ONE-PIECE TAIL ON THE BOOM: HOW IT ATTACHES

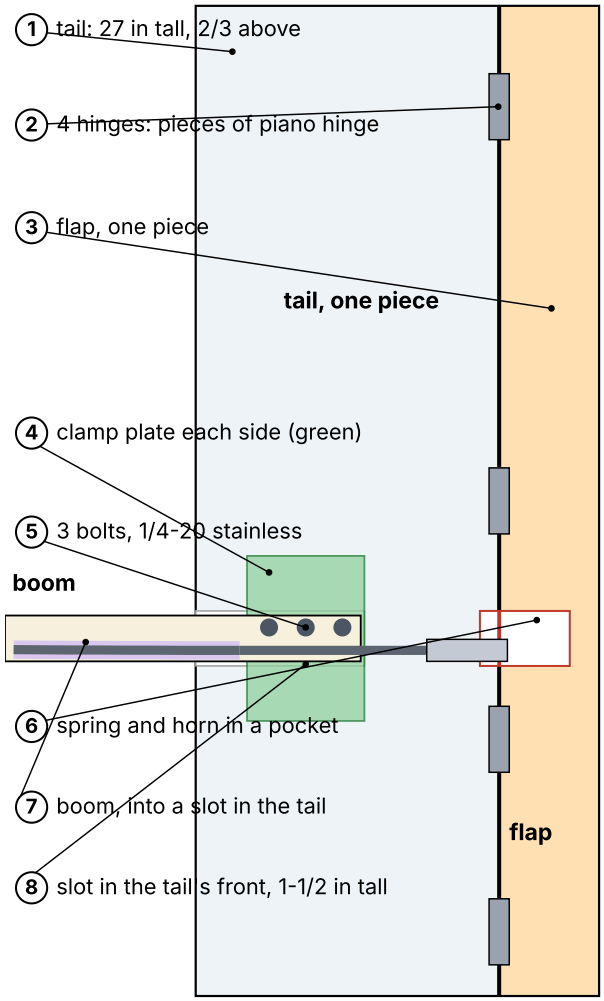
inches

Nov 2, 2026

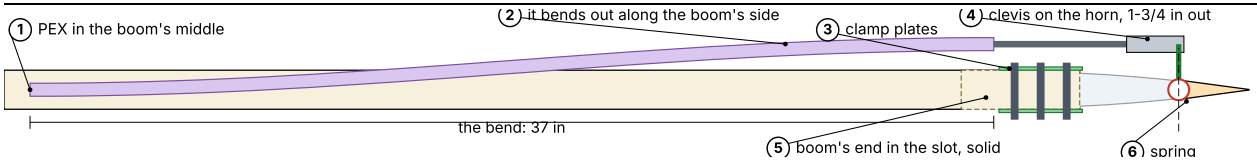
Where this differs from the guides:

1. Tail sits 2/3 above the boom, 1/3 below: 17-1/4 in above center, 9-3/4 in below.
2. A slot in the tail's front, 1-1/2 in tall, 4.6 in deep; the boom's end slides in.
3. Two G10 clamp plates, one each side, and 3 stainless bolts through plates and boom.
4. No breakaway.
5. The give-way spring is at the flap, in a pocket 1-1/2 in tall in its front edge. The flap stays one piece.
6. Horn 2 in, hole 1-3/4 in out. Full travel is about 34 deg; the flap clears 40. No stop pins.
7. The pushrod's PEX comes out the boom's far-face side for its last 24 in, faired in.
8. Four short hinges, not three.

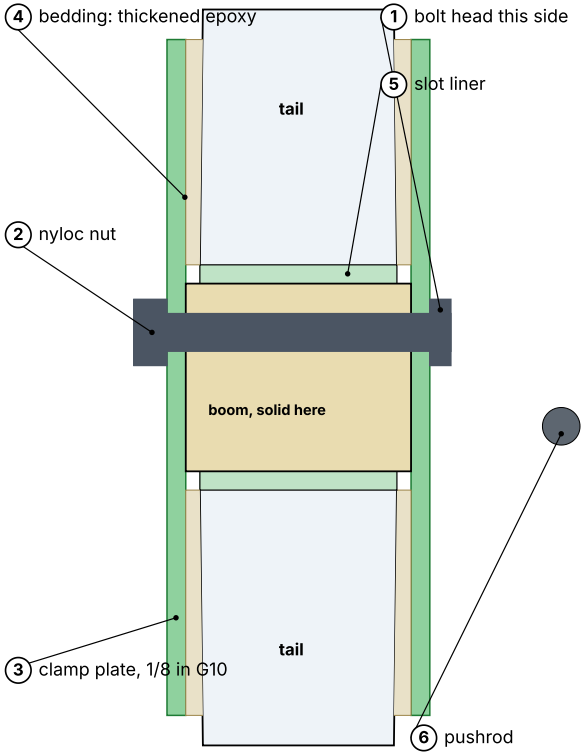
FROM THE SIDE, 1/5 SIZE



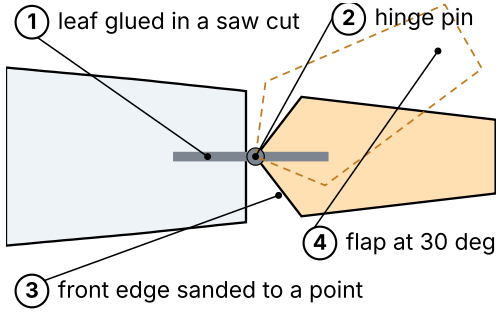
BOOM END AND TAIL FROM BELOW, 1/5 SIZE



THE CLAMP AT A BOLT, FULL SIZE

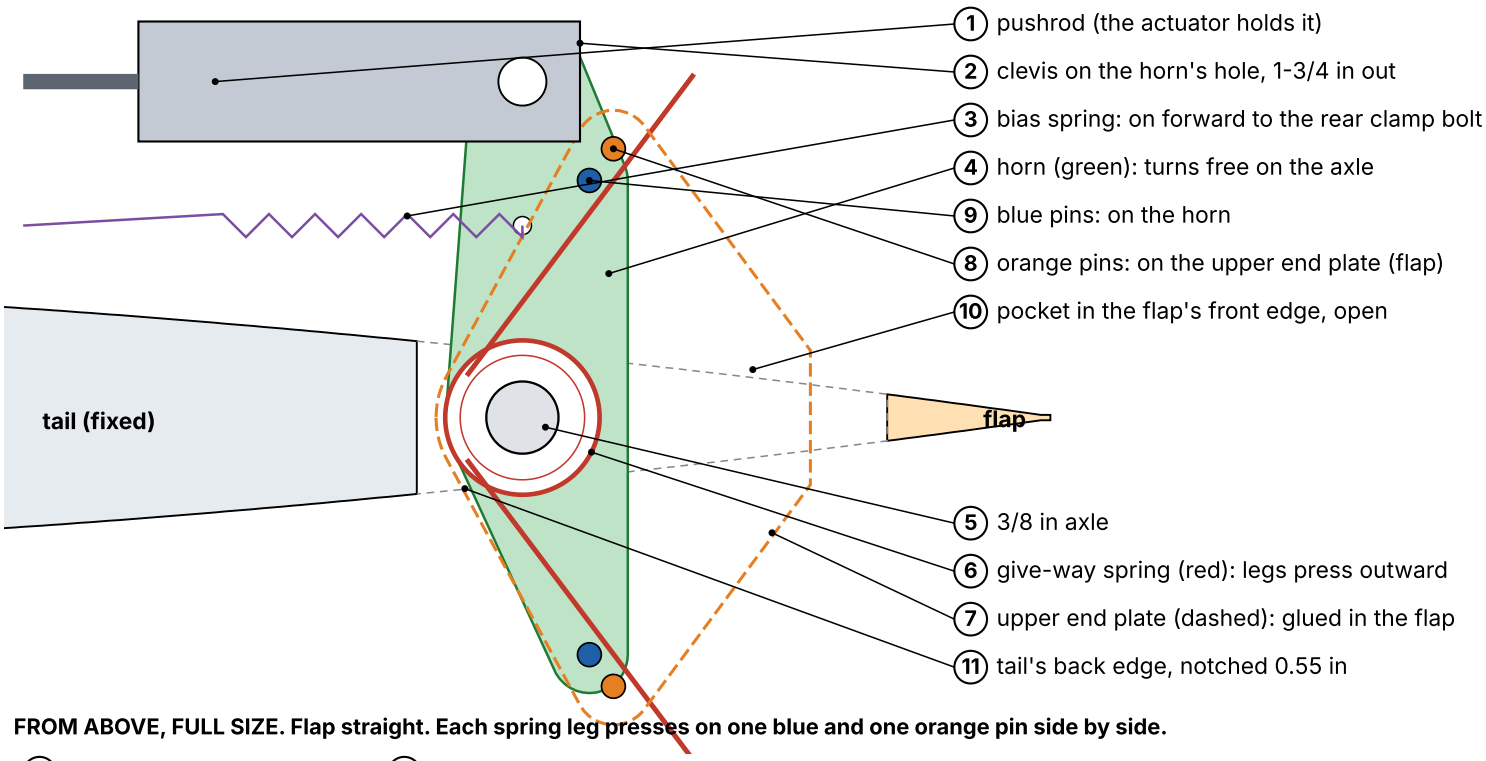


A HINGE CUT THROUGH, FULL SIZE

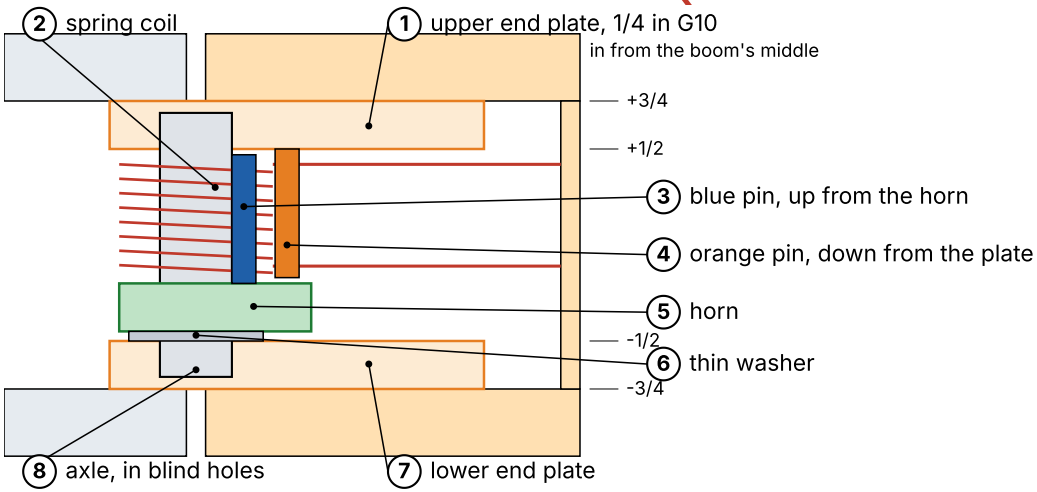


BUILD

1. **Boom:** built on the boom pocket sheet (PEX S-bend out the far side, solid last 4.5 in).
2. **Tail:** 36 slices as Stage 12, one piece. In the two middle slices cut the slot, 1.5 in tall, 4.6 in deep, and a 1/2 in notch at the back edge for the spring.
3. **Flap:** cut the back 2.75 in off, full height. Cut the pocket in its front edge, 1-1/2 in tall, 1.9 in deep, level with the slot. Sand the front edge to a point, 40 deg each side.
4. **Hard spots, before glassing:** at each hinge and under each end plate, dig the foam out 1/2 in deep, 2-1/2 in long. Fill with thickened epoxy.
5. **Glass** tail and flap. Line the slot top and bottom with 1/8 in G10.
6. **Hinges:** four 2 in pieces, two above the pocket, two below. Slots 3/8 in deep in the hard spots. Sand the leaves (80 grit), acetone, glue in with thickened epoxy. **Line all four up** on a straight rod while it cures.
7. **Flap spring and horn:** build it (spring pages). Glue its end plates into the pocket.
8. **Clamp plates:** release tape on the boom; slide the tail on. Bed a 1/8 in G10 plate, 3.2 × 4.5 in, each side over the slot, in thickened epoxy, with a fillet round its edges.
9. **Bolts:** three 1/4 in holes through plates and boom, 0.3 in above the boom's middle. 2-1/2 in bolts, Belleville under each nyloc, blue thread locker, about 60 in-lb (a guess), paint marks.
10. **Paint** the G10 plates and horn: G10 weathers in sun.
11. **Bias spring** (stops rattle): about 1/2 lb, 2 to 2-1/2 in long. From the horn's 3/32 in hole forward to a drilled 1/4 in fender washer under the **rear** clamp bolt's head.
12. **Pushrod:** clevis on the horn's 1-3/4 in hole; bare 1/4-28 jam nut. Grease the rod going into the PEX. Rubber boot over the PEX end.
13. **Lightning:** boom wire's lug under the rear clamp bolt's head, under the washer. No wire on the pushrod.
14. **Tef-Gel** on every stainless thread and pin.
15. **Soft limits:** 0.875 in of rod each way (flap 30 deg).



FROM ABOVE, FULL SIZE. Flap straight. Each spring leg presses on one blue and one orange pin side by side.



HOW IT WORKS

- The two end plates are glued in the pocket's top and bottom, so they turn with the flap. The horn turns free on the axle between them.
- Each spring leg presses on one blue pin (horn) and one orange pin (flap) side by side, so the horn and flap turn as one.
- A gust stronger than the spring's setting pushes an orange pin, and its leg, off the blue pin: the flap swings toward straight while the actuator holds the horn. The spring brings it back.
- Templates and steps: the next two pages.

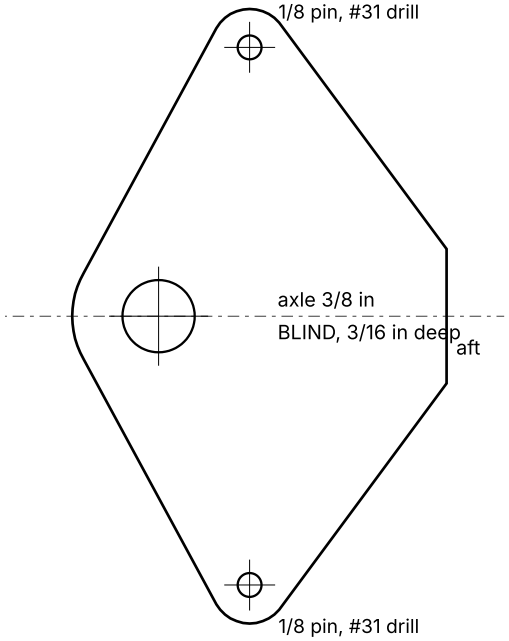
FLAP SPRING AND HORN: THE THREE G10 PARTS, FULL SIZE inches

print at 100 percent

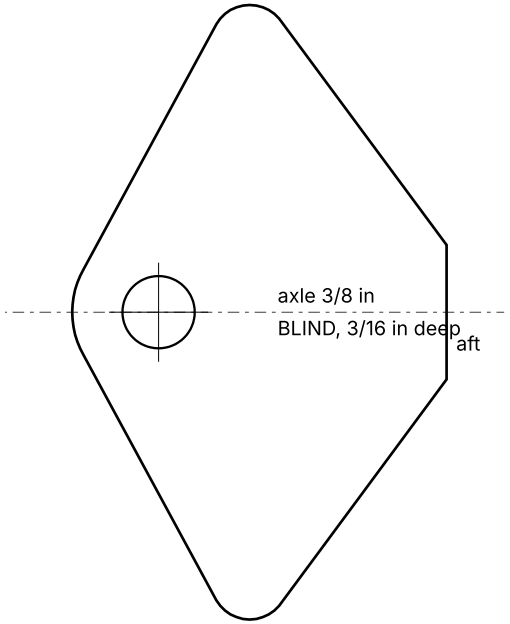
All three from 1/4 in G10. Crosses mark hole centers. The dash-dot line points aft, along the flap. Steps on the next page.

1 in

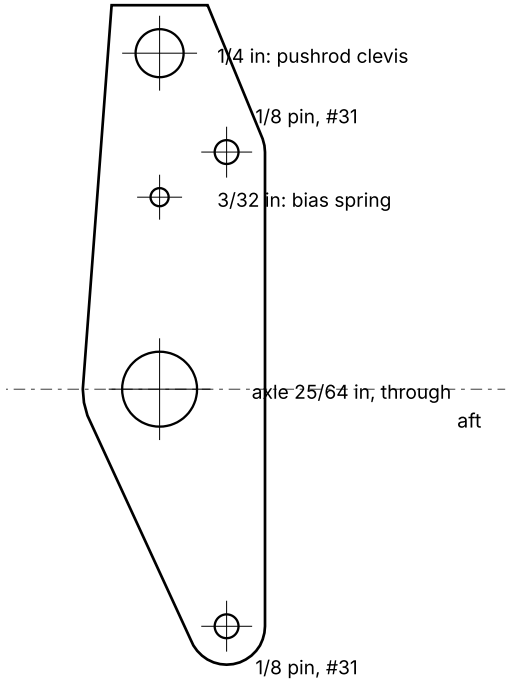
UPPER END PLATE

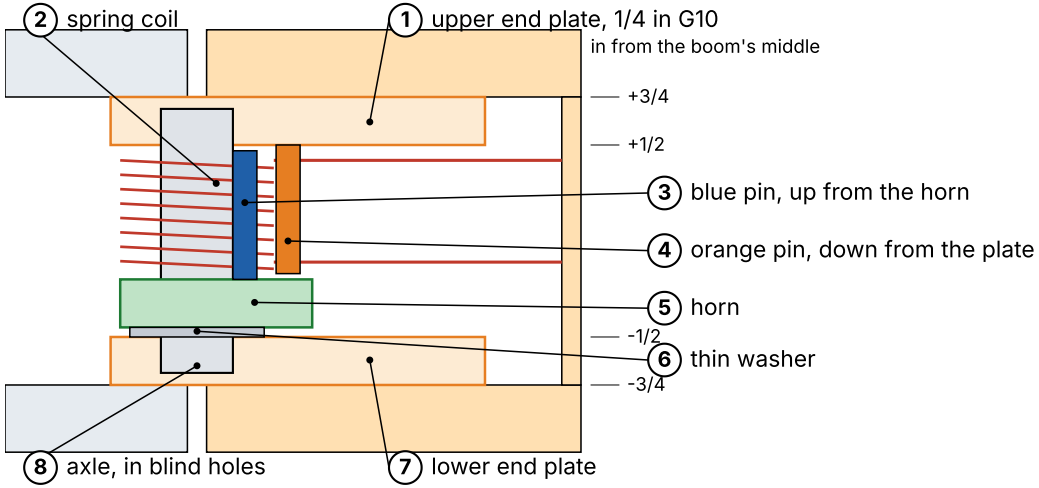


LOWER END PLATE (no pin holes)



HORN





1. **Print** page 1 at 100 percent. Check the 1 in bar.
2. **Cut:** stick the 3 templates on 1/4 in G10. Cut and sand to the line.
3. **Drill** every cross, at the size printed beside it. End plates' 3/8 in hole: **stop at 3/16 in deep.**
4. **Pins:** tap them in, no glue.
   Orange (upper plate): 11/16 in out. Blue (horn): 5/8 in out.
5. **Axle:** cut 1-3/8 in. Round the ends.
6. **Stack,** bottom up: lower plate, axle, washer, horn, spring.
7. **Spring:** squeeze its legs onto the outside of the blue pins. Clamp.
   Coil gets looser? Flip the spring.
8. **Close:** drop the upper plate on, orange pins outside the legs. Unclamp.
9. **Check:** twist the horn hard. It slips, then springs back.
10. **Glue** only the plates' outer faces into the flap pocket.
    No epoxy on the horn, spring or axle.

Parts: 1/4 in G10 (on hand) · spring 9287K47 · 3/8 in 316 rod B076CMP5J5 · four 1/8 × 1 in 316 dowels B00R1UV7QS · thin 3/8 in 316 washer
Drills: #31, 3/32, 1/4, 25/64, 3/8 in

NUMBERS (WORKED OUT)

- **Tail 2/3 up:** about 1.6 times the root bending of a centered tail, 3.3 times less than on top.
- **Loads:** storm gust about 15 lb on the tail; knockdown about 113 lb (a guess); the boom root gives at about 285 lb (inferred).
- **Clamp bolts, worst case:** about 924 lb each, against about 2,385 lb for a 1/4-20 316 bolt.
- **Pushrod pull:** about 2.3 lb at the spring's setting, 3.2 lb at full give.
- **Actuator play** (0.047 in): about 0.8 deg each way at the flap; the bias spring takes it up.
- **Pushrod bend:** about 21 thousand psi, under 316's 35. It passes 0.75 in outside the clamp plate.
- **Give-way spring:** 4.0 in-lb at rest (41 percent of its rating), 58 percent at full give, only while giving. Kept (Mike, Nov 2).

PARTS

- 316 piano hinge: Amazon B09J23T1VM.
- Three 1/4-20 × 2-1/2 in 316 bolts, washers, 1/4 in Bellevilles, nylocs (McMaster box).
- Axle, 3/8 in 316 rod: Amazon B076CMP5J5.
- Spring McMaster 9287K47. Look it over at each haul-out.
- Four 1/8 × 1 in 316 dowels: Amazon B00R1UV7QS.
- Bias spring, 316, about 1/2 lb (McMaster box); 1/4 in 316 fender washer; thin 3/8 in 316 washer.
- 1/4-28 316 jam nut (McMaster box). Small rubber boot (to pick).
- G10: 1/4 in (end plates, horn) and 1/8 in (clamp plates, slot liners).