

diaphragm is a bit rougher to cut out, but is actually a bit easier to work with once cut out. Use a 1/8" four-ply strip for support in the mini-Heil.

The Magnet Structure

With most speakers, reducing the magnet size not only reduces efficiency, but also impairs transient response, destroys speaker clarity, increases intermodulation distortion, and brings on a host of other evils which trouble cheap speakers. The Heil is such a good design that reducing the magnet size merely reduces efficiency. The sound quality remains excellent, even with a rather poor magnet structure. But a powerful magnet is as easy or difficult to build as a weak one, and efficiency is always desirable.

Large magnets can be built from smaller magnets by cementing them together in a series and/or parallel configuration. These small magnets are 7/8" x 1-7/8" x 3/8" ceramic types, often available very cheaply as overstock items from large suppliers such as Permag or Magnet Sales in Los Angeles; or they may be bought from Edmund Scientific as part #41799, at \$6.50 per package of 12 (allow 50¢ handling).

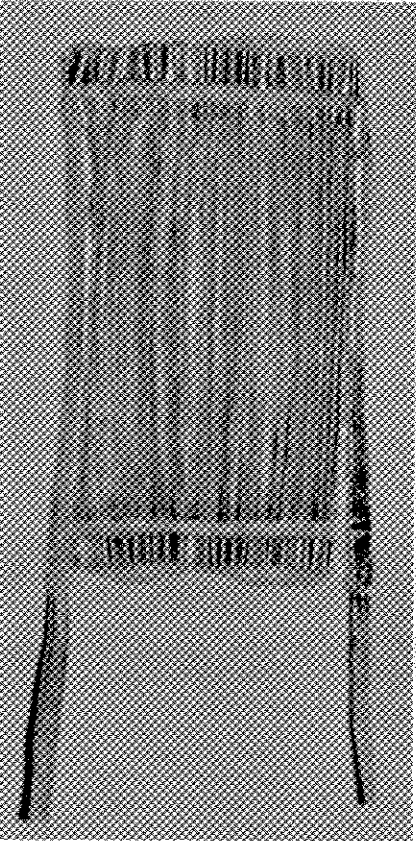


Fig.8: The diaphragm in Fig.7 folded for mounting in the magnet gap.

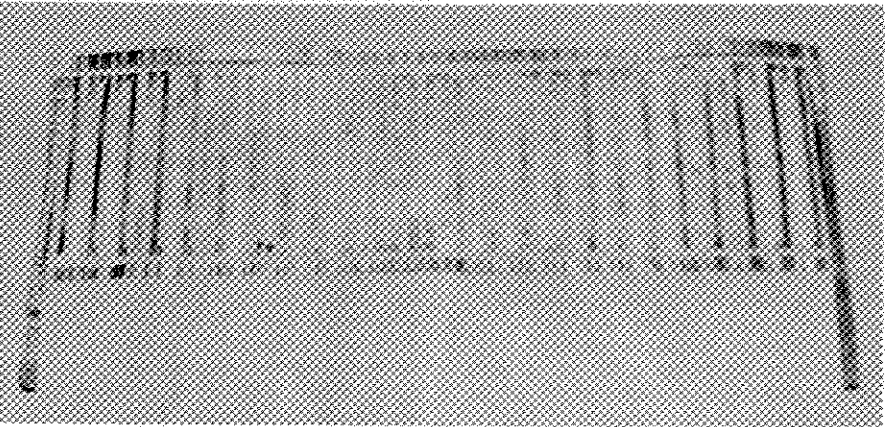


Fig.7: The diaphragms are light-weight aluminum foil sandwiched between two layers of the thinnest polyester "drop cloth" coated with rubber cement.

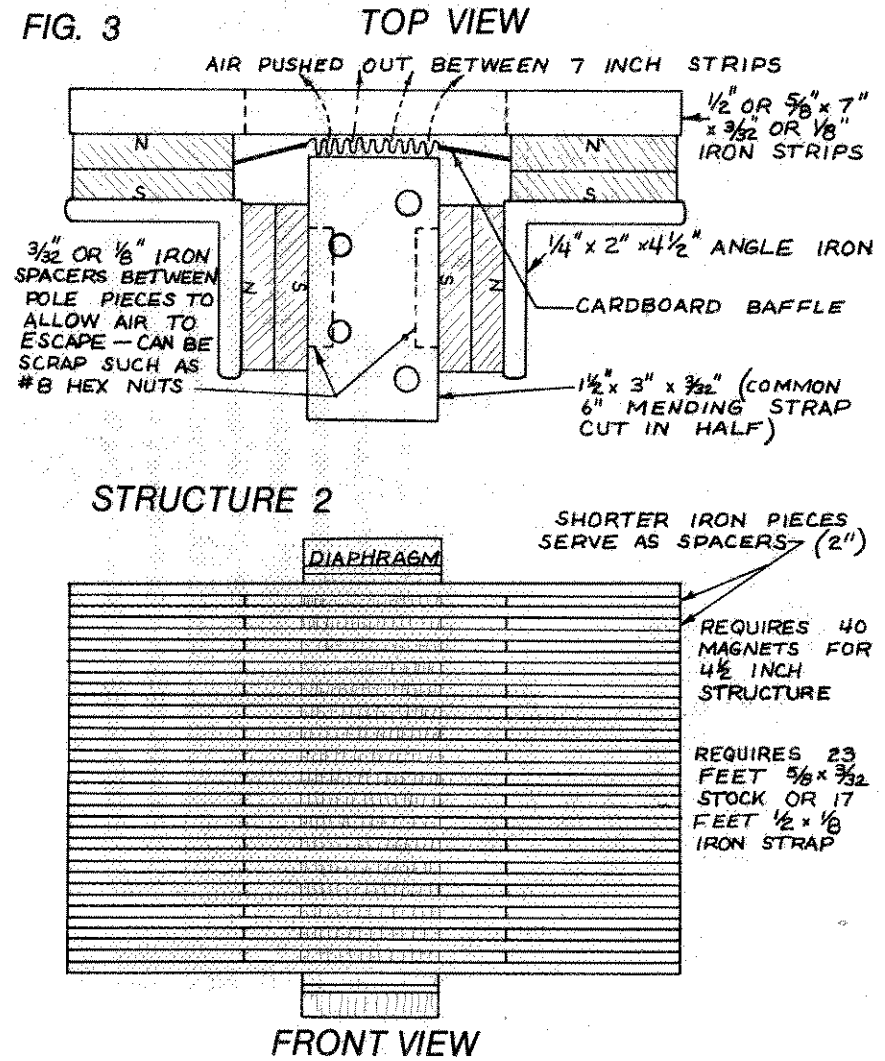


Fig.3: Simpler magnet structure for use with largest diaphragm. The number of iron pieces to construct the front grid depends on thickness of stock used. Aggregate height should be 4-3/4". The mending strap tail pieces should match the 7" front iron pieces.

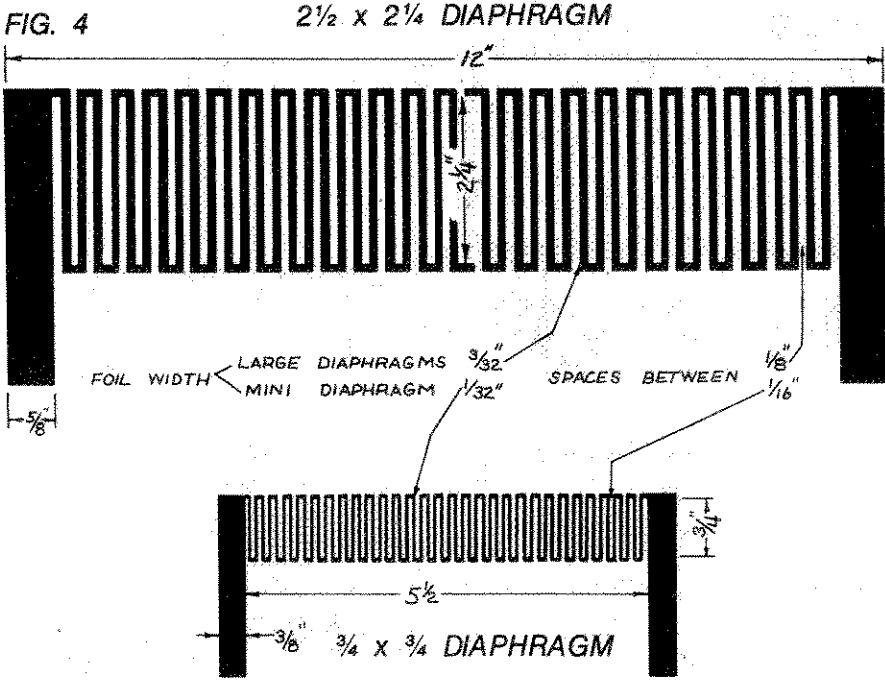


Fig.4: Dimension patterns for the two smaller diaphragms. NOT TO SCALE. Do your layout on 1/8" graph paper.

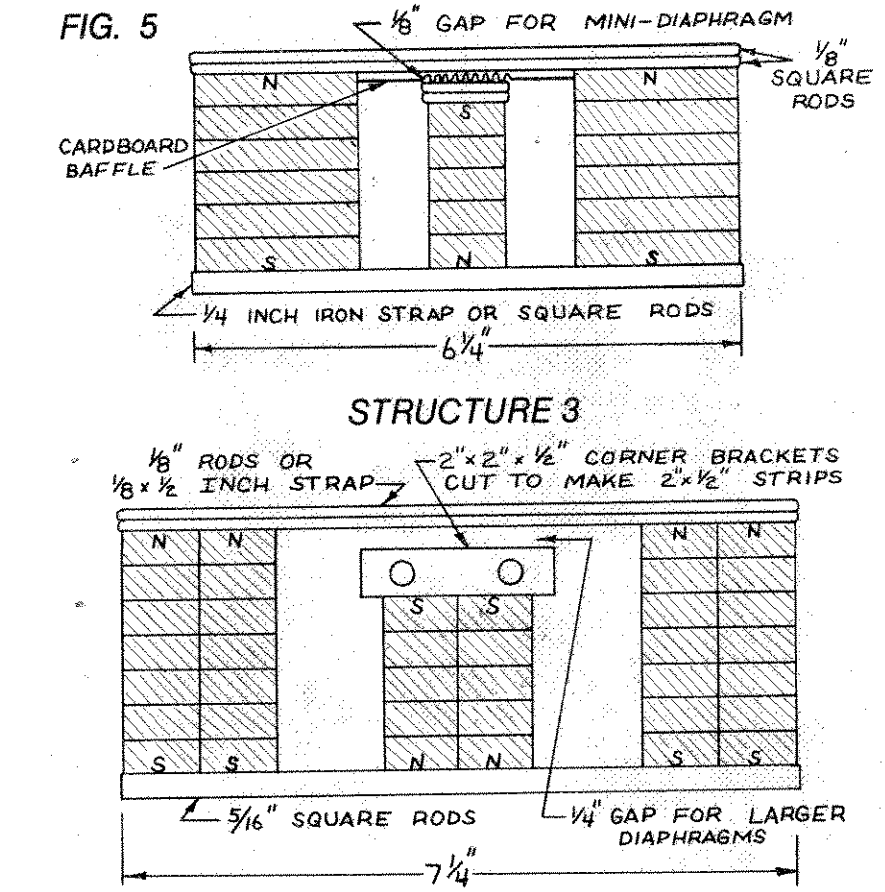


Fig.5: Magnet structure #3 will serve for either the small or the medium diaphragm. See also Figs. 10 and 11.

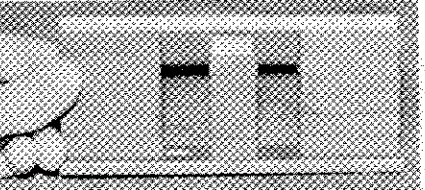


Fig.9: Magnet structure #3, top drawing in Fig.5.

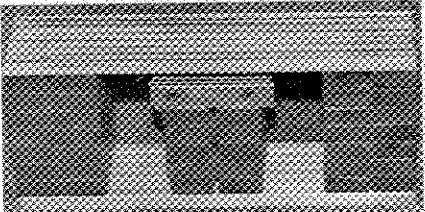


Fig.10: Close-up of magnet structure #3, bottom of Fig.5, before the diaphragm is mounted.

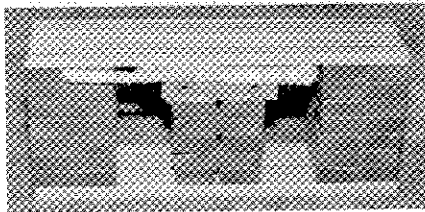


Fig.11: Magnet structure #3b with the mid-size diaphragm in sideways position, turned 90°.

Any of the magnet structures shown in Figs. 3 through 5 will yield a respectable magnetic field. The iron pole pieces will be the most difficult part to contend with; some structures require some power equipment to cut out, while some need the help of an iron shop.

Structure #1 is basically the one ESS use in the AMT-1 speaker, and results in a very powerful magnetic field. It is difficult to build without a table saw, and will take a good bit of time to cut out. The flat and angle stock must be bought from an iron shop or supplier. Structure #2 is also powerful, and can be done very quickly if an iron shop is nearby. Have them cut off the 1/4" angle iron and the 1/8" x 1 1/2" x 3" pieces and the 7" x 1/4" x 1/8" strips. Total cost should be fairly low. Glue the magnets to the angle iron with five-second glue (Crazy Glue or Permabond or Loc-tite, &c.) and cement the magnets to each other to build up to proper size.

Always be sure to observe proper polarity of the magnets. They will attract each other when stacked in "series," but will repel when laid next to each other in "parallel." The five-second glue helps a lot. Glue on the 1 1/2" x 3" pole pieces with five-minute epoxy (Devcon is the best and easiest to use).