

Build a FANTASTIC CONELESS LOUDSPEAKER! Here are the complete plans that you asked for after reading about this amazing speaker in our December issue

HERE THEY ARE—complete instructions by William Ashworth for building one of his coneless loudspeakers (page 36, Dec. '65 PM), as requested by many readers. Once you have the know-how, this speaker is surprisingly easy to put together.

Some of the parts needed to build a coneless speaker may be difficult to obtain, and, for this reason, Ashworth will supply kits of parts for these speakers for \$3.95 each (see parts list on page 170 for address).

The kit will contain a C-frame (the mounting bracket) complete with the 2-inch disc spot-welded to it. It also includes the coil, which consists of 4000 turns of No. 37 enameled wire, such as Formvar. Then there are the 37 half-inch silicone steel E-laminations, the brass, gap-spacing spring and the adjusting screw with two locking nuts.

Epoxy cement and solder are also needed to assemble a speaker, but these are not provided with the kit.

Important note: In the original story we stated that this speaker would cost only 38 cents to make. This price was a manufacturer's cost when turning out several thousand units using automated ma-

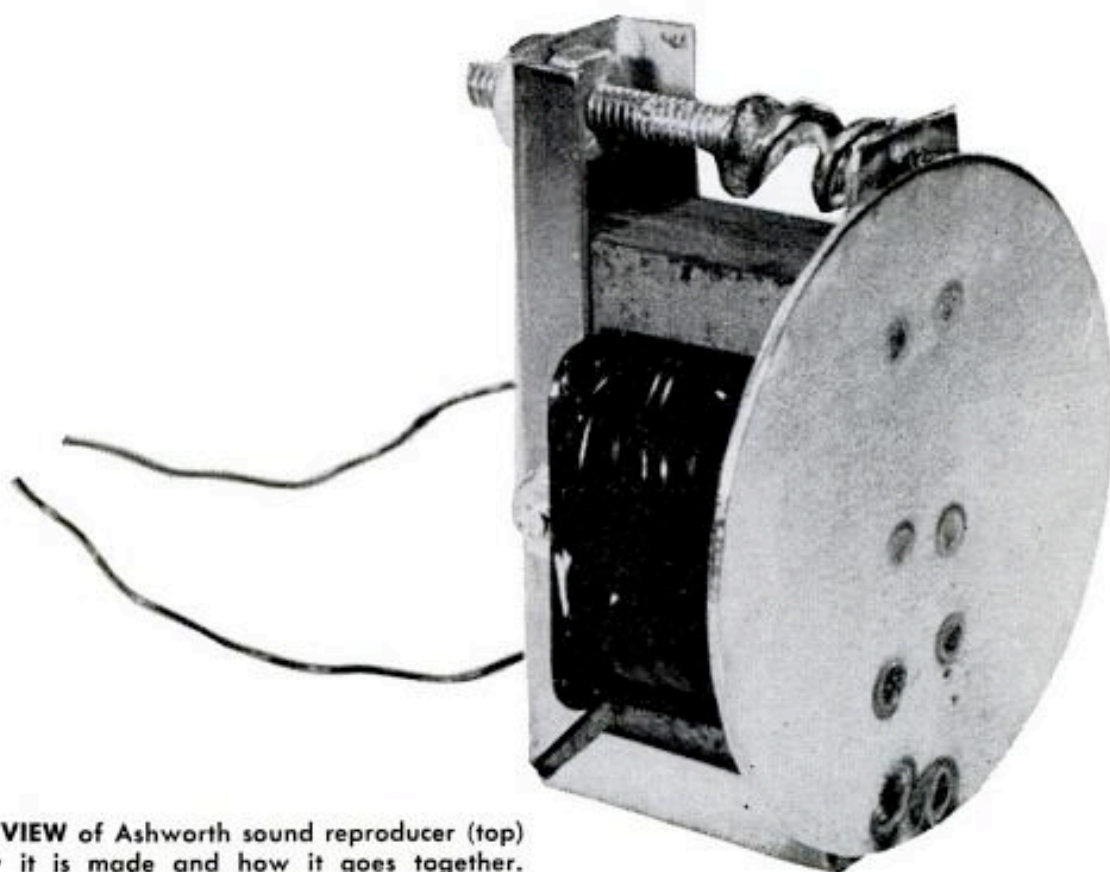
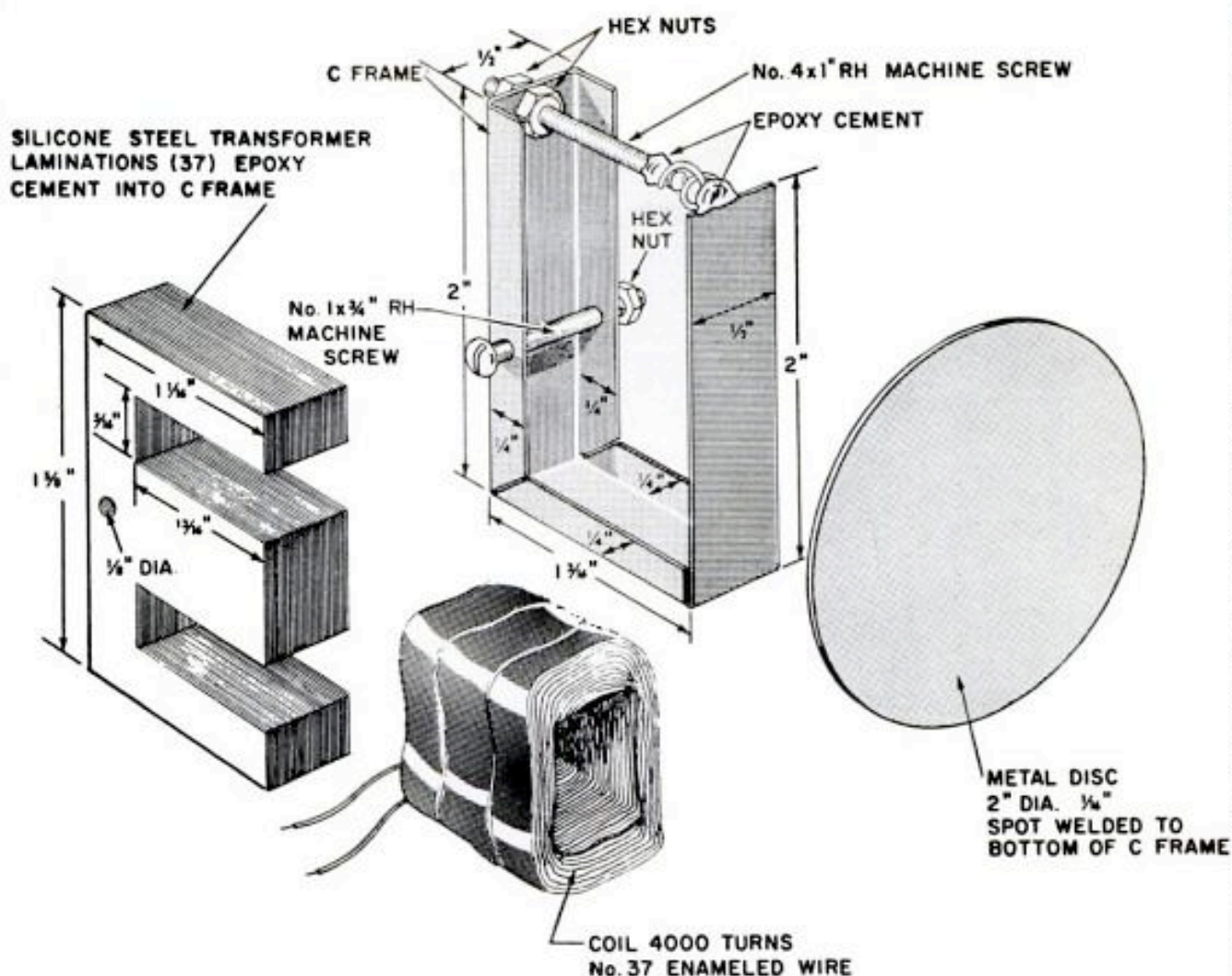
chinery. Obviously, in smaller quantities the materials cost more.

Once you have the parts you need, assembly begins. Start by bending the C-frame into its final shape but do not bend the side of the frame with the disc until later. Then with epoxy cement, fasten the laminations into place. You can insert a small screw through the holes in the frame and laminations to hold them firmly in place while the cement sets. When the epoxy is dry, slide the coil onto the center shaft of the laminations. Make sure the coil leads come up from the top.

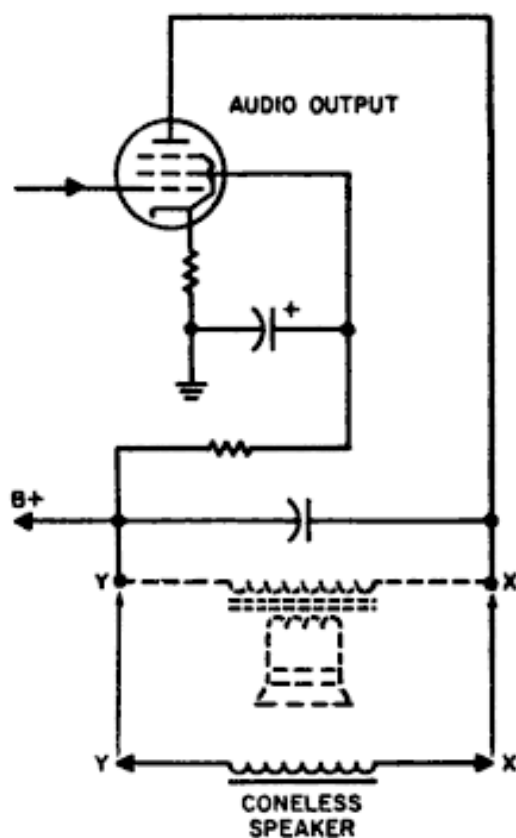
Now you can make the final bend on the frame. Then solder or epoxy-cement the head of the adjusting screw to the brass spring. Solder or epoxy the free end of the spring to the end of the C-frame fastened to the 2-in. disc. Again you'll have to wait for the cement to harden.

The next step is to put the locknuts into place but do not tighten them at this time. The speaker is now assembled. Connect it to an amplifier circuit as shown on page 170. With amplifier on, adjust the gap spacing for maximum volume with no metal-to-metal contact between the flat C-frame arm and the bottom of laminations.

This unit is designed for vacuum-tube



EXPLODED VIEW of Ashworth sound reproducer (top) shows how it is made and how it goes together. Laminations are glued in place with epoxy before the coil is slipped on. The sound reproducer disc is welded to the bottom leg of the "C" frame. The completely assembled speaker unit is shown at bottom right



CONNECT THE CONELESS SPEAKER into an amplifier circuit following this diagram. You'll note that it replaces the primary of an audio output transformer

amplifiers and, as the schematic (above) shows, it is connected in exactly the same way you would hook up the primary of a standard audio output transformer. In other words, the Ashworth unit is connected directly between the B-plus supply line and the plate of the output tube.

How can you best use a coneless speaker? The possibilities are almost endless. Here are a few of them. Please note that in all applications the 2-in. disc is cemented to the surface you wish to use as the sounding board.

In a child's record player, cement the disc to one side of the case. This makes the entire case a sound-producing element. You'll be surprised at the improvement in the sound.

If you cement one of these units to a wood door or the rear of a large plywood panel, the entire door or panel becomes a sound-producing source. You can do the same thing with most hard materials—such as doors, mirrors, windows.

If you connect the speaker to the bottom of a coffee table, the tabletop will become a speaker.

Among early proposals for potential coneless loudspeaker applications was one

from a discotheque operator who said he could use it to turn his dance floor into one giant speaker so that dancers would then feel, as well as hear, the music. Obviously, this will take a much larger unit, but he might just be able to do it.

If a deaf person holds one of these tiny speakers in the palm of his hand, he will feel the vibrations of music and speech. (*Caution note:* Beware the high voltage. Make certain a unit so used is well insulated by wrapping electrical tape around coil, laminations and top of C-frame.) This could become a very helpful aid in teaching such people to dance and talk.

We are sure that many more possible uses for this amazingly adaptable device will come from our readers. If you discover an unusual application, drop a line to our electronics editor and tell him what you've accomplished with the Ashworth sound reproducer.

The unit that has been described here is designed to handle up to five watts of audio signal. For greater power output the entire unit must be scaled up. We have no plans or instructions for this, but here is another area open for some interesting experimentation.

Only limitation is frequency response. The top, about 6000 cycles, isn't hi-fi but it's more than ample for speech, AM radio, intercoms or a child's phonograph.

For a final word of caution: Always be certain that the leads going to the coneless speaker, as well as the speaker itself, are carefully insulated. Remember, the coneless speaker is connected in the B-plus circuit, which can carry up to 200 v. d.c.—a dangerous level of electricity.

PARTS LIST

C-frame—made from piece of 1/16-in. steel as shown in exploded view, page 169

Sound-reproducer disc—2-in. dia. x 1/16-in. sheet steel

Transformer E-laminations—37 pieces silicone steel shaped as shown in exploded view

Coil—4000 turns No. 37 enameled wire

Adjusting screw—No. 4 x 1-in. RH machine screw with 2 hex nuts

Lock nuts—No. 4 (2)

Lamination holding screw—No. 1 x 3/4-in. RH machine screw with hex nut

Compression spring—1/2-in. spiral brass

Epoxy cement

Solder

A complete kit of parts, less epoxy cement and solder is available from William J. Ashworth, Ashworth Research & Development Laboratory, Highway 78 East, New Albany, Miss. The cost is \$3.95.