

Actually everything in this project was scrap from something else. The speakers were left over from student speaker building projects, as was the gasket material, the particle board, glue etc. The cost to build this is about \$30 even if you have to buy everything. About \$10 worth of particle board and the woofers were about \$10 each (MCM electronics or Parts Express).

The outside dimension on my box are 24" x 11.5" x 11.5". I used 3/4" particle board.

Cut List
4 pieces 10" x 10"
2 pieces 10" x 24"
2 pieces 11.5" x 24"

In two of the 10"x10" pieces rout out a 7" hole to hold the speaker. Adjust for your speaker. In one of the 11.5" x24" pieces drill three 2" holes, one in the center of the board, the other two 3" from each end.

Build a box using the remaining pieces, I glued mine together using Liquid Nails Construction adhesive but would probably use regular wood glue now. (I had an open tube of Liquid Nails, the students used on their speaker project). This will leave you an open topped box. Using two 6" wide boards as a spacer pushed up against the outside face, glue one of the 10"x 10" boards with your speaker mounted on it into the box, speaker cone facing toward the outside of the box. (This configuration puts the electrical connections in the same compartment) Remove the spacer boards and repeat on the other end. I connected the speaker in series since they were 4 Ohm speakers, connected so they push in phase. Run the wires out a hole in the side of the box or mount a connector to the box, I used banana plugs.

Screw or glue the 12x24" board with the holes drilled in it to the top sealing the box. I used foam gasket material to seal the box and a touch of caulk where the gasket material butted up together. See the picture. This allows access to the inside in the future. I also caulked all the interior seams but do not really think this is necessary.

To support the glass, I cut two approx 3" x 4" pieces of sheet magnet and glued this to the top just inside the outer holes. I then took two L shaped steel brackets to support the glass. The thin steel makes a knife edge to hold the glass at the node (.227 L from the ends of the glass). I had tried small rubber corks but they were too wide and the glass rocked off them. The magnets allow for easy repositioning of the supports for different length pieces of glass.

↙ I use 3" x 24" single pane glass = Dale

In my first test run, I took a pane out of a broken window from my house and using a glass cutter, cut it into 3" strips about 27.25" long (69.4 cm). 3" made the glass wider than the holes and the 27.25" was how big the glass pane was. I originally designed the box for a 24" length of glass. I tried just using the Pasco 9587C function generator. It did not have quite enough power to break the glass, but the amplitude did get quite large. So I took my adapter cable and fed it into the input of a 100W Radio Shack PA amplifier (garage sale find) and then connected that to the woofers in the box. I only had to go about 1/2 of the way to full volume for the glass to break at about 35Hz. I did it twice and the two broke within .3 Hz of each other and since this glass has some crud on the ends from being in the window I thought this was pretty good.

The air movement through the holes will easily blow out a lit match.

Date: Thu, 02 Mar 2006 09:39:41 -0700
From: Zigmund J. Peacock <peacock@physics.utah.edu>
Reply-To: tap-1@lists.ncsu.edu
To: tap-1@lists.ncsu.edu
Subject: Re: [tap-1] Shattering glass (Zig's method)

Taplers, I did not father the "Glassbreaker"!!!

I first saw it done by a High school teacher from the San Francisco Bay area, I thought it was great.

Then Dave Kardelis from the College of Eastern Utah presented plans for the box at an AAPT section meeting, I just copied and prettied up the concept.

The box is no more than a 12" x 12" x 24" box constructed of 1" particle board [I had a bunch leftover].

I used plexiglas for one side so you can see in. I drilled three 1.5" holes in the top for the air to come out.

The glass rests are 1" x 1" x 1/8th" steel angle which are held in place by 3" magnetic tape, if you building and need magnetic tape let me know I had to buy the minimum which was a lot.

I also have foam sealing tape to put under the clear plastic side to make a good air seal.

My job closes with the HR people the last day of this month, so shortly after that I should have the name of the next person here at Utah. They will accompany me to Syracuse so you shall all get to meet said person.

Zig

Urs Lauterburg wrote:

> Ziggy my dear...

>
> Could you mind to also forward me that material. Some day when all my fine
> wine glasses are gone I might also want to convert to breaking glass the
> Peacock-way. Of course you will get all the credits for the machine (a brass
> plate with your name, title and place of engagement and if you give it to me,
> the birth date).

> Thanks a lot for sharing. Aren't we glad that Zig's "'retirement ship'" is the
> UofU !

> Urs

> Urs Lauterburg
> Physics demonstrator
> Physikalisches Institut
> University of Bern
> Switzerland

> > Vacek, I'm speaking from the "retirement home" ie Lecture Demo @ U of U.
> > They haven't got my replacement on board yet.

> > I'd be happy to send both pictures and a wiring diagram to post at your
> > place.

> > Would that be OK with you?

> > Zig

> > Vacek Miglus wrote:

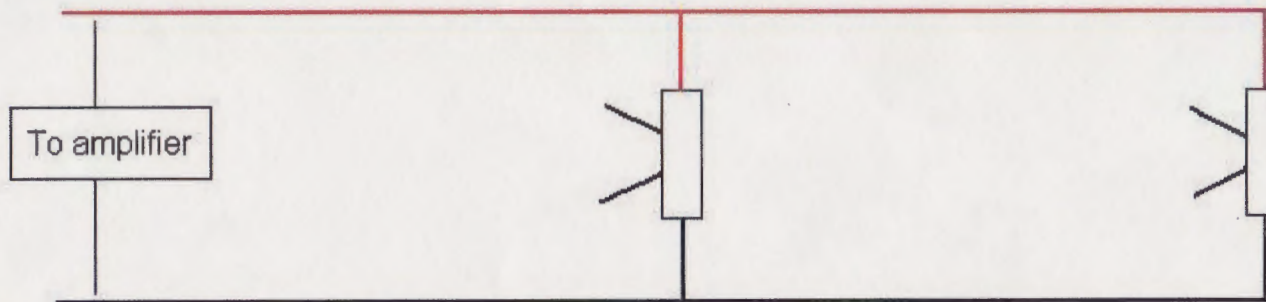
> > > At 11:41 PM 2/28/2006, you wrote:

> > > > Does anyone have a picture of Zig's apparatus for breaking flat glass
> > > > that was used at the summer AAPT meeting? Or even better would be
> > > > instructions (especially how the relative phase of the two speakers were
> > > > wired).

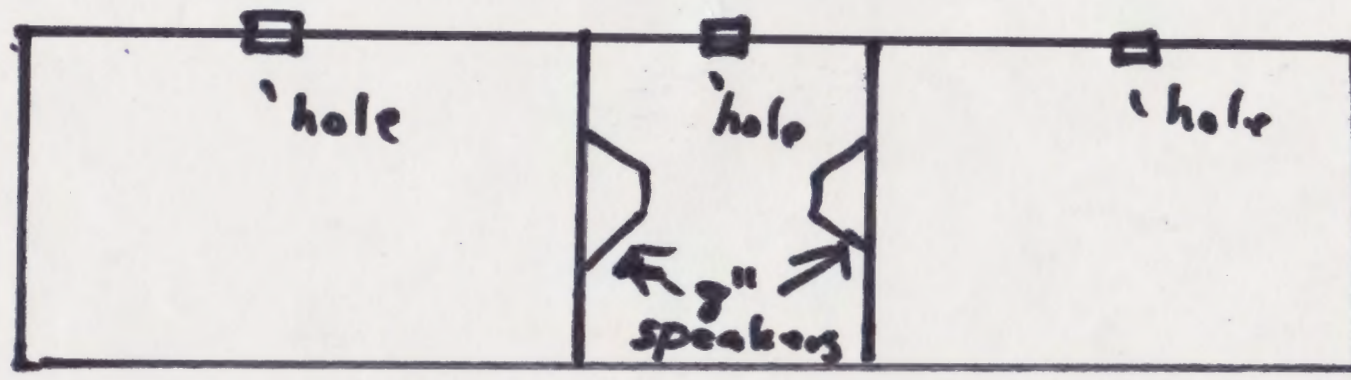
> > > Try:

> > > <http://vacek.smugmug.com/gallery/727186/10/31952647>

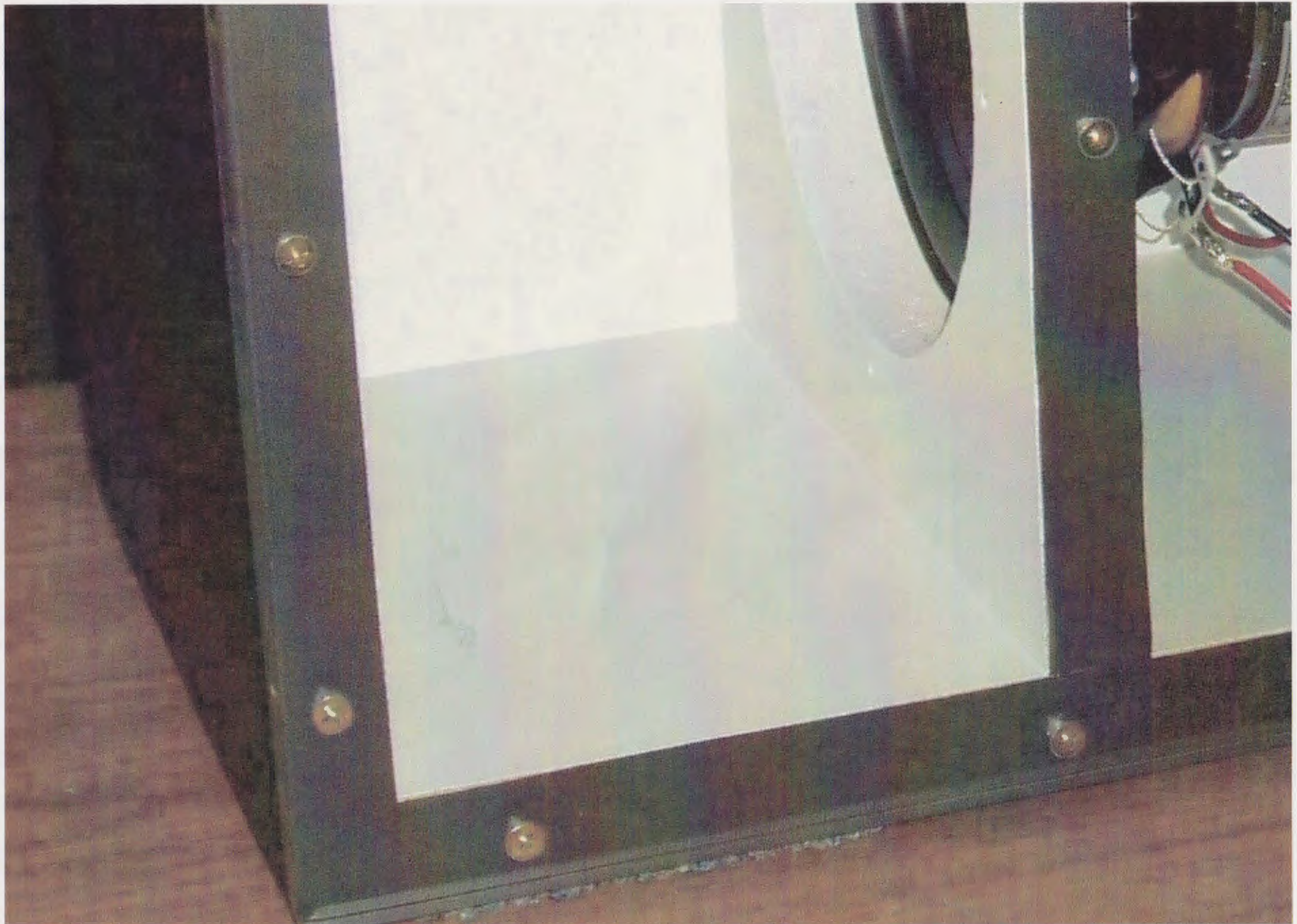
The speakers are wired in parallel, when they face each other in the box they are pushing and pulling against each other.
 BUT. the air can escape to push and pull on the glass.
 The glass is 24 x 3 inches double strength [window glass]. I use a laser to show the displacement, and it is visible when projected with a video camera.



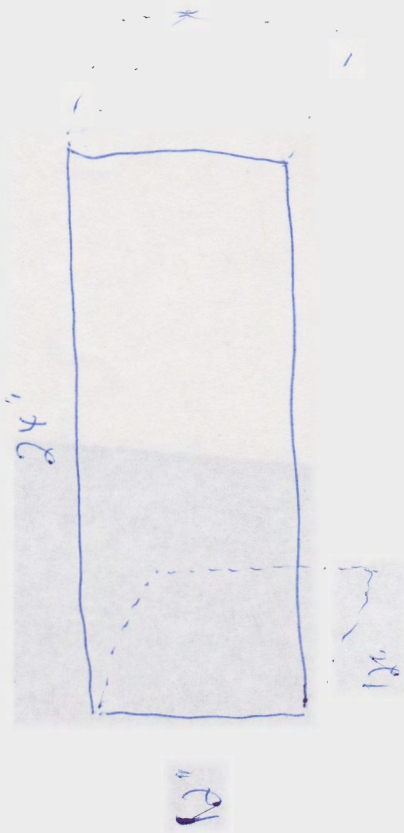
I used two 8" woofers I paid about \$25 per each.



Dale + Zig's setup.







Top/Bottom: 12" x 24"
Divides/Sides: 12" x ~~12"~~ 10 1/2" (4) } (3)
back: 12" x 24"