

THE
BAND SAW
AND **JIG SAW**
THEIR USE AND APPLICATION



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The
Bench Saw, Jointer and Shaper

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The Band Saw and Jig Saw

1937 Edition

1st Printing

A
Comprehensive Handbook
on
Uses and Applications
of the

BAND SAW
and
JIG SAW

*Containing over
100 photographic illustrations
and line drawings*

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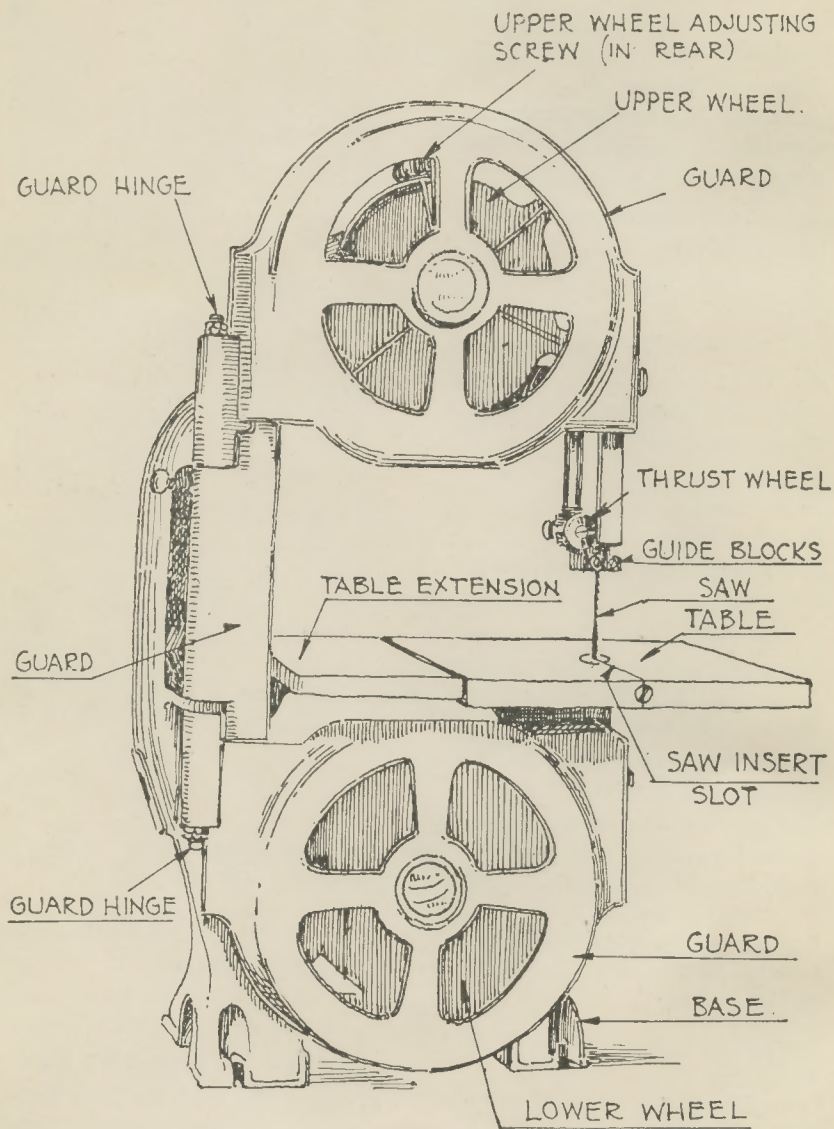
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BOOK ONE

The Band Saw



THE band saw, with its ability to cut all manner of curves from heavy lumber to thin plywood has always been one of the most essential machines in the woodworking shop. It is practically impossible to do the work that a band saw handles quickly and accurately with any other tool either hand or power operated. Only in the last few years has the small band saw been available for the home workshop enthusiast. At the present time there are several band saws available at unbelievably low cost, compared to the prices one had to pay a few years ago. For around twenty-five dollars one is able to purchase a machine that will not only stand up under hard, continuous usage but will do all the work that the more expensive machines of fifty to seventy-five dollars used to do. Not only have these modern machines been designed to insure ruggedness and long continued service, but the number of adjustments and the mechanism has been cut down to a minimum, so that a man need not be a thorough mechanic in order to adjust and operate one of them.

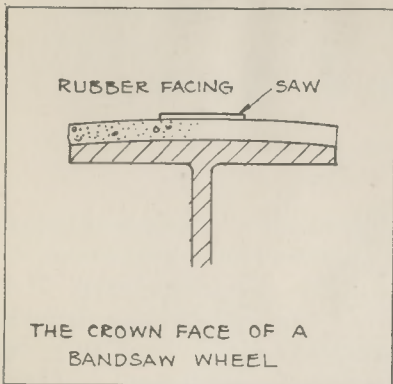


Points of Construction

The first requisite of a band saw is a heavy substantial frame that will not vibrate under continued running and cutting of either light or heavy wood. While vibration is not always detrimental to the machine, it is a decidedly aggravating feature and does not lend itself to accurate and smooth work. For this reason it is advisable for the prospective purchaser of a band saw to pay particular note to determine whether the table or the frame vibrates considerably, even though the machine may not be bolted down to the table.

Bolting the band saw rigidly to a substantial table or bench, helps greatly to eliminate vibration, yet in a properly designed machine, the table or frame should not vibrate under fairly heavy cuts, even though the machine is not bolted down.

Design of Blade Tensioner is Important



Another point of importance is the type of device for adjusting the blade to run true on the two wheels. On most of the present day machines the wheels are balanced and centered properly, and arranged with a crowned face; that is, a face wherein the center of the rim of the wheel is higher than the outside edges. It is a well-known fact that a flat belt running over a wheel or pulley will creep

to the highest point on the surface of the rim. This same principle is utilized in the band saw. The crowned rims cause the endless blade to travel at the center of the wheel rims. Most band saw wheels are faced with rubber bands to prevent dulling of the saw which would occur were it to run directly on a metal surface.



Changing the Tracking of a Blade

To facilitate changing the tracking of the blade, the average machine is made with the upper wheel tiltable as well as adjustable up and down. Mechanical adjusting screws are usually included by which very close and accurate tilting of the wheel may be accomplished. Not the least in importance are the bearings on which the two wheels revolve. The ones most commonly used are the bronze sleeve and the ball-bearing types. Some of the latest models have ball-bearings of the sealed type. These bearings are lubricated when they leave the factory, and require little if any attention for a long period of time. The sleeve bearing machines ordinarily have grease cups or oil cups. Be sure to supply plenty of oil or grease at these points if you expect your machine to continue to run true and be free from vibration.

The next point of importance in a band saw is the method of guiding and supporting the blade both above and below the table, to insure its running true and at the same time to prevent it from twisting under the side pressure exerted when cutting around circles or attempting to follow a straight line. In following a

straight line, particularly if the blade has become slightly dulled, it is almost impossible to prevent the blade from following the softer portions of a piece of wood and being deflected by the hard portions of the grain. This is especially true of the thinner gauge saw blades (of the sizes No. 26, 28, or 30 gauge). To direct the blade and keep it traveling on a line, guides are placed above and below the table. This guiding equipment on most modern band saws consists of a pair of block steel guiding pins which are arranged one on either side of the blade. They are adjustable and support the blade on both sides. In addition there is usually incorporated what is known as a thrust wheel which is set behind the back edge of the saw and is adjustable at the front or back to bring the saw to its proper depth between the block steel guides. Approximately the same type of support and thrust wheel arrangement is used underneath the table as above. The adjustment of both the guide and the thrust wheel is very important to prevent damage to the saw teeth and to insure accurate and smooth work. The upper guide assembly is adjustable up and down so that when sawing thin stock it may be lowered to a point just above the stock. It is raised when thicker stock is sawed. At all times the upper guide should be as close as possible to the stock being sawed.

The table should have a slight adjustment front and back to allow it to be properly leveled in relation to the saw. This latter adjustment is usually taken care of in the casting and mechanical assembly underneath the table, and by means of which the table itself is attached to the main casting. The tilt of the table to the left may be as little as 5° and is only for the purpose of trueing up the table with the saw blade. The tilting of the table to the right is usually arranged so as to allow up to 45° for certain types of band sawing which will be taken up later.



Installation

The band saw should be rigidly bolted to a substantial bench or stand and so arranged that the height of the band saw table is about 42" to 44" above the floor for the operator of average height. This distance will be altered, of course, to suit the requirements of taller or shorter operators. If the operator will stand in an upright position and bend his left arm at the elbow, and then measure from the under side of the elbow to the floor,

he will arrive at a table height which he will find is the most convenient and least tiring.

The band saw should be so mounted that a plentiful supply of light will come either from behind the operator or along the side of the saw frame. Adequate light should be directed at the point where the saw is entering the wood.

The location of the machine in the shop is also important. Time will be saved if the band saw is installed somewhere near the left end of the cabinet work bench. When placed in this position it is one of the most convenient machines to have around the shop, since it will lend itself readily to cutting small blocks and trimming up pieces of wood, making small gauges and stop blocks as well as the regular work of cutting curved lines.



Operating Speeds

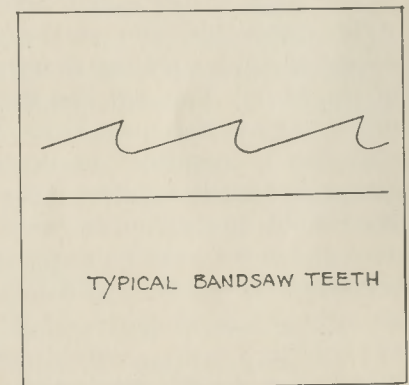
The speed of a band saw blade should be from 1500 to 2000 feet per minute. On a 12" band saw this would mean that the wheel itself should revolve at about 550 to 700 R.P.M. It is not advisable to run a machine faster than 700 R.P.M. since the increased friction and consequent heat at the guide blocks tends to burn the blade and cause undue blade breakage, not only at the point of brazing but at other points as well. On a 14" band saw, the wheel should revolve at from 500 to 650 R.P.M. with the most ideal speed at about 550 R.P.M. On a 10" band saw the revolutions per minute may be from 600 to 800 R.P.M., with the ideal speed at around 700 R.P.M. Theoretically, the speeding up of a band saw should speed up its cutting capacity, but due to the loss of power and the additional unnecessary friction caused at the guide, one finds that this is not so. If the ideal speed is maintained, the saw will not only cut as fast as desired but will also do very clean and creditable work.

The speed with which the stock can be fed depends on the sharpness of the saw, the thickness of the stock, and the skill of the operator. Ordinarily, the speed of the stock will be as fast as the saw can cut without undue pressure against the thrust wheel behind the saw. The exact adjustment and function of the thrust wheel will be described further on.

Sharpening a New Blade

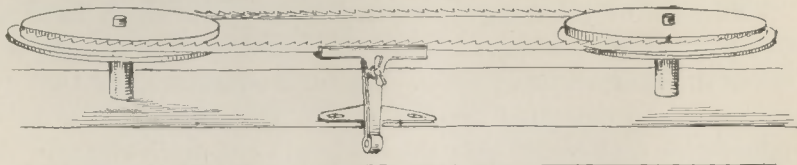
Because of the comparatively low price at which band saw blades may be purchased today it might seem inadvisable to cover the sharpening of them. Yet some operators find that even with a brand new blade, if one or two light strokes of a file are taken over each tooth, that the blade will cut much cleaner. Also that any tendency of the blade to creep to one side or to deviate from a straight line will be eliminated. The band saw is supposed to cut a straight line, and this line of cut should be parallel to the side of the table. Quite frequently the operator may find that the saw will cut a straight line but that this straight line is at an angle to the side of the table. The fault in this particular case is usually in the saw itself, indicating that it needs resharpening. When the ordinary band saw blade is manufactured, it is filed by machine and this filing is usually done in one direction only. This means that there will be a certain amount of wire edge projecting on one side of the saw. It is this wire edge which causes the saw to creep in the direction of its sharpest side. The only remedy in this case is resharpening of the saw, which, while it takes a little time, is not an arduous task.

In the sketch is shown the shape of a tooth on the average band saw blade. Note that there is a slight undercut to the front of the tooth which is slightly different from the regulation rip saw tooth. Outside of this deviation it is a rip tooth pure and simple. On practically all of the standard band saw blades the teeth should be filed straight across the blade. For the average run of woodwork a blade of from eight to twelve teeth per inch is usually chosen. In counting the number of teeth per inch, remember that there is always one more point than there are teeth. For instance on a 10-tooth blade, the distance between teeth will be one-tenth of an inch, but there will be eleven points to the inch.



THE BAND SAW

How to Make a Homemade Blade Sharpener



TYPICAL SET-UP FOR FILING BANDSAW BLADES

In the sketch is shown a home-made arrangement for sharpening band saw blades. Note that the whole outfit consists merely of a board on which to rest the balance of the blade while the portion that is in the clamp is being filed. An ordinary metal-worker's vise may be utilized for clamping the saw, providing the unclamped portion is supported in some way to hold it in a near horizontal position. Extreme care must be used in handling the blade to prevent its getting "kinks" from undue twisting strain.

While filing the blade it is clamped between the jaws of the vise in such a manner as to allow slightly more than the full tooth to project above the vise jaws. With an ordinary three-cornered saw file, take one or two strokes straight across the tooth, filing every other tooth all the way around the blade. After doing this, reverse the blade by turning it inside out and repeat the process filing every other tooth from the opposite side of the blade. You will find that it is only necessary to take one or two and at the most three strokes of the file in order to accomplish a complete sharpening. When a blade gets in such condition that it requires more than three or four file strokes it is advisable to obtain a new one. After a blade has been sharpened once or twice it may be necessary to reset the teeth. If the same procedure is followed as would be used for setting the teeth of an ordinary hand saw, using the same type of saw set, one can accomplish a very creditable job. There is this point to keep in mind when a blade needs sharpening: if you do not wish to do it yourself, you will find that the cost of having the job done by a regular mechanic is almost, if not as much as, the cost of a new blade. In fact the cost of new blades is so low that it hardly pays to have them resharpened. This is particularly true with the smaller types of machines, such as the 10" or 12".

The gauge, or thickness, of the metal in a band saw is im-

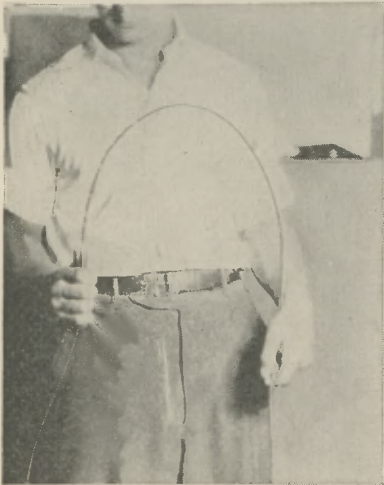
Its Use and Application

portant. For continuous, heavy work it is advisable to secure a blade of 23 or 24 gauge thickness, while for the average run of light work around the home workshop, a gauge of 26 or 28 is sufficient. In selecting a blade for a particular type of work the operator should use the widest saw that he can, and still be able to get around the smallest curve in the particular piece of work that he is cutting out. Remember that it is always easier to follow a straight line with a blade of $\frac{1}{2}$ " width than it is to keep on the same straight line with a blade only $\frac{1}{8}$ " in width. This is due to the fact that the $\frac{1}{2}$ " saw will have more bearing surface behind the teeth, against which the stock may be guided. Then again, it is unwise to use a $\frac{1}{2}$ " blade to cut circles having as small as a 2" radius since this causes considerable strain on the blade, trying to force it to go around such a small curve. Such manipulation is not only detrimental to the saw blade itself, but also throws undue wear on the saw guide, and unnecessary strain on the guide assembly. For the general run of work around a home workshop or small wood working shop a $\frac{3}{16}$ ", a $\frac{1}{4}$ " and a $\frac{5}{16}$ " or $\frac{3}{8}$ " blade will be found sufficient. For heavier types of work such as resawing boards to thinner dimensions and for sawing heavy lumber, a $\frac{1}{2}$ " band saw blade is recommended. When a band saw blade has been removed from the machine, it should be carefully coiled and hung up out of the way where it will not be injured by other metallic objects. It only requires a slight blow to throw some of the teeth out of alignment. A single tooth projecting beyond the others will not only cause the saw to deviate from a straight line, but will also cause a roughing of the edge being cut.



How to Coil a Blade

The coiling of a band saw blade is a rather tricky operation and hard to explain but it is hoped that through the medium of the photograph and the attendant explanation, that this trick may be readily learned. First grasp the blade in the left hand, with the teeth uppermost and the left hand thumb on the upper edge resting on the teeth. The right hand should be placed so that the thumb is on the underside of the blade or the back of the blade and in such a position that the thumb points toward you. The left thumb should point away from you. Now with a



Grasp the blade thus—

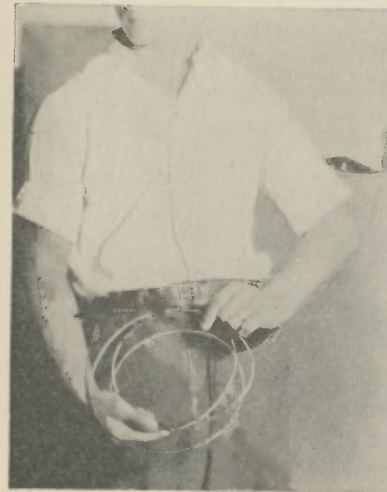
slightly twisting motion, raise or turn the right hand so that the thumb points up. At the same time turn the left hand so that the thumb points up. This will form two half loops in the blade. Now continue turning the right hand until the thumb points toward you and the loops thus formed are turned over until they go through the loop formed by the left hand and are underneath the left hand. Continue twisting or turning the right hand until the back of it is toward you and you will note that the saw has a tendency to form three loops

and go together. With the index finger of the left hand, grasp the three loops and release the saw with the right hand.

Another method of coiling a blade is used in production shops where large blades are handled. The blade is rested on the floor and the toe of the right foot is placed over it to hold it down. Both the right hand and the left hand grasp the saw at points approximately opposite each other on the saw blade. Then both right and left hands are twisted toward each other at the same time. Under this action the portion of the blade that is close to the operator is forced down into a loop. The loops which are formed by the right and left hands are brought toward each other, the right hand loop being guided underneath the left hand loop, and both hands forced down toward the floor. At this point the three loops formed will nest together and may be grasped by either the right or left hand.



turn the hands to this position—



—catch the loop with the index finger.

After a blade has been coiled it is good procedure to wrap a piece of soft iron wire around the coil at least at one place to prevent it from uncoiling accidentally. A blade falling from a hook or nail overhead and uncoiling as it falls can become rather dangerous. When coiling or uncoiling a saw blade, precaution must be taken to grip it firmly with both hands to prevent an accidental slipping of the blade during the operation. Care in handling will prevent the operator from a possible scratch or other injury.



The Blade Tension

The proper tension of a band saw blade for accurate and fast work is a very important matter and is not always understood and appreciated by the average operator. There is no absolute rule by which the tension of a blade may be measured as there is no hard and fast rule by which the operator may be guided. The general rule is to have the blade just tight enough to do its work and no tighter. It is not necessary to have the blade as tight as a fiddle string, nor is it wise to have the blade so loose that it may be easily twisted in going around small curves. While the blade is guided above and below the table to overcome this twisting tendency, the tension of the blade itself has a considerable influence on this twisting. While some band saws are equipped with so-called indicating or tensioning devices, the only real indicator is the operator himself. Experience, of course, can only come with continued operation. The safest procedure is to mount the blade and put only a slight tension on it, just enough tension to hold the blade in contact with the wheels while they revolve. If, with this much tension the operator finds that the blade has a tendency to twist when going around small curves,