



Sawyer/Cabinetmaker
Phil Hamlin at the controls
of his Baker bandmill.

PHOTOS BY JIM PHILP

The Baker Portable Bandmill

There's an old saying in the Appalachian timber country: Once you've got sawdust in your hair, you can never get it out. Phil Hamlin is a man with sawdust in his hair. Some of his earliest memories are of going to the woods with his father to cut saw logs. He still has his dad's first chainsaw, and he made a point of showing it to me. He also has a new Baker Portable Band Sawmill, which is the subject of this article.

As Phil grew older, he graduated from just tagging along to helping with the harvest. Dad did the felling and bucking while Phil did the limbing with his ax. Phil invested about six years as a sawyer on someone else's stationary Lane circular sawmill. Then he

In this issue of IS&WM, sawmill reviewer Jim Philp takes a look at Baker Products' entry into portable sawmilling.

As expected, the company known for its heavy-duty equipment didn't cut any corners on the 3638D band sawmill.

Reviewed by Jim Philp

bought his first portable sawmill, a Belsaw circular mill. In the course of custom sawing, building a two-story workshop and a two-story log home, he says that he completely wore out the Belsaw mill—despite having thoroughly rebuilt it.

Along the way, Phil also became a cabinetmaker, which is what he considers himself today—a cabinetmaker who also happens to own and operate a sawmill. His business is called the

Sidney Cabinet Shop, after its location in Sidney, Maine. In case you don't know about cabinetmakers, they seem to have a predisposed mind set to precision in woodworking. You should see some of the joinery in Phil's log home. So it's not surprising that Phil's demand for precision extends to his sawmilling efforts. He will not tolerate much error—about $\pm 1/32$ inch is all he will put up with.

When he set out to buy a new portable sawmill, Phil knew what he wanted, based upon his experience with the big mill and the small mill, plus his demand for accuracy. The mill had to be heavy enough to permit precise sawing. He wanted to be able to saw long timbers for timber frame house construction and large diameter logs, which are available locally, for wide boards. The mill had to be over-powered to enhance accuracy. He wanted diesel power for reliability and economy, and he wanted a band mill to minimize saw kerf.

After doing his homework and visiting some trade shows, Phil settled on the Baker mill with the 24-foot log option. So far, he is more than satisfied with his



The log turner is a free-floating hydraulic unit that is used in conjunction with the log clamp (hidden in this photo).

choice.

The Baker mill is big (34 feet long), heavy (5,500 pounds), and heavy duty. It is more than amply powered with its 38 horsepower Kubota industrial diesel engine. It is also extremely well engineered as well as being very simple and straightforward. As with any new product, the Baker mill does have a few minor problems that need to be addressed.

I think that you should understand how well the Baker mill is made. So bear with the "numbers section" that follows, and try to envision what it all means—a heavy, rugged piece of equipment that is designed to stay put.

The main frame of the Baker mill is made of 2-inch x 6-inch x 3/16-inch steel box beams. It is 31 feet long and 4 1/2 feet wide. In addition to the end members, there are also eight cross members, all 2-inch x

6-inch x 3/16-inch, spaced on 3-foot centers. Each of the cross members is topped by a piece of 1-inch x 2 1/2-inch steel, on edge, to act as log bunks. Therefore, the log is supported every 3 feet—better than on most stationary mills. The side rails are topped with flat steel tracks for the saw carriage to ride on. The entire mill is carried on four highway wheels, equipped with brakes.

The operator's manual for the mill notes that the main frame has a slight end-to-end crown, and explains how to level the frame during setup. Well, of course it has a crown.

MANUFACTURER'S COMMENTS:

The Baker Portable Band Sawmill is a robust band sawmill developed for maximum yield and accuracy. Baker builds this sawmill with the sawyer in mind, using a clean, efficient design and sturdy construction. Its 38 HP diesel motor is one of the most powerful in the industry, plus gasoline and electric powered models are available.

BAKER MILL DATA SHEET

NAME & MODEL NUMBER

Baker 3638D Band Sawmill

MANUFACTURER & ADDRESS

Baker Products, Sawmill Division
PO Box 128
Ellington, MO 63638
(573) 663-3133
Fax: (573) 663-2787
www.baker-online.com

MILL OVERVIEW

Band or Circle Mill: Band

Stationary or Portable:
Both types available

Options on review model:
Hydraulic debarker

Cutting Capacity: (diameter and length):
36-inch diameter x 24-foot length

Weight: Complete mill with debarker
5,200 lbs

Length & Width: Length 34 feet with removable tongue, 32 feet without tongue; width at widest point is 8 feet

FRAME & CARRIAGE

Size and Construction of Frame: Two 2-inch x 6-inch x 3/16-inch steel tubing; 2-inch x 6-inch x 3/16-inch x 42-inch steel tubing used as cross bunks

Tracks are Made of: 3-inch x 3/8-inch cold drawn flat steel

Are the Tracks Replaceable? Tracks are permanent

Wheels are Made of: High grade Teflon

Size of Bearings on Carriage: Wheels: R10LL radial bearings by Brokaw

Carriage Support System: 4 post head made of 2-inch x 3-inch steel tubing

SAWING HEAD

Wheel Diameter: 24 inches

Wheel Face Width: 1 inch

Wheel Construction: Crowned steel

Wheel Shaft and Bearing Size: Shaft size: 1 15/16 inches, Bearing size: 1 15/16 inches Sealmaster

Wheel Speed (RPM): 900 rpm

Saw Speed (SFPM): 5,650 sfpm

Recommended Saw Blade:
17 feet 4 inches x 1 1/4 inches x .042 or .035 inches

Kerf: .080 inches

Pitch: 3/4 inch, 7/8 inch, 1 inch

GUIDES AND STRAIN SYSTEM

Type of Guide: Baker designed low

profile guides with back up hardened rollers

Strain System Used: Mechanical spring tension

Wheel Tilting System: 2 point pivot adjustment

NETWORKS

Method of Setwork Drive: Chain driven by hydraulic motor

Set Display: Imperial scale board

Automatic Sets?: Optional 10 point electronic networks

ALIGNMENT

How is Alignment Done at Factory?: 4-foot level

Alignment Guides for User: 4-foot level

POWER PLANT

Standard: 38 HP Kubota diesel runs complete mill to include hydraulic functions

Optional: 25 HP Kohler gasoline runs saw head, 6 HP Kohler gasoline operates all log deck features

LOG TURNER

Hydraulic

LOG LOADER

Hydraulic

LOG DOGS

Hydraulic

CARRIAGE FEED DRIVE

Type: Chain driven by hydraulic motor

Forward Speed: 130 fpm, forward speed has a flow control valve for variable speeds

Reverse Speed: 130 fpm

TOWING

Wheels and Trailer: 14-inch white spoke wheels, P 205 R-75-14 Radial tires, surge brakes

Towing Weight: 5,200 lbs

Tongue Weight: 408 lbs.

OPTIONS AVAILABLE

Board drag backs are standard, optional hydraulic inline debarker, automatic and semi-automatic sharpener and setters

LIST PRICE AS SEEN

\$25,500 Base price

\$1,500 Optional debarker

\$27,000 Total

While some sawyers prefer to use this sawmill as a stand alone machine, others seeking higher production opt for a complete Baker Built Sawmill System that includes a stationary sawmill, edger, and resaw along with loading and conveying systems.

The sawmill is backed by the excellent reputation of Baker Products, a firm that has been manufacturing industrial woodworking machinery for more than ten years. As the world's

leading manufacturer of the thin-kerf band resaw, Baker Products ground breaking and innovative machinery have assisted customers in the wooden pallet, lumber, and fine furniture industries. Many of the features and time-proven parts used in their industrial machinery are found in the Baker Portable Band Sawmill, making this sawmill a smart choice for the smart sawyer.

Anything that is 31 feet long and is supported at the middle will droop at the ends. The droop isn't much, but it is enough to adversely affect sawing accuracy if it is not accounted for. I was delighted that Baker took the pains to describe the situation and how to accurately level their mill.

The saw head is supported by, and moves on, a four-post traveling frame. Each post has a doubly flanged wheel at its lower end that rides on the flat topped tracks. The frame for the saw head is constructed of 3-inch x 5-inch x 3/8-inch steel box beams, so there is not much opportunity for flexing or bending between the band wheels while under load. The saw head travels vertically between two 1 1/2-inch x 3-inch steel channels, and is guided by fully adjustable nylon rollers. Actually, the saw head is on one side of the channels and the engine is on the other; the entire assembly being oppositely cantilevered. At first, I thought that this was a rather a precarious balancing act, but I could detect no sign of play in the assembly. Having seen the mill in operation, I am now convinced that the engineering is sound, but I would be sure to watch the adjustment of the nylon rollers.

The four-post traveling frame is unusual in that it lacks the customary positive drive, which is usually a chain or cable that pulls the saw carriage back and forth along the tracks. The Baker mill uses powered

wheels that are connected to a hydraulic motor by roller chains and sprockets. There seems to be plenty of traction for moving the saw, since Phil Hamlin was able to move a large log back and forth lengthwise to get it centered with the log turner. There are positive stops at either end of the track to prevent the carriage from running off the track. If the carriage hits the stops, the wheels simply lose traction and spin. Each wheel has a floating brass track sweeper to clear sawdust, etc., from the tracks and to keep the wheels clean.

The 24-inch band wheels are machined from 1-inch solid steel plate. They ride on 2 3/16-inch steel shafts equipped with heavy duty bearings—two pillow block ball bearings on the drive side and a single flanged roller bearing on the idler side. The saw guides are made of hardened steel blocks, which are backed by Baker's proprietary eccentric roller guides. A nice feature of the roller guides is their 1/2-inch square steel shank which permits easy adjustment with just a 1/2-inch wrench. The moveable saw guide rides on a 1 1/4-inch square section solid steel shaft which is powered by a hydraulic motor.

Phil was using the 1 1/4-inch x 17-foot, 4-inch band-saw blades. A 1-inch blade is an option. Blade strain is adjusted on this mill by a simple spring tensioner that is torqued down to an index mark. The spring allows a certain amount of

(Continued on page 19)

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(Continued from page 7)

tensional movement of the idler wheel, and helps prevent excessive strain on the blade due to variations in the log. The idler wheel is adjustable, using hand tools, to fine-tune blade tracking.

On the day I visited with Phil, it was about 15 degrees F. He said he had not run the mill for about ten days, having been heavily involved in a cabinet installation. Since we had just had our first week of below-freezing weather, I expected sawing problems because the white pine logs he planned to saw would be frozen on the outside and not frozen on the inside.

When we arrived at the mill, I noticed Phil had a gasoline generator running and expected to find an

engine heater on the mill. But the electricity was for heating the hydraulic oil tank, an excellent idea for mills used in cold climates. Phil said the mill's diesel engine did not have an auxiliary heater, but that it would start right up. It did, after a short application of the glow-plugs. Still, an engine heater would be nice for those really cold mornings we routinely have in Maine.

As soon as the engine had idled for a few minutes, and all the hydraulics had been cycled a few times to get the warm oil flowing, we were ready to start sawing—almost. The log turner was frozen. The turner is a hydraulic-powered unit that “floats” inside a steel box frame. It is open at both the top and the bottom. In warm

weather, bark particles that fall into the top fall out the bottom. When it is cold, the stuff just freezes into a solid, compacted mass. We heated and hammered for a few minutes, and got the turner free. But it soon accumulated a new charge of frozen bark as Phil sawed. A floating cover of some kind needs to be devised to keep the turner free in cold weather. This is probably a simple matter, and the people at Baker tell me they are looking into it.

As Phil sawed the first pine log, about 14 inches in diameter, I was impressed by the obvious power and smoothness of the Baker mill. But all was not well. A slight waviness was evident on the sawn surfaces, about 1/32 inch, which indicated that the saw was deviating from a straight line. I sug-



When a cabinetmaker builds a log home, expect some sophisticated joinery. The silo contains a hand-built spiral staircase.

gested the problem was probably a result of partially frozen timber, but Phil said that was only part of the problem; he had already sawed for a full day with the blade that was on the machine. So Phil changed blades while we talked and I took a picture. The total down-time was 2 1/2 minutes. Simplicity of design and good engineering made blade changing very easy.

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With the new blade installed, no more sawing variation was visually apparent, so I got out my dial caliper. Variation within a single board was very slight—only about .010 inch—and this level of accuracy continued all the rest of the day. Variation between boards was another matter, however. It was difficult to maintain 1/32-inch (.031 inch) consistency in thickness from board to board. The problem lies with the pointer that indicates the height of the saw above the bunks. It is mounted on a long arm that suffers from severe "jiggling." It vibrates, making it difficult to tell where the pointer is pointed. I think that if the good engineers at Baker can produce a machine that saws with micrometer accuracy, they can invent a better method of indexing. That indicator is the only wimpy component that I discovered on the entire Baker sawmill. Mike McNail, at Baker products, tells me that they have designed an improved pointer arm, but are still not satisfied. Anyway, the problem is being addressed.

The third log that Phil sawed arrived at the loader well off center. Phil was able to get it onto the mill with only a little trouble, but it was in such a position that it would have been impossible to turn. He simply raised the arms to corral the log, raised the three taper sawing attachments (each of which is topped by a roller) and moved the log into position with the saw carriage. This is a great feature of the Baker mill.

I guess that you can tell

that I liked the Baker mill. Here are some more of my observations and Phil Hamlin's comments in abbreviated form.

The mill is totally hydraulically controlled. It requires eleven handles to operate. These are well thought out and are positioned in a logical manner—the lever you use first is positioned beside the one you will use next, and so on.

Phil Hamlin's mill has the diesel option, and all hydraulics are powered from the single engine. The gasoline and electric powered options use separate power sources for the hydraulics.

The diesel engine is equipped with a centrifugal clutch. When the engine is idling, the blade does not move, but all the hydraulics are active at reduced speed. To start the blade, and to bring the hydraulics up to full speed, an electric switch is activated. This brings the engine up to governed RPM.

The engine is connected to the sawhead by three matched v-belts and appropriate multi-grooved sheaves. This, in conjunction with the centrifugal clutch, makes a very efficient and, presumably, trouble free power transmission system.

The Baker mill is very quiet in operation. This is probably because of the large muffler and its location, which is high in the air. I always wear hearing protection around machinery—even mowing the lawn—but this sawmill was not at all bothersome.

All hydraulic hoses are



The 24-inch band wheels are machined from 1-inch solid steel and turn on 2³/₁₆-inch bearings.

contained in a flexing plastic track that keeps everything contained and out of the way. Some chafing was evident on the terminal ends of the hoses where the saw carriage passes over them. Either a guard or relocation is indicated.

Phil pulls his mill with a Ford F-150 pickup truck. He says, "you know that it's back there, but towing is fairly easy."

Phil ordered the optional bark scorer that cleans the log ahead of the saw blade. He believes it has been a very worthwhile investment for improving blade life. The attachment works nicely, but appears to be a bit under powered.

All of the bolts on the Baker mill are equipped with aircraft type locking nuts. They cost more, but they don't fall off.

Phil has been well satisfied with the service that he has received from Baker—but then he has not needed much. The only thing that has gone wrong with his mill is a broken hydraulic motor that he ran a log into while he was learning to run the mill. They replaced that at no charge.

The board drags return sawn lumber to the operator's position very nicely. Nevertheless, Phil finds himself walking down to

the log being sawed rather often to get a good look at the next board. The closest that the Baker mill can cut to the log bunks is 1 1/4 inches. That means that the thinnest "dog board" that can be cut is 5/4, unless the sawyer places some shims under the cant for the last series of cuts. It would be nice if this could be re-engineered to allow a final cut of 1 inch.

Phil plans to buy a separate edger to compliment his sawmill. I think that he is right—an edger should increase the mill's production by about 30 percent.

IN CONCLUSION: The Baker portable band-saw mill is a big, heavy, rugged piece of equipment that is capable of precision sawing. It is well engineered, well made and mechanically simple. It is obviously intended for the high end of the portable mill market, and for the low end of the stationary mill market, with the 40 horsepower electric power option. ■

Jim Philp is an Extension Wood Products Specialist at the University of Maine. Philp has built and operated a commercial hardwood sawmill, and has "played with" a number of the current crop of portable sawmills.

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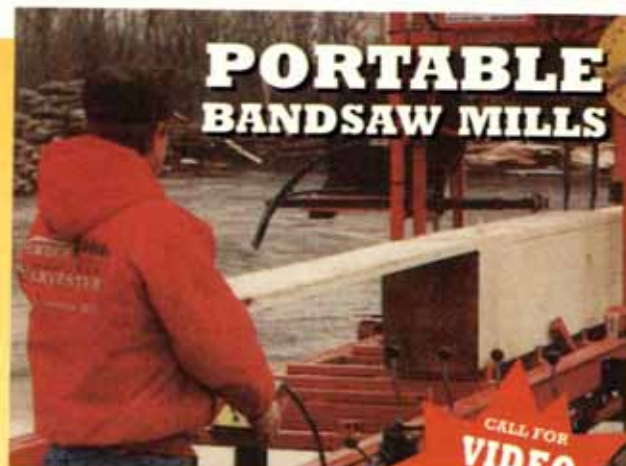
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