

any more than 18-inch long, it will certainly keep the man feeding the vertical machine on the jump to keep one piece close behind the other, unless the stock is fed on a very slow feed; and even at that it would be utterly impossible for the resawyer to pick up the complete boards and put them in the rolls of the vertical machine, if they were 18 or 20-in. wide and very short.

At present we are making boxes out of Balm of Gilead lumber. Any one who has had experience in fitting saws to cut this lumber will admit it is a tough proposition. I would rather saw hard maple any time. The boxes are 19-inch wide by 25 $\frac{3}{4}$ -inch long. I was watching the horizontal machine at work this afternoon and timed the machine on slow feed. It was turning out twenty-three pieces to the minute. We were running on slow feed because the stock had to be tied up in bunches, and the boys doing the tying could not keep up if the pieces came out any faster. When resawing stock that does not have to be tied, we turn out about forty pieces to the minute of this same stock.

It is impossible to do this work on a vertical machine, unless the double tongue and groove are made so tight that the pieces have to be driven together, so they will hold while the resawyer is turning them up to be put in the rolls of the machine. One cannot put as many pieces through the vertical machine as can be put through the horizontal, even then, because if the feed were fast as the horizontal, and the pieces very short, they would be out of the rolls before the resawyer could get hold of another piece. Then, again, a good many boxes are not double tongued and grooved. It would be out of the question to drive these pieces together to hold so that they could be picked up and put into the rolls of the vertical machine, without coming apart. The only way this box could be resawed would be to saw one piece at a time until the whole width of the box had been sawed. This would be a very slow way indeed.

Buying a horizontal band resaw for box factory work is a very important undertaking. The buyer should not take the first that is offered unless he is sure the machine has all the necessary equipment for his work. He should see that the machine is equipped with a good automatic hopper feed, with steel chain and steel bars to deliver the stock to the rolls. He should also see that the chain is so constructed that the steel bars can be easily spaced for different lengths of stock. And he should see that the machine is equipped with a sectional roll, so that pieces of uneven thickness may be fed through as though the stock was all of uneven thickness. The next important thing is to see that the machine is constructed so that the cut will be close to the driven wheel, as this will insure a large capacity. One more very important thing to see to is the latest improved straining device. This, on a horizontal band resaw, should be very sensitive, and so arranged that it can be easily adjusted.—W. Thompson.

PROPER JOINTING OF STAVES AND HEADING.

By James Innes.

What is a theoretically perfect joint on staves? It is a segment of a circle, the diameter of which is governed by the length and bilge of the stave; in other words, if a stave 30 inches long, with a $\frac{3}{4}$ -inch bilge, was laid on the ground; a peg driven in the ground and 16 feet away from the centre of the stave; a string attached to this peg, extending to the outside edge of the stave at the centre, should travel exactly along the outside edge of the stave, and if continued in the circle meet the opposite end of the stave, after completing the circle. Thus:—

By using the above method, what the old-time coopers called a "round barrel" is produced, tight at the head, quarter and bilge; provided the staves are manufactured with proper circle, jointed with a slight under-cut, and no staves put up so wide, that they will buckle in.

While the above is both theoretically and practically a perfect joint, a satisfactory joint can be made on staves varying considerably from the above, even the "cock bilge," and producing a tight barrel; providing that at all times the quarter is straight enough, so that the staves at their ends and the bilge come together without leaving openings at the quarter.

The barrel, however, is never as strong as when the staves are jointed on the circle (as above), as it is only the quarter hoops that hold the staves in place, and if these hoops are released the staves spring out at once in an attempt to form an arch.

The principal errors to avoid in jointing staves are, first, to put too much under-cut on the staves; and next, the breaking away of the staves on the under edge when jointing.



Providing the staves have too much under-cut, when the barrels are shaved it is liable to leave an opening where the wood is shaved away, and where steam trusses are used often causes buckling in. This matter, however, can be easily avoided by the cooper.

The breaking away of the staves on the inner edge can be absolutely prevented by the jointers having their knives sharp, their bed-plates square, and on no account allowing the staves to tip when jointing.

If the staves are dry when they are jointed and the above rules are conformed to there will be no trouble so far as the joints on the staves are concerned.

Nearly every old cooper you speak to will tell you that the proper way to joint heading is to leave a slight opening in the centre; in other words, they say leave your heading slack in the centre.

This is a relic of by-gone days, when all heading was air-dried. When the heading was made, and put up into bundles, out of what was supposed to be thoroughly seasoned timber, and kept in a warm, dry place for months, the outside of the bundles would naturally dry more than the inside, as, no matter how long heading boards have dried on the yard, when they are turned up and stored in a