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Printer's Saw Rebuilt

Converting the Hammond Glider

by Stan Wellborn

The Hammond Trim-O-Saw, originally used for cutting lead type in newspaper composing rooms, becomes an accurate woodworking machine for mortising and precise cutting.

When Jim Haber, of Silver Spring, Md., set out to find a table saw that would be unfailingly accurate and precise, he was attracted by a cutoff saw in the graphic arts shop of the high school where he teaches. The machine was a Hammond Trim-o-saw, widely used in the printing trade to cut slugs of metal type used to compose newspaper pages. Made by the Hammond Machine Co. in Kalamazoo, Mich., the saw is known in the printing business as a Hammond Glider. Its principal feature is a 22-in. by 21-in. cast-iron table that rolls on sliding ball-bearing supports. That feature made it superb in newspaper composing rooms, where exact dimensions were critical. In recent years, however, as printing establishments converted from "hot type" to photographic composition, the Hammond Glider became obsolete. Thousands of the machines have ended up in liquidator warehouses as junk. Hammond no longer manufactures the machine, and Haber notes that only some models can be modified in the way he suggests. On the other hand, even a stock Hammond Glider would be a valuable addition to most shops, especially as a second table saw for fine joinery.

Haber decided that the saw could be modified into a multi-purpose machine that would be more accurate than any moderately priced saw available. These changes would be necessary:

-It would need a 10-in. blade (the saw normally takes a 7-in. blade that attaches to an unorthodox three-point arbor).

-The larger blade would then have to be able to be lowered beneath the table.

-it would need an accessory chuck that would take bits to cut slot mortises, plus an auxiliary mortising table.

-Some provision for angle-cutting with a miter attachment would have to be added..Haber's saw was designed to make only 90 degree cuts; some models include a mitering accessory.

-Provision would have to be made for rip rails and a rip fence, since the saw does not have such attachments.

Haber, an industrial-arts teacher and an experienced wood and metal worker, bought his used Hammond Glider for $300, and spent an additional $450 for modifications. Haber believes any woodworker can make the same conversion he did. But he cautions that the margin for error is extremely small, and some parts of the project must be entrusted to a skilled machinist.

Modifying the blade arbor-One of the key operations in redesigning the machine involves retooling the three-point arbor and adding a chuck to its other end for use as a slot mortiser. Again, Haber emphasizes that these modifications must be done in a machine shop. Only careful machining will avoid runout or wobble in the blade or chuck.

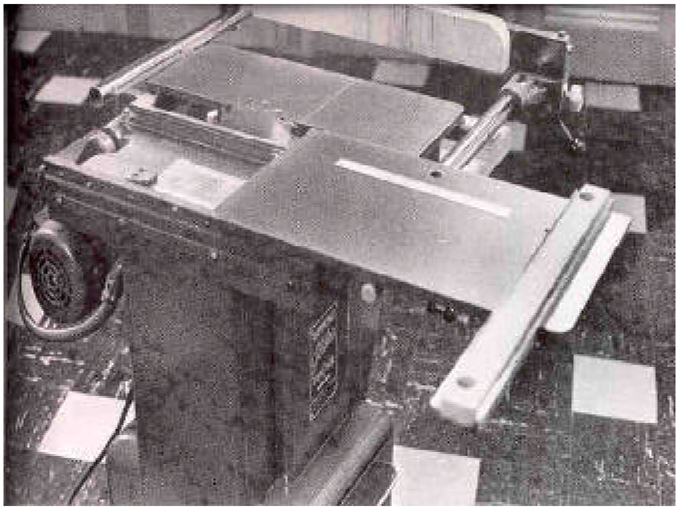
The arbor of the Hammond saw consists of a bored shaft with a blade-mounting head on its left-hand end, followed by spanner nuts that hold two bearings in position. Then there is a pulley for the drive belt, followed by yet another spanner nut. At the right-hand end is a space where many print shops attached a grinding wheel. A center bolt runs through the hollow arbor; it must be discarded.

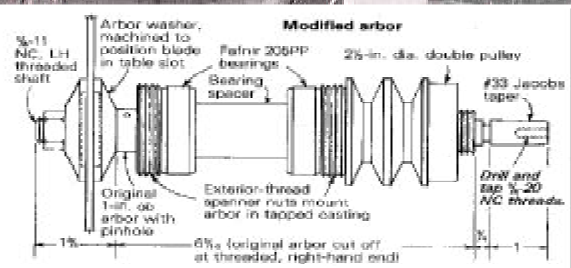
The blade-mounting head must also be removed, because the hole of a normal 10-in. blade will not fit on the mounting. The head is removed by taking out a steel pin, and the end of the shaft must be bored to accept a 5/8-in. rod that will be pressed into the arbor. After the shaft is bored by a machine shop, the rod is pressed into position and secured. Haber welded the rod into the shaft through the hole used to pin the original mounting head. It is important to use a steel that is similar to that of the shaft, so that the steels will be compatible and no unusual stresses will develop when the arbor is heated during welding. Your machinist may suggest an alternative for fastening the rod tightly in the shaft.

After the rod is welded into place, threads must be cut on the shaft end. The blade will be slipped over these threads and held by a nut. Haber used 5/8-in. 11 -NC left-hand threads so the retaining nut will tighten against the blade as it cuts. He left part of the shaft unthreaded, so the hole in the blade would fit closely.

Providing blade clearance-At this point, the table itself must be unbolted from the machine and turned upside down. This makes it easier to cut spaces at three points in the iron castings beneath the table so that the blade can be fully recessed below the table surface. Be sure to maintain the position of the shims between the table and the stand. To mark the, blade clearance spaces, rig up a mock sawblade from a piece of wood 5-1/2 in. long mounted on a dowel. By swinging this around, it will be obvious what needs to be removed to allow room for a 10-in. sawblade.

In stock condition, the web of the main casting that holds the arbor head interferes with the threaded shaft that raises and lowers the blade, limiting a 10-in. blade from retracting below the surface of the table. To overcome this, cut away



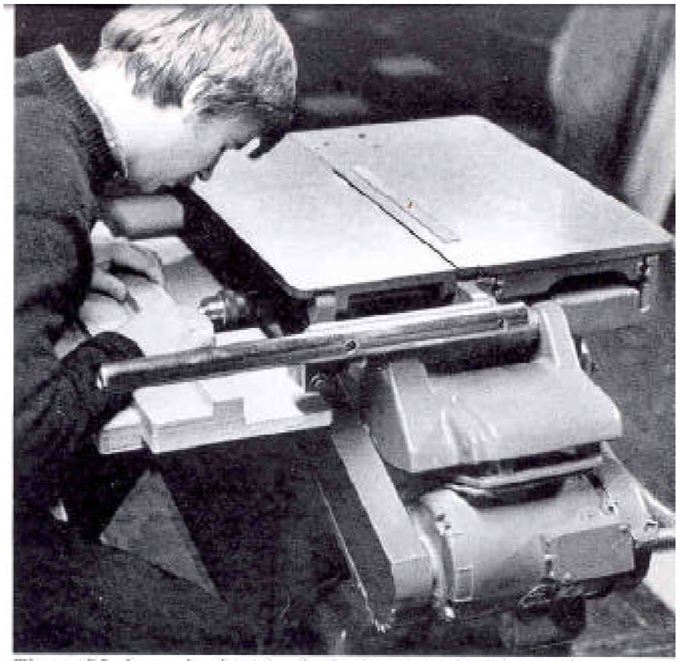


part of the web to achieve the necessary clearance. Haber drilled small holes on a line along the intended cuts, then he hacksawed along the pattern of holes. The cuts were then filed smooth. The next task was to increase the blade slot by grinding the right-hand table, again to allow the saw to take a 10-in. blade. Be sure the blade clears through its full range of vertical travel before starting the motor.

Replacing the motor-The Hammond Glider comes with a 3-phase, 220-volt motor. Haber substituted a single-phase, 110 to 220-volt, 2-HP capacitor-start motor, mounted via two existing holes in the motor-mount plate, plus two more holes drilled and tapped to fit. He then fitted a 4-in. motor pulley and two 42-in. belts, and refashioned the sheet-metal belt guard. The blade speed is approximately 4,200 RPM. The replacement motor cost approximately $150.

Adding a slot-mortising chuck-Haber added a slot mortiser by buying a drill arbor with a 5/8-in. straight shaft on one end and a #33 Jacobs taper on the other. The right-hand end of the saw arbor was bored to accept the 5/8-in. shaft, then the shaft was pressed and pinned in place. A heavy-duty Jacobs chuck was placed on the tapered end, and the end of the shaft was bored and tapped with 1/4-20 thread. A cap screw could thus be driven through the throat of the chuck into the tapped hole to keep the chuck on the shaft. Haber says the machining of the arbor and chuck for the slot mortiser is a critical operation because there's no margin for error. The machinist gets only one chance to get it right. Any mistake will result in too much wobble in the mortising bit, and it will be impossible to correct. Haber advises getting a machinist you can trust. The combined cost of the arbor modifications was approximately $100.

Making the mortising table-The support for the mortising table was made out of l/8-in. cold-rolled steel and was attached



The modified saw arbor has a Jacobs chuck on its outboard end and is used for slot mortising (above). The auxiliary steel and plywood mortising table is attached to the side of the saw cabinet. Equipped with Rockwell guide bars and fence (upper left), the saw can have a rip capacity of 48 in. The rolling table allows for extremely accurate crosscuts on boards up to 21 in. wide, and can be fitted with a tenoning jig or miter gauge for joining operations.

to the body of the machine just below the mortising chuck. Small steel tabs were welded to the support through which bolts could be run to attach the support piece to the saw. On top of the support sits the mortising table itself, approximately 22 in. long by 12 in. wide, made of Baltic birch plywood. A sliding jig, mounted on the table, braces and positions the work. The stock is slid along the jig by hand, although Haber hopes eventually to devise a rack-and-pinion mechanism to drive the mortising table. The cost of the mortising table was $50. At this point, Haber decided to add rails for a rip fence, using standard Rockwell parts. The procedure for doing this is too exacting to be described here, and Haber believes that most woodworkers would prefer to engineer their own rip attachments. He emphasizes that the woodworker should define the uses and functions he will require for the type of work he does, and modify the machine accordingly. It should be noted that these saws have some disadvantages. Neither the arbor nor the table tilts, making bevel cuts impossible without jigs. The saw will not accept a dado head, although dadoes can be cut by making repeated passes over the blade. Table extensions for cutting large plywood panels cannot easily be added. The principal advantage is extreme accuracy In an industrial machine that will probably outlive its owner. There's a removable crosscut bar pinned into the sliding table at a perfect 90 degrees, and a clamping attachment for holding the tiniest piece of stock steady during the cut. The top of the bar is marked with the pica measurements used in the printing trade. A pica is about one-sixth of an inch, and the scale may prove useful for comparing a series of cuts. The crosscut travel is 21 in. Finally, the saw comes equipped with a roll-away bin that fits beneath the blade to catch sawdust.

Stan Wellborn is a journalist and amateur woodworker, -living in Washington, D. C. Photos by the author.

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Regarding Jim Haber's article about converting a printer's saw for woodworking (FWW #32, Jan.'82), I'm a machinist and I saw this article when a customer came in asking me for an estimate on the conversion. I advised him not to do it, because you suggest welding onto a high-speed spindle. The heat of welding might change the strength properties of the steel, so I wouldn't risk welding onto any arbor running faster than about 100 RPM. It's too dangerous. Instead I'd turn a new shaft in one piece.

I got interested in the problem and found a used Hammond Glider, but out here in L.A. it cost about $750, not $300. By the time you finished the conversion you'd have spent a lot more than $1,000. On the other hand, a stock Hammond Glider without any modifications would be valuable in any shop, it's a real nice machine.

-*Gene ONeill, Canoga Park, Calif.*

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In regard to Gene O'Neill's letter (FWW #34, p. 4) about the Hammond Glider, I was concerned about the same problem of welding the arbor. I've discovered that the arbor can be left in much the original form. The only changes I will make are the addition of the 5/8-11 NC LH threaded shaft and the taper at the other end. The machinist doing the work feels that a crosspin will be sufficient to secure the two additions. He also advises against welding, as it may weaken and possibly warp the shaft. By the way, I was more fortunate than Mr. O'Neil--my Glider cost $275.

-*Robert Ricker, Chicago, IL*