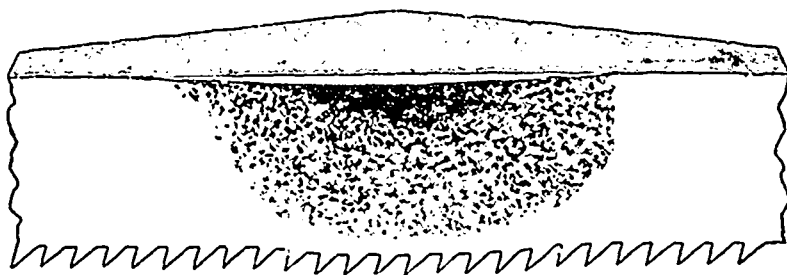


### TENSION—WHAT IS IT AND HOW TO OBTAIN IT.

TENSION in a saw is a preparation of the saw to do a specific work by compensating in advance for certain conditions known to arise during the operation of sawing. During the hardening and tempering processes, according to the thinness of the blade, it runs in various forms of bends and twists; in band saws it often deviates from a true line flatwise, edges still remaining parallel, but having run in a serpentine form. It is the work of the expert saw-maker to correct these inequalities arising during the process of manufacture. The saw is also susceptible to modifications in form arising from its use in the mill, and it is the work of the expert saw filer to correct such inequalities thus arising during use.

The tensioning of a band saw ought to be more easily understood and reduced to a system than the tensioning of a circular, for the reason that band saws are, for the most part, run of an even width, with the same relative tension, whatever the width, while the circular saw varies with different diameters, speeds and conditions of use. In a band saw, by a constant and proper use of the straight edge and tension gauge, the drop may be regulated to a nicety. An able filer, as a result of study and investigation, should arrive at a condition for the fitting of his saws, to suit the particular band mill and the work in hand, that should continue practically uniform. A filer that is able to keep his saws in condition to accomplish uniform and satisfactory results is entitled to and may expect good remuneration for his effort, while his employer may likewise expect a proper daily average output.

To secure the proper action of the saw teeth, the toothed edge of the saw should be the shortest or firmest. The tendency of the saw while in operation, and as a result of the processes of sharpening and swaging, is toward a "fast" condition, that is, an expansion of the edges longer than the central portions. This tendency must be constantly counteracted by the processes



EXPANDING THE BACK EDGE.

of hammering or rolling for tension, whereby the central portions of the saw are expanded and made longer than the edges, and the back edge made longer than the toothed edge, in various degrees. The weight or strain used on the mill is calculated to create a frictional contact between the saw blade, which is simply a belt of steel, and the band wheels, sufficient to overcome the resistance of the lumber to the action of the saw in the cut, and this forcing apart of the wheels by the strain on the mill exerts a strain on the saw which is greatest on the toothed edge, because the remainder of the saw has been given more tension or expansion. In the process of sawing there is added to the above longitudinal strain on the saw, a lateral strain, due to the feed of the timber to the saw, and this feed must be directly proportioned to the excess of strain in

the toothed edge over the remainder of saw, or the saw will not cut to a line. The sawyer must so direct the feed that this lateral strain of the saw in the cut shall not exceed the longitudinal strain of the cutting edge, or in other words, must vary the feed according to the size and clearness of the stock being sawed. It will also be apparent that the prevention of cracks, or the preservation of the life of the saw, must depend very largely upon the avoidance of all unnecessary strains upon the saw, whether longitudinal or lateral.

A band saw running on a mechanically straight line is much more efficient than one running on an irresponsible wave line. When the saw is properly tensioned, if you apply a straight edge to the back of saw, longitudinally, the saw shows convex, and if applied to side of saw it will show flat all along the blade. Place the saw upon the mill under the strain and it becomes a straight belt of steel, with the toothed edge so tight that it is supposed to cut a line. It doesn't always do it, however, as many a lumber pile testifies.

The exercise of care each day and the close examination of the saw as it comes off the mill marks the successful filer. The special work each time may be little, but it is the "stitch in time." It means an ultimate saving of time and of saws. Look for the tight spots. Make sure the tooth side is not convex. So doing, the work of fitting is reduced to a minimum, unless you strike iron or stone, or have a saw pulled off the wheels.

Band saws are bound to stretch on the toothed edge, and when so stretched are likely to crack. In testing the edges lay the saw flat on leveling bench, test the back with straight edge, and if a hollow spot is found, use the round face hammer, or the rolls, along the section thus requiring expansion, having regard to not taking out the tension, which you will do if you work along the edge without going into the body of the saw. If you use a hammer, use it so as to avoid any marks or indentations. Have the back of the saw touch the straight edge throughout, or better still, have the back full or convex. Thus the tooth edge, being the shortest edge, when subjected to strain is drawn tight or straight and passes through the cut on a line, whereas, if longer than the back edge, it would tend to wave or kink, thus causing a constant vibration of the blade.

In applying the straight edge, mark only the highest spots, being careful to mark directly on these lumps. A straight edge, in testing tension, should not be rocked or leaned, but applied as nearly square as possible. A north or east light is best, and light should strike saw from but one direction.

The tension in a circular saw is like the tire on a wagon, it holds and steadies the inner portions. It is somewhat similar in the case of a band saw. The reason why the back edge may be slightly longer than the front is that the strain of the weights on mill, and the friction arising from the saw in cut, which is 50% or more greater on the front edge than on the back, causes heat which expands the blade to a certain degree, and more on front than back. If this difference in length

of the two edges is made equal to the expansion of the saw in operation, then the saw will cut a line and with no tendency to crack. But if you get the back too long, so that the expansion of the toothed edge cannot compensate for it, then the front will crack, as it cannot stretch enough. If you could examine the saw in operation at full speed, you would find little or no tension apparent, because the heat draws the tension and makes an even strain on the blade. Both filer and sawyer have to do with the preservation of tension. The sawyer should see that the guide is neither too tight nor too loose after each changing. The guide must be in perfect line with the carriage or feed roller. Sometimes a chip falls between the guide and the saw and wedges in so tightly that it cannot be removed until saw is brought to a standstill. Before this can be done the saw will be in bad condition. The tension is out and it may be cracked or spoiled entirely. From catalogue of Baldwin, Tuthill & Bolton, Grand Rapids Mich.

### FORESTRY IN NORTH AMERICA.

A RECENT issue of the Journal of the Canadian Bankers' Association contains a carefully compiled article by Mr. John Bertram entitled "The Forestry Question in North America." At its outset reference is made to the evil consequences of deforesting, and to the growing appreciation in late years of the necessity of perpetuating our forest wealth. The steps taken by the United States in this direction are outlined. As showing the rapidity with which the State of Michigan was denuded of its forests of white pine, it is stated that the cut of timber increased from 788,318,000 feet in 1878 to 1,413,631,089 feet in 1890, and decreased to 513,585,289 feet in 1900, of which 265,234,314 was from Canadian logs. In the Dominion of Canada the forestry movement is said to be steadily growing, and the Ontario government is commended for its system of fire ranging. Figures are given showing the rate of growth of young pine. Germany has a system of forestry, and the net revenue from the crown forests, after paying all expenses (which were over 50 per cent. of the net product) was, in 1893, \$1.33 per acre. The concluding paragraph reads as follows:

"Canadians are still unable to grasp the significance of their heritage. They have, north of the height of land in Ontario and Quebec, a still unbroken wilderness covered mainly with spruce fit for the saw and pulp mill. As the world's supply of sawn lumber and pulp wood decreases, the shores of the Hudson Bay and Labrador will resound with the hum of machinery, and the world's supply of spruce timber will be sent forth from that northern country; and as spruce reproduces itself quickly, it will, with good judgment and the institution of a proper forestry policy, forever remain a mine of wealth to the country."

One of the busiest mills along the river last season was that of Smalleys & Woodworth, of Bay City, Mich. The band saw was started on day work February 24, and ran uninterruptedly until December 1, while night work was begun March 20 and kept up until the close of the season. Steady employment was furnished to 75 men. The total cut was 22,500,000 feet.