Drilling Pin Blocks In The Piano

By Ron Nossaman June 2004

As there are a number of different kinds of pin block, it seems there ought to be more than a couple of ways to drill them. From asking around, it seems that most shops drill their blocks on the drill press, out of the piano, after first fitting and mounting the plate to the block, and marking all the hole locations with a pencil, transfer punch, or drill bit. This works fine, for the most part, but seemed to me to be troublesome in getting holes accurately placed, particularly in those pianos with bushed plates.

For many years, I've been told that the only reason for plate bushings is to serve as a guide for the bit when drilling the pin block. While I won't get into that subject here, I did wonder why, if that was what they said bushings were for, did everyone ignore the bushings altogether and mark the block for drilling separately on the drill press? Doesn't compute.

Another alternative method that actually used the bushings for their "intended" purpose, was drilling the block, mounted in the plate, freehand. This actually works better than it probably should, if you have a steady hand, a good eye, and some way of maintaining the drilling angle, or angles, you have chosen for that piano. Now, how about the uniformity of fit of the pin in the block?

The standard approach is to buy a bit appropriately sized to the pin and pin block type you intend to use. It must be of a length appropriate to your drilling method, of high helix and parabolic flute, and replaced with a new bit every block or two. The RPM and feed speeds are absolutely critical to uniformity of feel in the installed pins, so the highly precise drill press is preferred over hand drilling. The drill press must be in excellent shape, of high quality, and exhibiting no quill slop or runout, or you will surely end up with wildly erratic pin torque levels in the finished product. The lower density blocks like the Steinway and Boldock, are the most resilient and forgiving, with the Baldwin, Falconwood, and Delignit blocks being nearly totally intolerant of any imprecision. The rotary cut eleven ply multi-lam blocks are somewhere in between.

The drill press I had originally chosen for shop use was the 32" Delta radial, and I still use it. It's not a heavyweight, and doesn't have the accuracy potential of even a worn out and discarded milling machine, yet I wanted a method of using it to accurately drill Delignit blocks in the piano. I wanted to fit the block, set the plate height, mount the block and plate, and not separate the plate from the block again to drill the block. I don't like pulling plates in and out more than is minimally necessary when I could be spending the time doing something more productive, or dangerous. So here I was, in possession of a light duty, ugly, low priced, low precision, but wonderfully versatile bench top machine (Which is why I chose it – the versatility, not the ugliness or low precision). I just needed a way to drill uniformly obsessively accurate holes in a controllable and repeatable manner in the block – in the piano – without spending all day doing it. No problem.

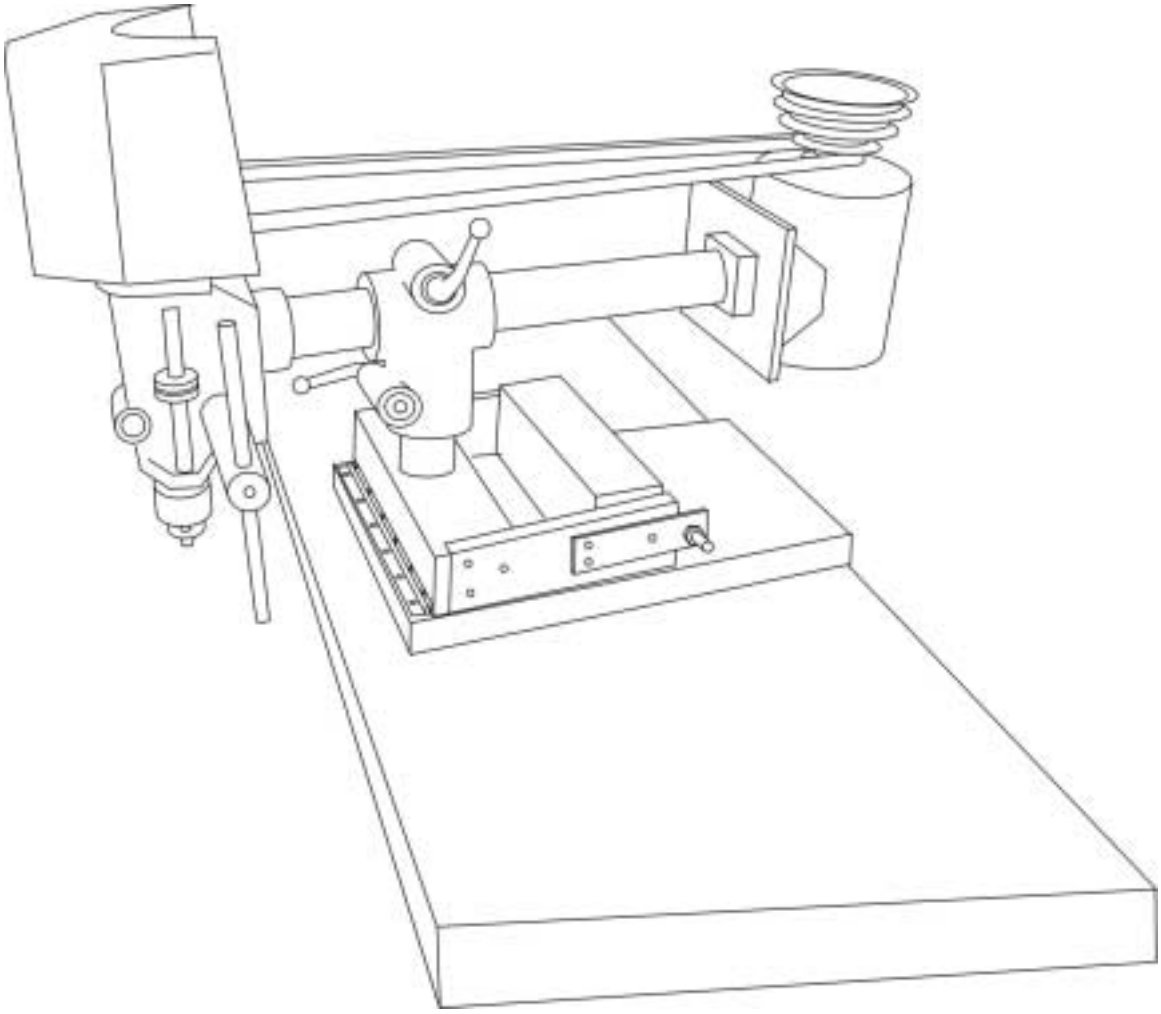
In the land of real industry, there is an occasional need to move multi-ton machines in or out of areas closely surrounded by other multi-ton machines that don't survive being smashed into by their counterparts during these moves. When it's not possible to get cranes, jacks and dollies, or thousands of laborers in to muscle the things around, they have to resort to cheap tricks and magic. The machines are levitated. Airtight platforms are built around them, with rubber skirting making a sliding seal to the floor. Compressed air is pumped in, and the multi-ton machine floats on a thin frictionless air cushion, easily pushed and steered between obstacles to where it needs to go. Cheap magic! So why couldn't I do that with my drill press?

Below are a couple of drawings of what I came up with. It is adjustable for pin angle, and the levitation is supplied by an air hose, with valve (chip blower), attached to a nipple through the hole shown in the middle of the platform. No skirting is necessary, just a flat-bottomed base, and a flat topped platform to glide over. I use a double-wide pin plank sitting on the piano rim for the platform. Hold the valve open to float the contraption easily where you want it, then let the valve close, and it sits down on the base and doesn't move around while the hole is drilled. Very controllable, and you can point the thing in the direction of the agraffes for that particular pin hole, so the pin angle is always opposite the direction of the string tension. So far, so good. Now how do you drill dead accurate holes with a sloppy tool? No problem.

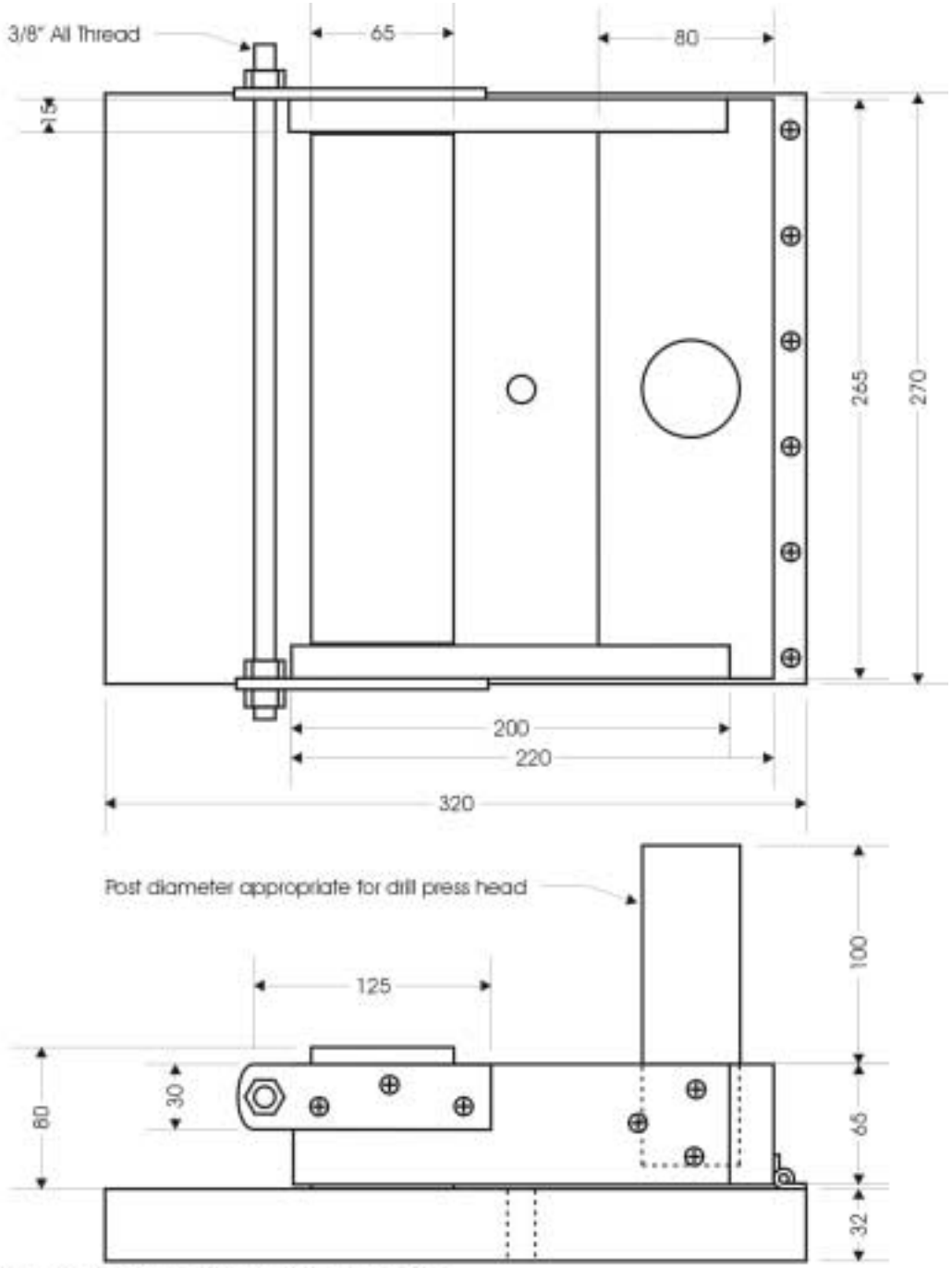
Out in that world of real industry I mentioned earlier, machinists learned long ago that they could drill a more accurate finished size hole by drilling a slightly smaller hole first and reaming it to final size with a second pass. This works with pin blocks too, and very nicely. For bushed plates, the bushing serves to center the bit in the hole. For plates without bushings, either a transfer punch, or a drill bit slightly smaller than the plate hole will make a dimple in the block for the drill to start. Or, if you'd like something more positive, a bullet point bit by Black & Decker, or a center drill with a collar the right diameter for the plate hole will sink a deeper locating hole in the block.

For Delignit, I drill the entire block with a 1/4" (0.25", E, or 6.3mm) bit as a pilot hole. This is a regular old jobbers bit of appropriate length to reach the block from the platform above. It's nothing exotic, because it isn't necessary for it to be. If it gets too hot and drills the hole 0.001" too big, I don't care. If my feed speeds aren't perfectly uniform and there is another 0.0015" variation from one hole to the next, again, I don't care. If the RPM is too high, or the bit isn't like-new sharp, and the hole is burnished inside, I still don't care. This is just a hole. It doesn't have to be a particularly good hole, just an absence of material. All it has to be is clear through the block for chip clearance, in the right spot, at the right angle, and pointed in approximately the right direction. Oh yes, and it also should be about 0.015" (0.38mm) smaller than the finished bore size. This 0.015" allows a second pass with an equally ordinary bit of the desired diameter for the pin and pin block material, to ream to final size. I typically use 17/64", H, or 6.8mm (0.2656"-0.2677", or 6.75mm – 6.8mm) for final size. This second pass removes any glazing from the first pass and trues up the hole. Little heat is generated with such minimal stock removal, chip clearance is no problem because the chips are dust and there's lots of room

in the empty flutes for them, and the bit self-centers in the pilot hole, with the hole doing the guiding instead of the sloppy quill of the drill press. The result is a very precise and uniform set of holes from a machine setup that isn't remotely capable of producing anything like that in a one-pass drilling system. A vacuum tube is nice to gather the chips as you drill, but you don't need anything at all to cool the bits. Here are the drawings



In writing this, I went looking and found no advertised source for the Delta radial drill press. I'm not entirely sure if they are even available anymore. Grizzly makes one that appears to be quite suitable for about $150 plus shipping. Other bench top models may well work, but you might have to counterweight the back of the platform to balance the load near the center. That's one advantage of the radial. Balance is merely a matter of sliding the horizontal post forward or back until the hovercraft floats easily.



Materials: All dimensions in millimeters unless otherwise noted.
Dimensions are not critical, except the mounting post for the drill press head.

1 Ea. 32x270x320 pinblock material - Base platform - must be flat
1 Ea. 65x80x265 Hardwood - base for drill press carriage
1 Ea. 80x65x233 hardwood - 1mm shorter than space between arms of drill press carriage
2 Ea. 15x65x220 Hardwood - Arms for drill press carriage
1 EA. 300mm long All-Thread - 3/8" or rough metric equivalent.
3 Ea. Nuts to fit All-Thread
2 EA. 5x30x125 steel brackets, drilled and countersunk as necessary for All-Thread and screws
1 Ea. Length of piano hinge, or three individual butt hinges