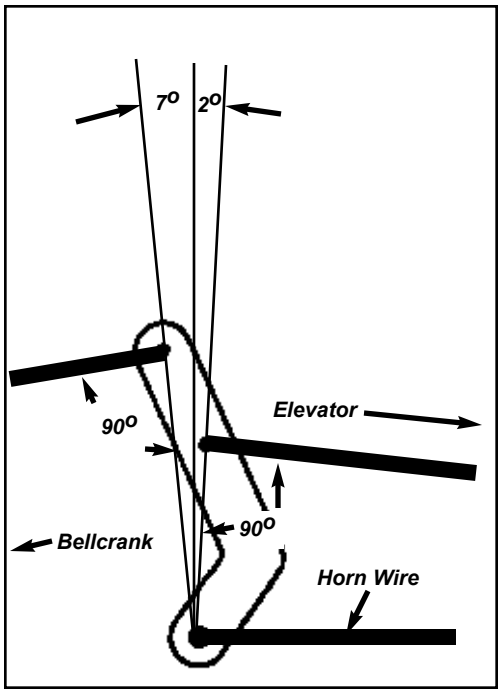
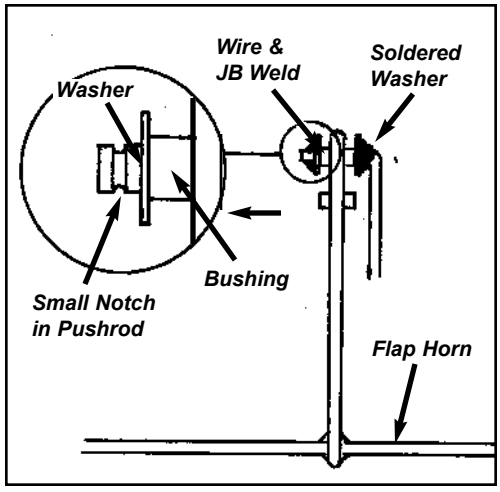
“True 90” Bushed Flap Horn

1. Thank you for purchasing the “True 90”, Trailing Edge Saving Flap Horn. When properly installed, this horn will deflect the flaps the same number of degrees in each direction and at the same speed. The object is to start out with the flaps in neutral and both pushrods at 90 degrees relative to the pivot point. In other words, each bushing is located in the middle of its arc. The bellcrank pushrod bushing is seven degrees forward and the elevator pushrod bushing is two degrees to the rear of verticle. Of course the geometry is a little different for each airplane, but this configuration was derived at by looking at 20 plans and taking the average. With slight adjustments it will eliminate all or most of the bias in most planes. For the vast majority of planes it’s much better than having the bushings directly on top of each other.



2. Another nice feature of this horn is that it is bent away from the trailing edge at 35 degrees thus eliminating the need to cut a deep notch in the trailing edge of the wing to clear the verticle when the flap is full up. Only a small notch is necessary thus saving the strength of the trailing edge.

3. The horn wire is music wire. The horn verticle piece is 4130 aircraft steel, .063” (1/16”) thick. The horns are brazed using an oxygen acetylene torch bringing the metal to 2000 degrees, cherry red. A 1/16” flux coated bronze brazing rod is flowed into the joint. Twenty-five seconds after the red goes out, the joint is oil quenched. This slightly softens the music wire keeping it strong, but making it tweekable.



4. Bend the horn wire using one of the commercial 3/32” music wire benders such as Harry Higley’s or for 1/8” horns the K&S bender works great. Don’t bend the horn wire in a vise or with ordinary pliers. Also remember there is a front and a back to this horn. Bend the horn wire towards the elevator! The lower hole should be just barely behind verticle.

5. To permanently connect the pushrods to the horn, solder a washer perpendicular to the pushrod at the bend. Cut the pushrod to length leaving about 1/8” beyond the bushing. With a Dremel cut off disk, cut a shallow notch in the end of the pushrod. Put the pushrod through the bushing, add a #3 washer, wrap a few rounds of fine copper wire into the groove and against the washer. Add a little JB Weld to the wire and against the washer. Make sure you don’t get any behind the washer. Instead of the copper wire you could use a 3/32” wheel collar.

6. When the JB Weld dries, lubricate the bushings with a good, modern silicone based lubricant. You should now have a smooth control system with no play in it and you will never have to worry about it coming apart.

7s. If you have any questions or suggestions or need help in any way, give me a call (256) 820-6970 or email me at tom_morris@prodigy.net