

Articulated Dust Port Cover For the Ryobi BT3000 Table Saw

By Jim Frye

This accessory for the BT3000 (BT3K) is intended to complete the process to enclose the cabinet of the BT3K. The purpose of this exercise is twofold. First, by closing up as many of the large openings in the cabinet as possible, better dust extraction can be done within the shrouded blade area. This should also help keep dust out of the motor. Secondly, the more openings in that are closed, the less noise should escape and thus make the saw quieter to operate. The first part of this exercise was undertaken by creating a “belly pan” to close off the bottom of the cabinet and to collect any dust that didn’t get collected via the saw’s dust port. At that time, the triangular openings in the top front and rear of the cabinet were closed off and the vent slots on the left side of the cabinet were closed as well. This cover project will close off the remaining large opening leaving just the motor vent on the right side of the cabinet, the slot in the throat plate, and the crescent shaped slot in the front of the cabinet that the tilt/elevation hand wheel operates in.

This accessory is designed with the idea that a dust collection device such as a shop vac or dust collector will be used when the saw is operating. Closing off this much of the cabinet openings might reduce the air flow for the motor and cause problems with overheating if a dust collection device isn’t used. I only have a shop vac for use with my saw and therefore I don’t have any experience using this arrangement with a regular dust collector unit. My shop vac moves 195 cfm and this cover works fine with that kind of volume. Large dust collectors may move so much air that closing off the entire dust collection port might be restrictive. If you have a large volume dust collector, it might be worthwhile to consider a second connection to the dust pan on the bottom of the saw cabinet in addition to the one on the dust port itself.

This project was very difficult to design as space constraints dictated that it could not be a simple piece. The cover was designed to require the least amount of change to the saw cabinet itself and as such, only one hole needs to be drilled in the cabinet. This hole is in an out of the way corner and will not interfere with the saw’s normal operation. The other mounting point for this cover is the dust port itself and that presented the biggest challenge. The dust cover must be removable to allow for a total tear down of the saw’s locker bracket since the dust port is an integral part of the locker bracket casting. Therefore, attachment of the cover must be removable. The port does not protrude from the saw cabinet very far and presents a very small area for attaching anything. Several designs that involved clamping as an attachment method were tried, but they were either too large to fit and allow the dust collection hose to plug in, or were very difficult to build with simple shop tools. If the port had been a half inch longer, this would have been much easier to accomplish. In the end, silicone sealer was used for gluing the cover to the port and it seems to work just fine. The silicone sealer bond can be broken for removing the cover in the event a tear down is required.

This cover is composed of three pieces and some 1/4"x20 threaded hardware. The first two pictures show the front and back of each part and the associated hardware pieces. The first piece (Part A) is a crescent shaped plate that by itself will cover 50% to 100% of the dust port slot. It covers 50% with the blade at 90 degrees and 100% with the blade set at 45 degrees. To get the remainder of the slot covered between 90 degrees and 45 degrees, an additional cover piece is required. The reason a second part is required, is due to the fact that at 45 degrees, the dust port is very close to the top, outside edge of the cabinet and there is no room for Part A to be longer than it is or it would extend beyond the top of the saw table. Therefore, the remaining part of the cover must articulate or move out of the way. The second and third pieces (Part B & Part C) are the articulating parts. Parts B & C are laminated together to form a cover that wraps around the end of, and on top of, Part A and thus close off the portion of the slot that Part A can not cover up. The two parts of the cover are connected together and thus Part B overlaps onto Part A. As Part A moves across the dust port slot, it causes Part BC to swing out of the way while keeping the slot covered. This cover requires a single 1/4" diameter hole to be drilled in the lower right corner of the rear panel of the saw cabinet. This hole will have a threaded plate installed behind it inside the saw cabinet to provide a place for the pivot bolt to screw into. The additional hardware that is required to assemble this cover are a 1/4"x20x1 1/2" Knock Down connector bolt, a 1/4"x20x1" hex bolt, three 1/4" plain washers, three 1/4" fender washers, a small steel plate threaded 1/4"x20, and two 1/4" hex nuts. You will also need a tube of silicone sealer.

Begin construction of this accessory by tracing the patterns of Parts A, B, & C onto a suitable material. I made mine from some 1/4" luan plywood. I actually broke with my own tradition on this one and bought the plywood (\$1.86 for a 2'x4' piece) instead of making it from scraps. You could also use 1/4" Plexiglas or acrylic sheet for these cover parts. The patterns accompanying this article were made by tracing the full sized parts of the cover. Make photocopies of the patterns and rubber cement them onto the plywood. I cut the parts out on my band saw and smoothed the edges with a sanding block. Sharp eyed readers will spot that Part A is narrower at one end than the other. The piece was originally the same width as the bolt hole end is overall. The longer, left side was widened slightly later to make it easier to align Part A on the port slot in the cabinet. Part A has a 3/4" diameter by 1/16" deep recess on the back side of the part centered on the pivot hole at the right end of the plate. This recess will accept the flat head of the knock down connector bolt that will be epoxied in place there. The recess will allow the bolt head to slide past the end of the dust port slot in the cabinet without binding. The central hole in Part A was cut with a 2 1/2" outside diameter hole saw in the drill press. This was a tad too small to fit over the saw's dust port, but that's fine as you will want this hole to be a press fit on the port. 80 grit sand paper was wrapped around a 1" diameter cylinder and used to custom fit the hole to the port. Sand this part smooth and slightly round all edges.

After you have cut Parts B and C out, laminate them together with wood working glue and clamp all around the edge of the two pieces. The pictures show how the two parts fit together. The operating bolt slot in Part B is to be 5/16" wide to allow the 1/4" KD connector bolt to slide freely in it. I bored holes at the ends of the slot with a 5/16" bit and used a coping saw to connect the holes to form a slot. The slot is a bit long on the drawing to ensure there will not be any binding after the parts are assembled on the saw cabinet. Bore a 1/4" hole through both pieces as shown on Part B. This is the pivot bolt hole. After the glue has set, smooth this assembly and round the edges as on Part A. Both Parts A & BC were finished with colored Watco and varnish.

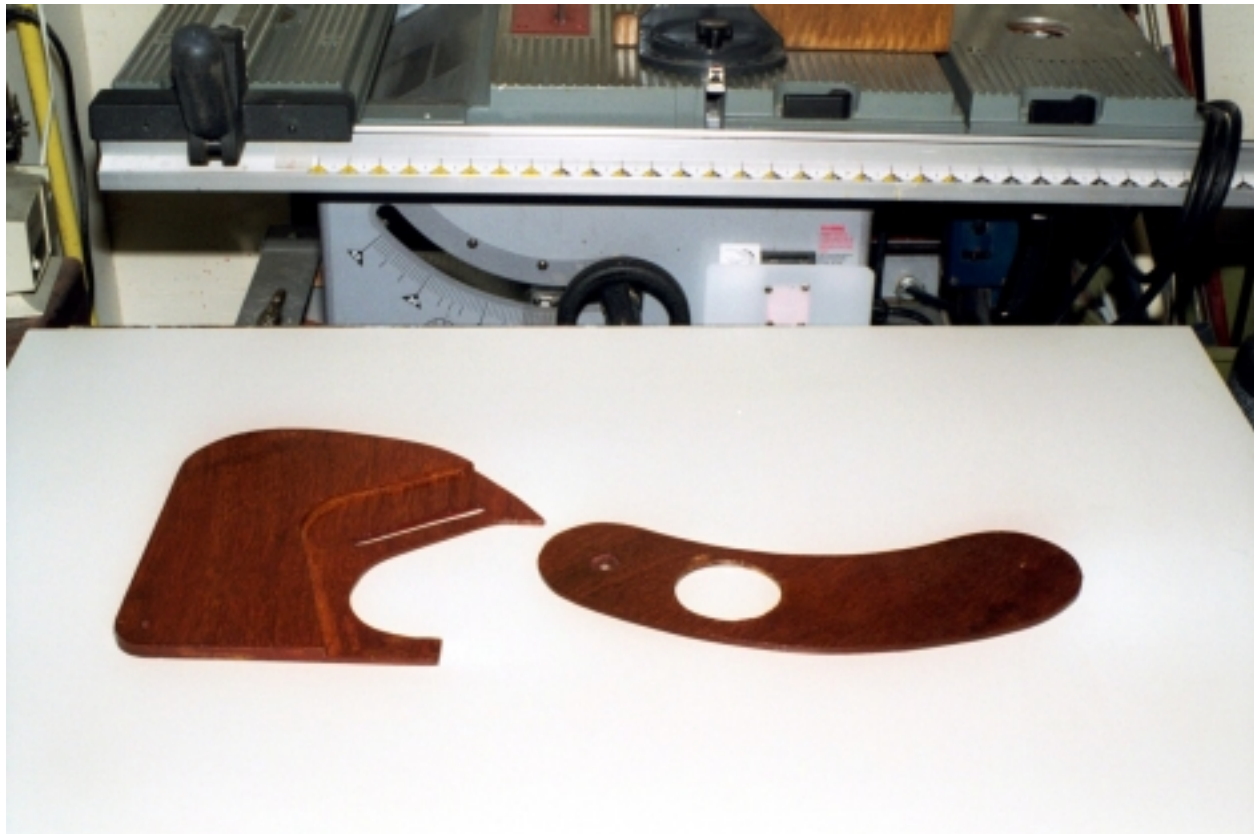
To begin assembling the cover on the saw cabinet, start by marking and drilling the saw cabinet for the pivot bolt hole. First place the arbor at 90 degrees and lock the tilt hand wheel in the usual fashion. I epoxied the KD connector bolt into the recess on the back of Part A with the threaded portion protruding through the front and set it aside to cure. Next, place Part BC on the back of the saw cabinet at the lower right hand corner with the right and bottom edges of BC flush (or just slightly inside of) with the right edge and bottom of the saw cabinet. Mark the location of the hole on the cabinet and drill a 1/4" hole there. This hole will need to be threaded and this can be accomplished in one of several ways. I used a 1" square, 1/4" thick steel plate that was threaded 1/4"x20 already. You could use a 1/4" nut that has a washer flange on it. A piece of hardwood with a 1/4"x20 threaded insert or T-nut could also be used. Whatever you choose to use, this threaded piece is glued to the inside of the saw cabinet centered on the hole you just drilled. This bolt will not have much torque applied to it, so the nut's glue joint will not be stressed very much at all. Construction adhesive was used to glue the plate to the inside of the cabinet. The pivot bolt was used to hold the plate in place until the glue cured. The threads of the bolt were coated with oil and threaded into the plate with some washers under the head of the bolt. After an overnight curing period, the bolt was removed leaving a threaded hole in the side of the saw cabinet.

The next step in the assembly process is to fit Part A onto the dust port and align it to the dust port slot in the cabinet. Part A must be positioned so that it covers the slot at all times and it must operate Part BC properly also. This is the trickiest part of this project. I marked the side of the dust port with a fine point marker at roughly the 12 o'clock position. To mount Part A, I ran a bead of clear silicone sealer around the outside of the saw's dust port about 1/4" outside the saw cabinet. Next I reinstalled Part A onto the dust port tight against the saw cabinet surface and taped it place with some masking tape. Check inside the saw cabinet to make sure the silicone sealer has not squeezed onto any part of the cabinet. Next, place Part BC in place with the slot over the bolt sticking out of Part A. Align the pivot hole in Part BC with the pivot hole in the cabinet and thread the pivot bolt into the threaded hole. You may have to adjust the tape holding Part A in place. I used a 1/4" fender washer on each side of Part BC to ease it's motion. This bolt is left just loose enough so that Part BC can move without binding. Next, place a fender washer and two or three plain washers on the operating bolt sticking out to the slot in Part BC and thread on two nuts. The knock down connector bolt I had wasn't threaded all the way to the head and I needed three

washers to clear the unthreaded portion. Adjust the first nut so that Part BC moves easily without binding on the bolt protruding through the slot and lock the nut in position with the second nut. Next, place a mark Part A to align it with the mark on the dust port. Now, release the masking tap holding Part A and have a helper slowly crank the tilt wheel to 45 degrees while you hold Part A on it's registration mark and against the saw cabinet. Shift Part A as necessary to make sure it covers the dust port slot. This should properly align Part A on the dust port. I added a very small bead of sealer around the joint between front of Part A and the dust port where Part BC does not come close to the dust port. This about at the 8:00 o'clock to 11:00 o'clock position. Add some masking tape to hold Parts A & BC in place against the saw cabinet. Lock the tilt mechanism in place and leave the assembly overnight to allow the silicone sealer to cure.

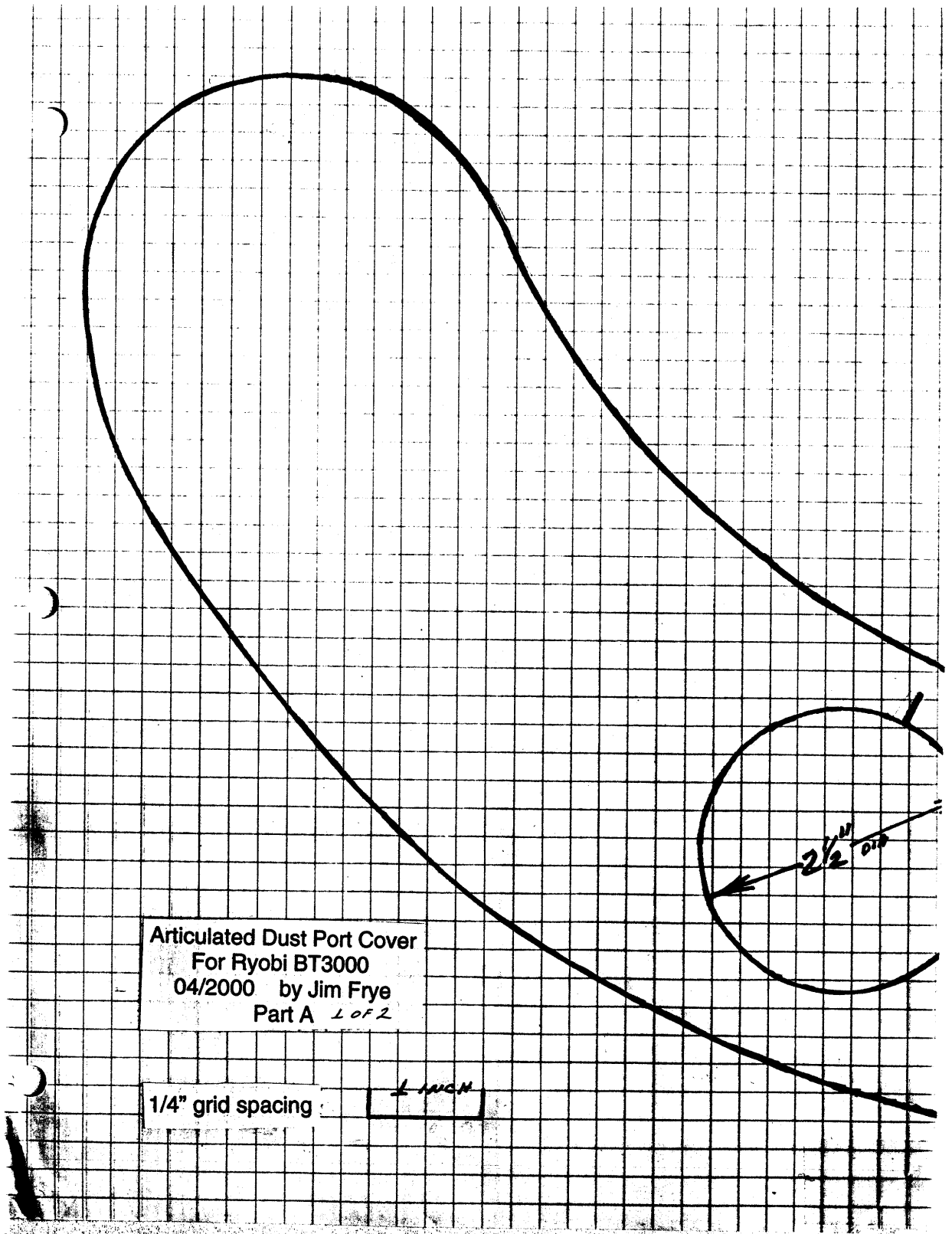
The next day, unlock the tilt mechanism and retract the tilt hand wheel 5 degrees at a time while checking that the dust cover parts are moving without binding with each other or hitting any other parts of the saw like the dust port, rails, tables, or any other accessory you have installed. If you encounter any binding or interference, mark the spot. Disassemble the Part BC from the cover and correct the fit at the point of interference. Then reassemble the cover and proceed with the advancement of the tilt until you get to 45 degrees. The slot in Part B is longer than necessary to allow for adjusting the saw's 90 degree and 45 degree stops in the future. Once the cover operates smoothly over the entire tilt range of the saw, put non-permanent thread locking compound on both the pivot bolt threads and on the operating bolt threads.

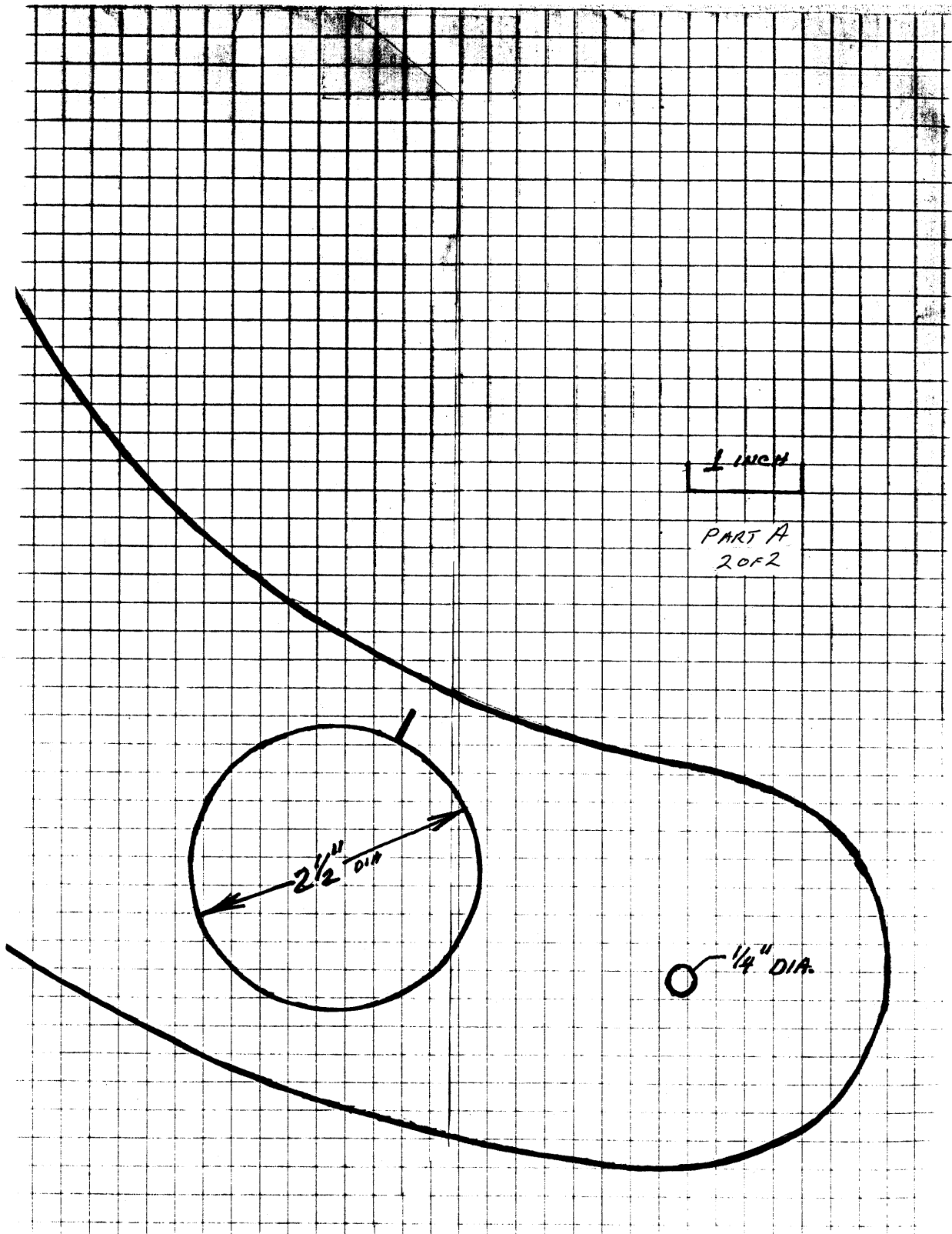
This completes the assembly and installation of the articulated dust port cover. Now you can plug in your shop vac and get more dust collected than ever before. The last four pictures show the cover's positioning at 0, 15, 30, & 45 degrees. Notice that I didn't get the alignment of Part A right and it exposes a bit of the dust port opening at 45 degrees. Do as I say, not as I do!

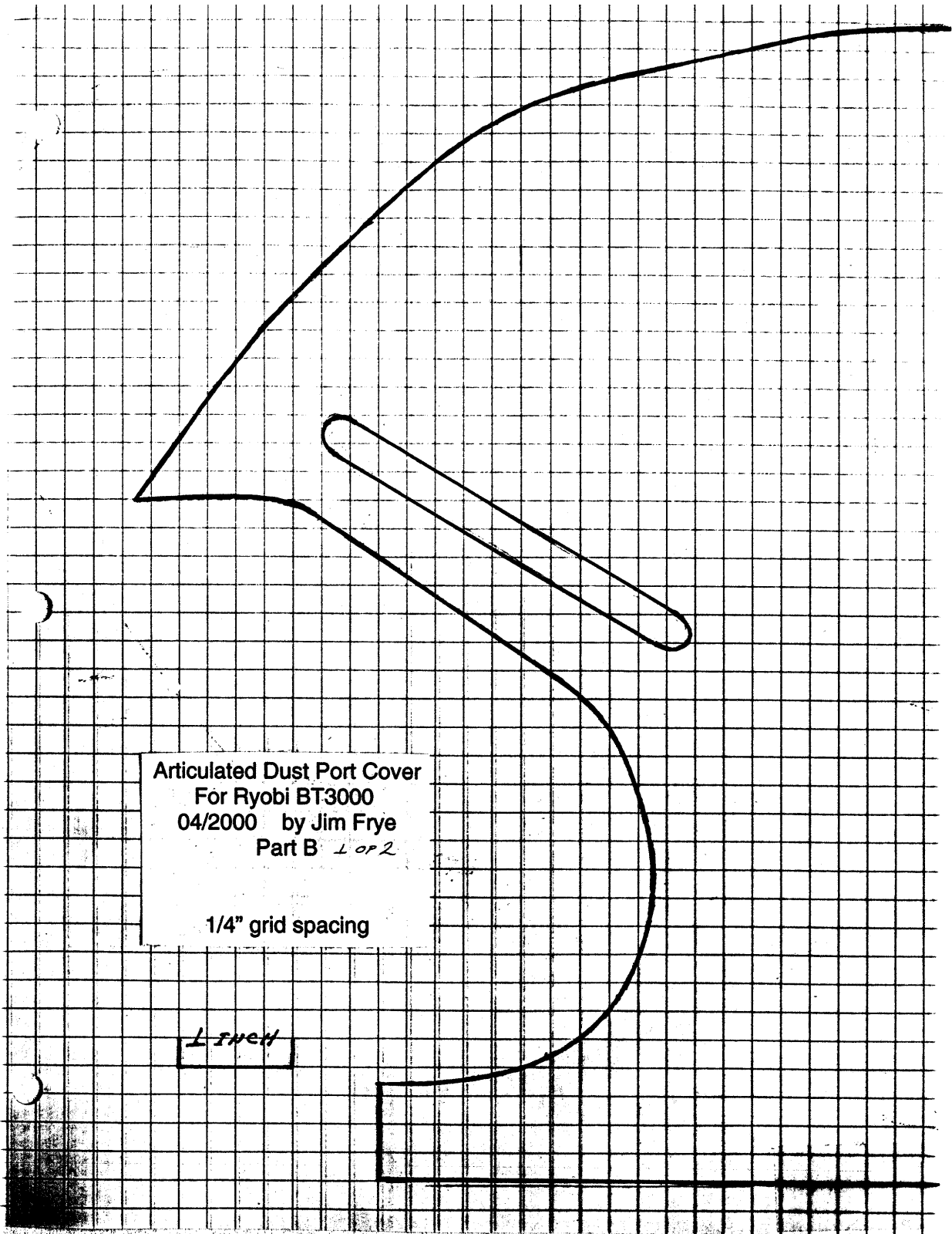








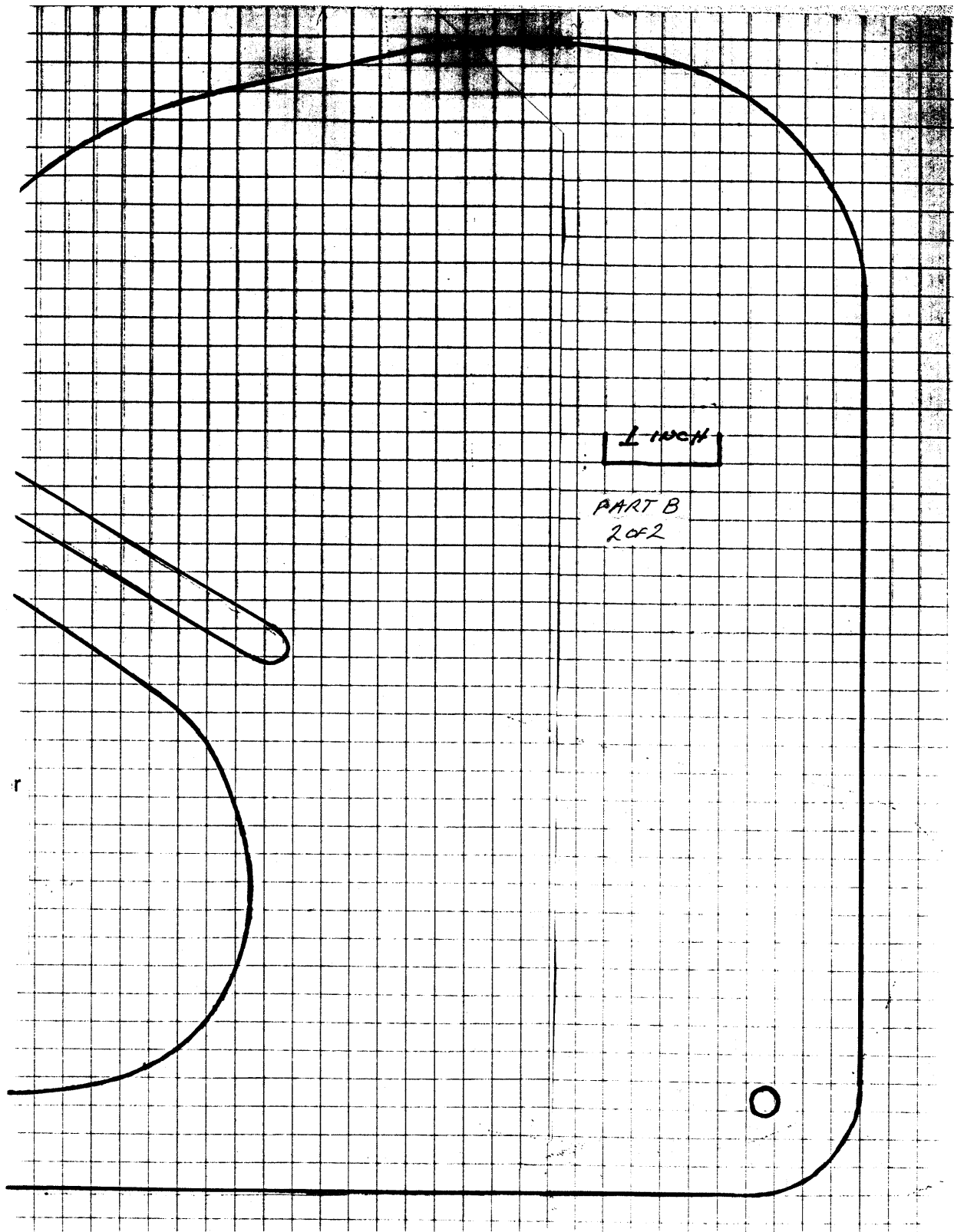


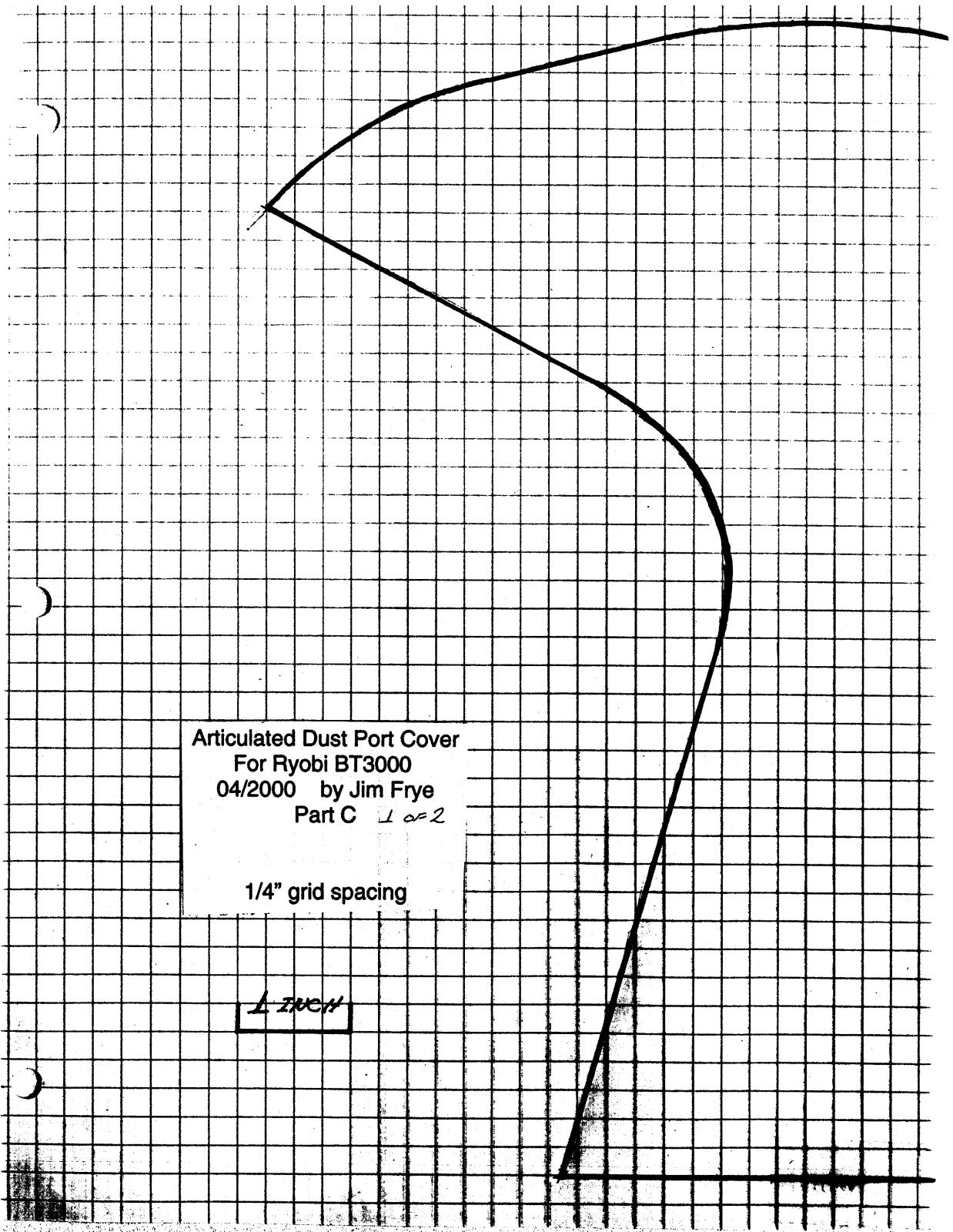


Articulated Dust Port Cover
For Ryobi BT3000
04/2000 by Jim Frye
Part B LOP2

1/4" grid spacing

L 2nd

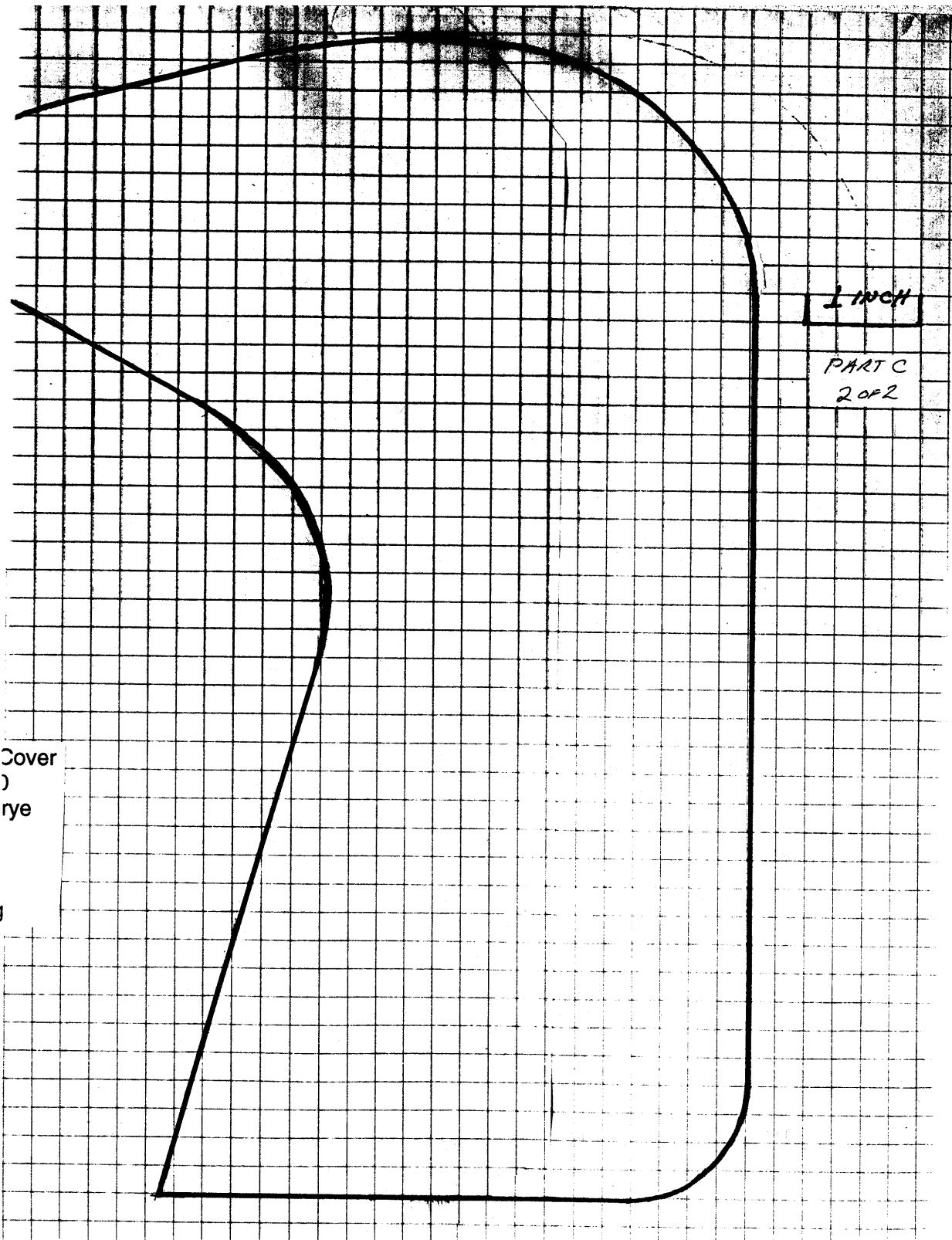




Articulated Dust Port Cover
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Part C 1 of 2

1/4" grid spacing

1 INCH



Cover
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rye

1 INCH
PART C
2 OF 2