stabilizing structures but tensioning a wire should not be used to correct sag or lean in the first place. Come-alongs, pries, jacks or power machinery should be used to correct sag or lean before wires are tensioned to maintain the correction. Attempting to pull heavy structures straight with the wire can damage the wire tensioning device or cause wire tensions to exceed the recommended force limit of 300 lbs.

If you are stabilizing a shed, first square up the wall to be stabilized before tensioning the wire(s). If you are squaring up a sagging gate, first pry the gate up until it is square, block it in position and then tension the wire(s).

Prevent a Wooden Gate from Sagging

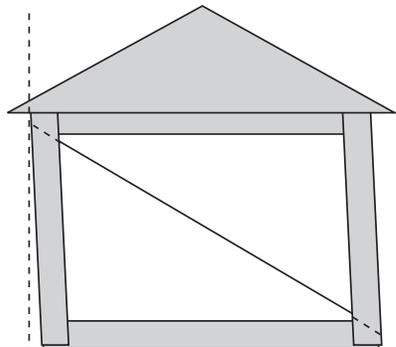
- ▶ In general, you will want to drill a hole close to the top of the upright on the hinge side of the gate and another near the bottom end of the opposite upright. Using a board (or a chalk line) mark the drilling angle and location on frame uprights.
- ▶ Drill both holes and then counterbore both holes just enough for the anchor flange to be firmly seated. Always counter bore if you are drilling on an angle other than 90° to the wood surface.
- ▶ Cut a piece of wire at least 6" longer than the measurement indicates you will need, push it through one anchor so that about 1" is exposed.
- ▶ Next, feed the wire from one hole in the gate frame through the path to the other hole and insert the wire into the other anchor as far as you can, seating the anchor in the drilled hole as you do it. Then tension the wire.



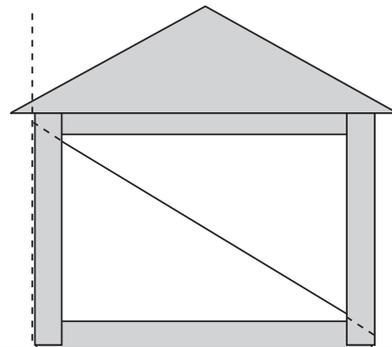
Cross-section of counter bored hole.

NOTE: When working with thin material, it is important to align the anchors carefully or the anchor jaws may not engage fully.

Stabilizing a Small Shed



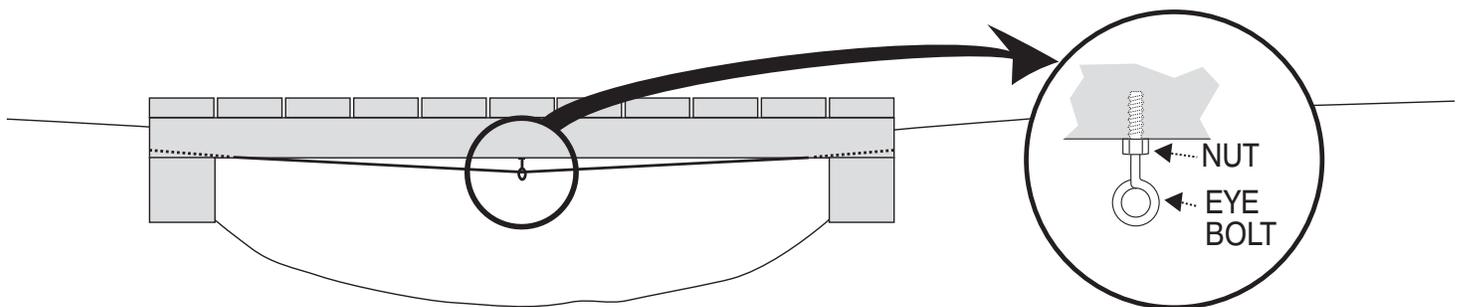
Before correcting the lean.



Wire tensioned after the correction.

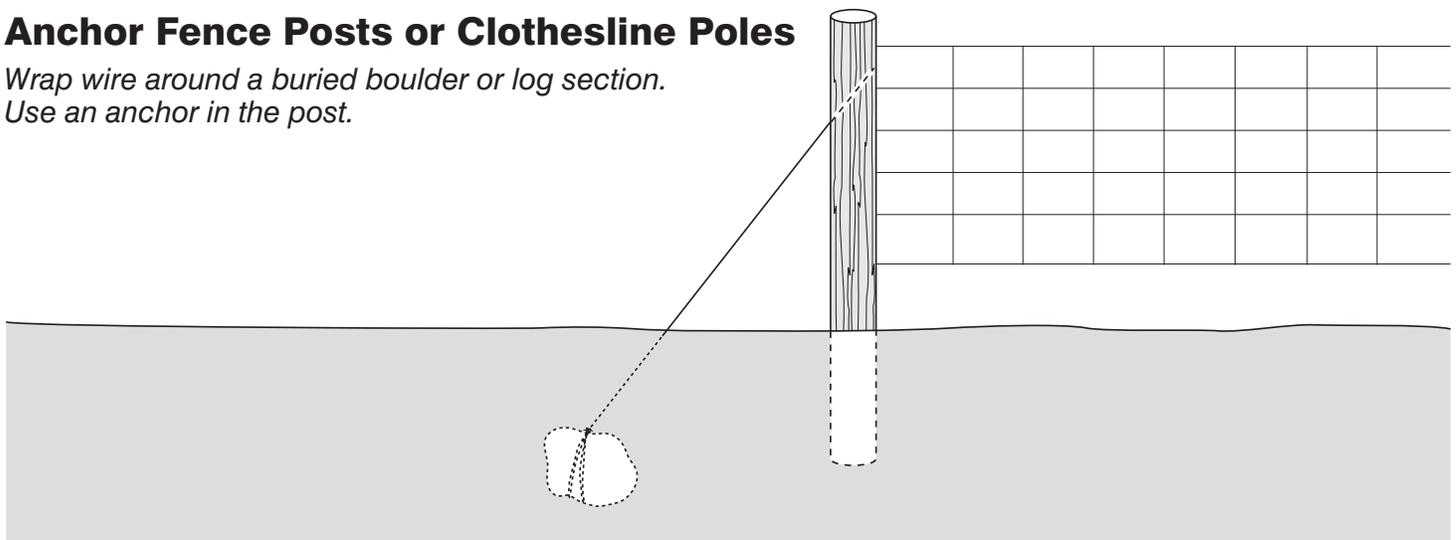
Strengthen a Foot Bridge

A tension wire removes bounce from the bridge while strengthening it and preventing sag. The number of wires and anchors used depends on the bridge length and expected load. For a narrow bridge with a light expected load, a single wire on the center joist may be adequate. Longer and wider foot bridges may need wires in all the joists and it may be convenient to use a 2" x 4", or similar, instead of eye bolts.



Anchor Fence Posts or Clothesline Poles

Wrap wire around a buried boulder or log section.
Use an anchor in the post.



Avoiding Over-Tensioning Wire

This system is normally used with high-tension steel wire (HTSW). The tension measurement methods mentioned below apply only to HTSW which does not deform under tension. You can use the system with softer wire but it will withstand much less tension because it deforms more easily. HTSW will break, not deform, at high tension. It will elongate slightly under tension but will return to its original length when tension is relieved. Not so with soft wire.

When you first anchor the wire and apply tension, measure the tension once the sag is minimal and you start to feel significant resistance as you are tensioning. You want to be below 300 lbs. of force because tensioning is a one-way street; you can always increase it but you cannot reduce it with these anchors.

When you use the system the first time it is a good idea to set up your test equipment so that you can test the tension as you progress. You will quickly get a good sense of what 200 lbs of force feels like compared to 300 lbs. of force and will shortly be able to tension wire by sound and feel alone.

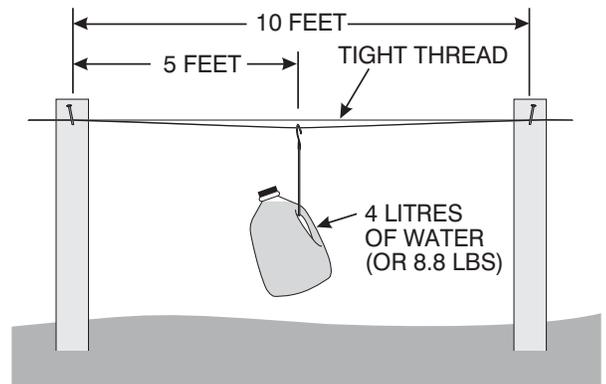
U.S. Steel Fence-Wire Gauge

WIRE GAUGE	WIRE DIA.	LBS/100FT
11.0	0.1205"	3.87
12.0	0.1055"	2.97
12½	0.0985"	2.64
14.0	0.0800"	1.70
16.0	0.0625"	1.04

Tension Measurement Using Weight

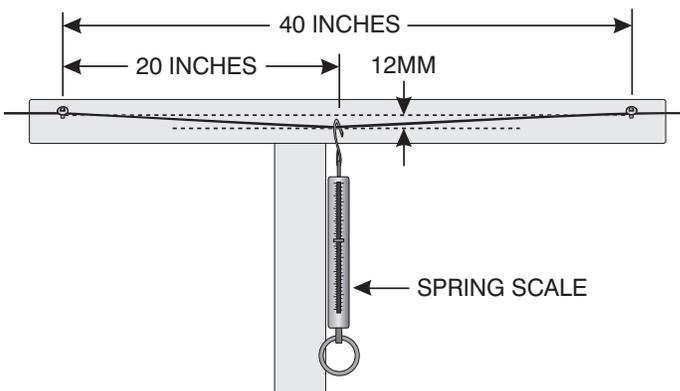
For horizontal fences, the simplest measurement method is to hang a 4 litre jug of water from the mid point of a wire supported at either end as shown. The amount of displacement of the wire from the thread (see adjacent table) will tell you the tension within about 10%. Applies to 12.5 and 14 gauge high-tension steel wire only.

Wire Tension (lbs)	Wire Deflection from Straight 14 & 12.5 Gauge
200	1-3/16"
250	1"
300	7/8"
350	3/4"
400	11/16"
450	5/8"
500	9/16"
550	1/2"



Tension Measurement Using a Spring Scale

For non-horizontal wires, a similar displacement system is used. Using a device as shown, draw a line along the underside of the tensioned wire resting on the two nails. Next, using a spring scale, displace the wire until the bottom of it is touching a line 12mm below the original line (the gauge below can be cut out and attached to the device). The reading on the scale in pounds multiplied by 20 will give you the wire tension. For greatest accuracy, the tensioned wire should remain in a straight line except for the portion between the two nails. This method applies to high-tension steel wire only, not any other types.



Gauge for Spring Scale Tension Measurement

