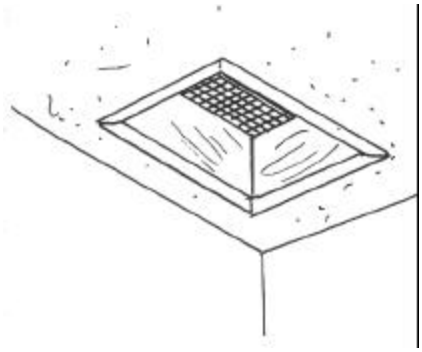
Heat your upstairs by cutting holes in the floor!

by Don Fallick

Many old, two-story houses have upstairs rooms that are impossible to heat in the winter time. In nearly every case, the problem is that the rooms were built with no way for the cold air in the room to get back to the furnace or stove downstairs. Since there's no place for the cold air to go, the warm air downstairs can't get into the upstairs rooms to warm them up. As a result, the downstairs bakes, while the upstairs freezes. If this describes your house, don't despair. There's a cheap and easy way to fix it that may also save you money on your total heating bill. The solution is to cut a hole in the floor of each upstairs room, through the ceiling downstairs, so the cold air has somewhere to go.



Location of your hole is very important. It should not adversely affect convection downstairs. But more important, it should not prove a safety hazard to people upstairs or compromise the structural integrity of the floor. If you place the hole between 2 joists, it is unlikely to weaken the floor. If you can place it under a large item of furniture, such as a bed or dresser, it is unlikely to prove a safety hazard, even without a grating over it. (But you will put a grating over it anyhow, right?) Examine the room with an eye to moving the furniture later. Will a change bring the hole into a new traffic pattern? When you have tentatively decided on a location for your hole, go downstairs and see where it's going to come out. Dust, dirt, and small objects sometimes fall through floor holes, or are pushed through by children. It's not a good idea to put holes directly over dining, cooking, or sitting areas. No one wants to catch dirt in their soup or a marble on their head.

Finding floor joists

To prevent cutting floor joists you must locate them positively. If the floor is wood, you may be able to tell where the joists are by looking at the nails. Tongue and groove flooring is usually laid with the nails hidden, so you can't tell where the joists are by looking. Rugs can be removed, but wall-to-wall carpets and glued-down linoleum make a harder problem. Sometimes you can tap with a hammer on the downstairs ceiling and listen for the "solid" sound that indicates the location of a joist. This does not work well with old-time wooden lath and plaster ceilings. An electronic "stud finder", available in discount stores for about $15, may prove helpful. The surest way I know to locate joists is in the ceiling downstairs, by turning off the electricity and removing a ceiling light fixture. The junction box may have knockouts removed, which will give you a hint about which side of the box is nailed to a joist. Even if it doesn't, you know that ONE of the sides is a joist. By carefully drilling a small hole in the plaster on each side of the box, you should be able to find the joist because the drill bit will penetrate the lath and plaster on the other 2 sides, but on the joist side it will stay in wood the full length of the bit. Use a fairly long bit, since lath and plaster in some old houses can be over an inch thick. Keep your holes within the area that will be covered by the light fixture when you replace it. Sticking masking tape to the plaster before you drill will keep the plaster from breaking out around the hole. Wear eye protection.

Locating the hole

When you know which way the joists run, measure from the joist whose location you know, in multiples of 16 inches, until you get close to the proposed location of your hole. In most houses, floor joists are placed 16 inches apart. But if the upstairs was an addition to an original one-story building, the joists may have been laid 24 inches center to center. Since 16 and 24 are both multiples of 8, they may coincide right next to your hole. Or the joists may be nowhere near where you want them to be. In any case, when you think you know where the joists are, pencil in lines where you think the edges of your hole should be. The hole should be a rectangle about V12 the size of the upstairs room. So an 8 ft. x 12 ft. room should have an 8 in. x 12 in. hole. If the room is much larger than this, it may need more than one hole for proper circulation. The hole must not cross a joist. When the hole is laid out on the ceiling, turn off any electric circuits that might be running through the ceiling, and drill a series of small holes, in a line at right angles to the joists. Start at the center of your pencilled rectangle, then an inch on either side of the center, then two inches, etc. Eventually you will either find a joist or reach one of your pencilled lines. If you find a joist, you can locate your hole precisely, with confidence. If you don't find a joist, your hole will be just fine where you've drawn it.

Cutting the hole

This is easiest to accomplish if you can locate the hole on the floor above. Cutting plaster ceilings from below will get you a face full of plaster dust, maybe an eyeful, too, even with eye protection. If you have a rotary power saw, start cutting through the flooring and subflooring, gradually deepening the cut, until you are just cutting all the way through, to avoid cutting wires that may be below the floor.

You will have to finish the cuts at the corners with a hand saw or a chisel. Once you've got the flooring out, you'll be able to tell if there's any wiring in the way. Next, the lath and plaster ceiling can be cut out with a keyhole saw from above, or from below with a saber saw or reciprocating saw.

If you can't locate the hole on the upstairs floor, you'll have to cut from the bottom up. Again, make sure you're not going to cut into any live wires, then cut carefully using a non-electric saw such as a keyhole saw, so you'll feel any wires you may run into before you sever them. Saw carefully and don't allow the saw to drag against the plaster when you pull it out at the end of each stroke. To further prevent plaster at the edge from chipping out, hold a piece of scrap wood tightly against the ceiling along the kerf as you saw. Work over a drop cloth or spread newspapers on the floor to catch plaster dust, and wear eye protection.

Once you have the ceiling removed, you can locate the hole upstairs by drilling a small hole in each corner. If there's carpet on the floor upstairs, don't drill. A drill can pull the pile out of a carpet faster than you'd believe. Instead, locate the corners by nailing nails up through the floor, or nail down from the top approximately, then measure from the nails to the actual corners. Cut the carpet with a razor knife, about ¼ inch outside of the actual hole, so you don't catch the carpet with the saw. Then saw out the hole.

Finishing the hole

It's a good idea to line the inside of the hole to prevent dirt and dust inside the ceiling from raining down on the lower floor. Use wood of the same width as the floor joists. If the floor joists are 2x8s, use 2x8 or 1x8 boards. Modern lumber is milled about ¼ inch narrower than the old-time, "rough cut", or "full size" boards. If you can't find the same size lumber, get the next larger size and rip it (cut it lengthwise) to fit exactly. Often your lumber dealer will do this for you for a small extra charge. If you have to do it yourself by hand, it's a lot easier using 1x stock.

Check the thickness of your floor grate and cut back the flooring to the proper depth, ¾ inch beyond the edge of the hole, all the way around it. Set your rotary saw to the exact depth and make your cuts, then finish the corners with a sharp chisel then turn the chisel bevel down and mortise out the ledge.

Do not go any deeper than the top of the subflooring. Make each board the same length as the actual side of the hole it is covering, plus an amount equal to the thickness of the board. Place the board between the floor and ceiling, with all the "excess" length to one side of the hole, and nail in place with casing nails driven up through the ceiling and down through the subfloor. Then butt the end of the next board tightly against the "excess" length of the first and nail it in place. To aid in handling these pieces of wood, screw a couple of wood screws part way into the face of each board, and remove them after it is nailed in place. Finish the ceiling with corner moulding, available wherever wood products are sold. Paint or stain the moulding before you put it up, and miter the corners, or it won't look right.

Floor grates

Even if the hole is under a piece of furniture, it needs a floor grate on top. If nothing else, this will keep "dust bunnies" and large objects from falling through. Floor grates can sometimes be found in old houses that are being demolished, or they may be improvised from any number of things. Old treadle sewing machine parts work well. If you can't find anything cheap, try a scrap metal dealer. As a last resort, you can have grates made up by a furnace dealer or sheet metal shop, but expect to pay custom prices. If your grate is nearly the same thickness as the flooring, you can set it right on top of the subfloor. If it sticks up slightly above the floor, trim around it with moulding of the appropriate thickness, to keep people from stumbling on the edges. Miter the corners of the moulding, and paint or stain it before you nail it down. Special metal trim for finishing the cut edges of carpets is available at most hardware or builders supply stores.

For grates that are too thick to set on top of the subfloor, form a ledge inside the hole at the appropriate depth by gluing and screwing W boards to the sides of the hole. If you know you are going to do this, it's a real good idea to use 2 inch thick boards for the sides of the hole, and use 16 D (16 penny) box nails to secure them to the floor and ceiling.

Heating bills

When your cold-air returns are complete, you will be amazed how much warmer your upstairs rooms will be. You may even discover that your total heating bill goes down. The energy that you used to expend over-heating the downstairs, in a vain attempt to warm up the upstairs just a little, now is not needed at all. Now the warm air downstairs rises and heats the upstairs as well, doing double duty, before returning to be reheated. Δ

Firearms stand next in importance to the Constitution itself. They are the American people's liberty teeth and keystone under independence… From the hour the Pilgrims landed, to the present day, events, occurrences, and tendencies prove that to ensure peace, security and happiness, the rifle and pistol are equally indispensable… The very atmosphere of firearms everywhere restrains evil interference—they deserve a place of honor with all that's good."

George Washington