...ned beef, all thoroughly cooked and ready to slice for ...e table, and each ham or piece of beef securely wrapped in one or more thicknesses of heavy brown paper, so ...s to be safe from flies or dust.

In the factory of which I speak, several sizes of these ...xes were made to suit the size of the retailers' orders, ...d, from these boxes up to a large heavy pork box, for ...ing dry-salted pork, all were being made at the same ...e. It may be noted here that the size of the box often ...s something to do with the quality of the lumber used, ...d, such is the range in quality, unless a piece of board ...s a large, loose knot in it, or some other kind of a hole ...r a rotten piece too soft to hold together long enough to ...ely carry its contents to some distance, little or nothing ...f it is wasted in the making of the larger or coarser ...zes. So, when a board comes to the cutting bench, it ...kes but a glance for the cutter to decide what to put ...s first cut into. If he has a clean, solid piece he can ...t off without involving waste in the next cut, he takes ...d for some size or quality of box requiring that kind of ...ock.

The next piece may be too poor to accompany the first ...ece, or there may be a loss on it, or a spot that must be ...t out. But, even in this respect, the cutter does not ...ways do the cutting out, as perhaps it may be better ...ce when the piece passes to the rip saw, to size up the ...des, top and bottom of the given box, so he may leave ...e defective parts in, simply cutting the right length, ...epending upon the man at the rip saw to make it good ...ough for the box for which he designs it. If the cutter ...as not sizes enough on his list or on his orders to use up ...l the pieces he is obliged to make, those pieces left are ...nt on the carrier to some other part of the shop where ...ey are carefully piled up and marked for future use.

Before getting thus far, I ought to have said more with ...gard to the thickness of stock. For instance, the bulk ...f the lumber bought for any box factory is sawed one ...ch thick, or, really, an inch and one-sixteenth, although ...ere is a good deal cut that is barely an inch thick. Next comes stock one and one-quarter, one and one-half ...d two inches. The box makers buy but little over two ...ches thick, although occasionally some is wanted for ...ecial purposes, usually to be resawed into several ...ickness of thin lumber, which can be obtained in no ...her way. As a general rule, the saw mills make but ...ry little lumber, suitable for the box makers, which is ...der one inch thick, although, in some kinds, like poplar, ...asswood, cottonwood and gum, the box makers get ...ore or less of the low sortings of thin stock, cut per...ps for other purposes, but which is too poor to ship for ...ything but boxes. In cottonwood and gum there is, ...sides, considerable cut thin purposely for the box ...akers, but, at the same time, very much of both kinds ...f wood has to be resawed for the smaller and finer ...xes.

I think the bulk of the one-inch lumber bought by the ...x-makers is used full thickness, after simply dressing. They buy the inch-and one-fourth and inch and one-half ...o be resawed into two, three or four thinner pieces. As I have already said, the two-inch and thicker is almost in...riably bought to be resawed, but, of course, some two-...ch stock, as well as some of the thinner kind, the inch ...d a-half and inch and a-quarter, is used for making ...eats, of which more will be said later on.

To return to the regular process through which the ...mber goes: It may be said that, usually, after leaving ...e cutting-up bench, it goes to the rip saw, where the ...pper takes one, two or more pieces of the cut-up lumber ...de by side, rips off enough from the last piece to leave ...e whole just wide enough for a top or bottom or side, ...d, perhaps, at the same time, the pieces for the ends, ...tting just enough together to make the parts of the box ...ady to nail up.

Here, again, is a great chance for saving or losing. Where two, three or more parts are required for a side or ...ttom, the ripper must be able to lay his hand on a last ...ece that shall so nearly answer the purpose as to re...re the least amount to be ripped off, or else he must ...ke a piece so wide that after ripping off what is needed ...r the purpose, he will have a piece left to go into ...e next side or whatever he is making. It also depends ...pon him to cut out the defective parts in the boards ...ithout wasting any of the good lumber. He may some...es be obliged to cut out such a wide piece from the ...ddle of the board, in order to get rid of a bad defect, ...which case he sends the piece cut out back to the cut-...p man to be cut over for a smaller box.

It is plainly to be seen that there must be a man of the best judgement at the rip saw bench, as well as at the cutting table; for between the two men, more than anywhere else in the mill, lies the making or breaking of the concern. Between them more than anywhere else in the shop, after the buying of stock, lies the portion of profit and loss, provided always the man who makes the price on the finished box has figured properly.—Packages.

SAW GRINDING.

THE following suggestions are taken from the Timber Trades Journal, London. They are contributed by M. Powis Bale, M.E., author of several works on wood-working methods, and are presumed to represent the latest English practice:

For many years after the introduction of emery wheels or discs, a prejudice existed against their use for sharpening saws, and, to some extent, this prejudice still survives. It arose chiefly from the fact that many of the wheels made were unsuited to their work, and the user had little knowledge as to their proper management. In the following paper some hints will be given as to their management, which may be found serviceable to users, and although these remarks relate chiefly to emery wheels for sharpening saws, they can in most cases be equally well applied to emery wheels used for other purposes. In the first place, it is important to secure an emery wheel of good quality, and of a texture and hardness well suited to the work. This is not so simple a matter as it may at first appear, owing to the quantity of cheap, inferior wheels—chiefly of continental make—with which the market is flooded.

For saw-sharpening purposes a moderately soft wheel should be preferred, since it will cut quicker and heat and glaze less than a hard one; it will, however, wear out a little sooner. Some wheels are harder on their surface than further in, and they do not cut their best until they are worn a little, but the best class of wheels may be obtained of any required degree of hardness, as it is only necessary to vary the proportions of the compound used in their manufacture. Sometimes a good wheel will be condemned as bad when the fault may arise from its being unsuited to the work it is used for, or it may have been run at an improper speed. In establishments where a variety of work is done, it will pay well to have a fair assortment of wheels, and not make one do duty for all kinds of operations. When the wheel is secured, before mounted it should be examined to see that it is perfectly sound. This may be ascertained by tapping it lightly with a hammer; if sound it will ring, if it does not ring it should be closely examined, and if any cracks or flaws are detected, however slight, the wheel should be discarded, as it would be dangerous to work.

To lessen the chance of accidents from cracks, the manufacturers of some wheels insert in them a web or webs of brass wire, proportioned in strength to the size and weight of the wheel. They claim that the insertion of the wire does not in any way affect the cutting power of the wheel, as it wears away in advance of the emery. The wheel should be mounted so that it fits easily on the spindle, and thus have room to expand should it become warm. Large washers or flanges, say about one-third the diameter of the wheel, should be fitted on either side. These are preferably made slightly concave on their inner side, and a thin piece of packing—rubber or leather will do very well—should be placed between them and the wheel. Care must be taken that they are not screwed too tightly, as the wheels are liable to crack, especially if a little warped, and they are then, of course, exceedingly dangerous. The saw-sharpening machine in which the wheels are run should be well made and substantially built, the main frame being cast in one piece. In the best machines the emery wheel is mounted on a small steel spindle running in bearings or centers fitted in a counterbalanced swinging carriage. This carriage is brought down to the saw by hand, and, by means of a quadrant, can be set at an angle to give any desired lead to tooth; stops are also fitted to regulate the depth of the gullet and the pitch of the tooth. The countershaft is usually placed at the back of the machine, and the band (belt) giving motion to the emery disc passes over an idle pulley and then directly on to a small pulley on the emery disc spindle. In the place of single pulleys the writer strongly recommends the use of adjustable pulleys of different size, or small cone pulleys, so that as the wheel wears less in diameter its speed can be increased in proportion.

The question of speed is a factor of immense importance in the successful working of emery wheels. The best cutting speed will vary somewhat in wheels of different character; but a speed of from 4,500 feet to 5,500 feet per minute at the periphery of the disc will usually be found suitable. A speed midway between the figures, say 5,000 feet per minute for the 12-inch wheel, which is generally used in sharpening saws, may be accepted as a standard. When the wheels are worn down considerably in diameter a smaller set of side washers may be substituted.

For sharpening saws, wheels of a thickness of three-eighths to three-quarter-inch, with a diameter of 12 inches, will be found the most suitable sizes. If a deep gullet be required, a moderately coarse grit wheel should be employed, and for topping and finishing the teeth, a fine grit wheel used; the teeth should not afterward be touched with a file, as some operators will persist in doing. It will pay well to have a set of emery wheels mounted on different spindles, so that they can readily be slipped in and out of the machine. In sharpening saws, in fact in any kind of emery grinding, the pressure of the wheel on the material to be removed, or vice versa, should be light. It is a very erroneous idea that heavy pressure produces rapid cutting; it simply results in the glazing of the wheel and the hardening or burning of the teeth, which will often crumble and break at the points when in work.

The teeth of saws should never be allowed to get short and stumpy, as they will do less work and take more power to drive, as the saw has a greater tendency to bind owing to the want of sufficient room in the gullets for the sawdust to escape rapidly. If a saw has been badly kept and it is necessary to remove much metal, instead of forcing the wheel as hard as possible on the saw-plate, and making it become red or blue from the heat, the operation should be lightly repeated several times in succession. With the object of preventing the case-hardening of the teeth points, sometimes a jet of water is allowed to play on the tooth being sharpened, but with ordinary skill and care this should not be necessary.

In America deep gullets are often cut with a milling cutter arranged with an automatic feed, and a stop adjustment to regulate the depth of gullet; but if a saw be kept in proper order the use of this tool is unnecessary. The same may be said of the fly press sometimes used in this country, which, in punching out deep gullets, often springs or cracks the saw plate, and is at the best a very bad practice.

STEAM PIPE COVERING.

A NOVEL method of testing the efficiency of coverings for steam pipes electrically is in use. A section of the steam pipe is heated electrically by means of a coil of wire in oil within the pipe. The amount of energy necessary to keep the pipe at a definite temperature is measured. Since the energy supplied is just enough to maintain a constant temperature, it must therefore equal the heat lost from the pipe. Hence, from the electrical energy supplied the heat lost from the outside of the pipe can be calculated. The new method, which was recently described by Prof. Chas. L. Morton before one of the American learned societies, would seem to be worthy of attention.

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