from which three boards have been made from one, we find that the thin board is not susceptible of representation in thickness by any of the ordinary terms used to designate fractions of an inch, nor when we put two of these thin boards together to figure a pair of box parts do we find the problem any easier; yet by using the "Box Estimator" and taking the contents of the 5-4 tables, dividing same by ⅓ for one piece, or ⅔ for two pieces, we get the board measure contents at once. Then when four pieces are made from a board 1¼ inch thick, we know that the board measure contents of one of the thin pieces is exactly 5-16 inch of 1-inch lumber and hence for box parts, used in pairs, ⅝-inch lumber is required, so, taking the contents results from the "Box Estimator" tables for 5-4 lumber, we need only one-half of the figures there given.

Thus, in board measure

12 × 12 × ⅓ of 5-4 = .417
12 × 12 × ⅔ of 5-4 = .834

And

12 × 12 × ¼ of 5-4 = .313
12 × 12 × ½ of 5-4 = .625

For 6-4 lumber we have, for once resawing, in each piece exactly ¾ of the contents of 1-inch board, say

12 × 12 × ½ of 6-4 = .750

For 6-4 lumber resawed twice, we get precisely the same board measure contents that we do if 1-inch-thick lumber is used, and resawed in centre, i.e., for each piece of the product, viz:

12 × 12 × ⅓ of 6-4 = .500

When three resawings are made in a 6-4 board then each piece equals ⅜ of 1 inch thick or

12 × 12 × ¼ of 6-4 = .375

And, of course, box parts, being in pairs, require double the amount of board measure feet. The figures for the box parts would be:

12 × 12 × ¾ of 6-4 = .750

or just one-half of the contents tables of 6-4 lumber as shown in the "Box Estimator."

If we deal with five pieces from 6-4 lumber, we find no term in board measure which properly expresses this product of a 6-4 board after being resawed four times. It is nearly 5-16 of one inch thick, but not quite. The product is, however, just one-fifth of the contents of the 6-4 tables of the "Box Estimator," and for box parts as we need two pieces for each part then two-fifths of these tables will express correctly the board measure contents thus:

12 × 12 × 1-5 of 6-4 = .300
12 × 12 × 2-5 of 6-4 = .600

I am not aware of any great amount of 8-4 lumber being worked into boxes. Yet I do know it is used occasionally, and I think it better to illustrate this a little.

12 × 12 × 8-4 = 2.000 No resawing.
12 × 12 × ½ of 8-4 = 1.000 Resawed once.
12 × 12 × ⅓ of 8-4 = .667 Resawed twice.
12 × 12 × ¼ of 8-4 = .500 Resawed thrice.
12 × 12 × 1-5 of 8-4 = .400 Resawed four times.
12 × 12 × ⅙ of 8-4 = .334 Resawed five times.
12 × 12 × 1-7 of 8-4 = .286 Resawed six times.
12 × 12 × ⅛ of 8-4 = .250 Resawed seven times.

The foregoing figures being for one piece of each description of product of the 8-4 plank, must, of course, be doubled after resawing commences.

The 8-4 tables of the "Box Estimator" are intended for the figuring, in pairs, of parts of boxes made from 1-inch lumber, these being usually known by the term of ⅞ inch, and these 8-4 tables are also used for the surface measure contents of a pair of parts for any box.

When resawing of 8-4 commences we find that dividing the plank in the centre brings us back to the 4-4 problems, which have already been explained, but if we resaw the 8-4 plank twice we have a product which can be expressed only by saying it is ⅓ of 8-4 so far as board measure goes, and the 8-4 figures thus in pairs for box parts:

12 × 12 × all of 8-4 = 2.000 Resawed once.
12 × 12 × ⅔ of 8-4 = 1.334 Resawed twice.
12 × 12 × ½ of 8-4 = 1.000 Resawed thrice.
12 × 12 × 2-5 of 8-4 = .800 Resawed four times.
12 × 12 × ⅓ of 8-4 = .667 Resawed five times.
12 × 12 × 2-7 of 8-4 = .571 Resawed six times.
12 × 12 × ¼ of 8-4 = .500 Resawed seven times.

Now the foregoing examples of thin lumber do not cover by any means the combinations which are made by many manufacturers to suit certain conditions; there is the manipulation which takes place by resawing (not in the centre) but to one side of the board, producing different thicknesses from the same board to suit various orders.

The usual result of such proceeding is to increase labor cost by reason of slower cutting and more handling, which increase also adds to fixed expense because of decreased factory output, and there is liable to be more waste made when such combinations are attempted.

The beginner should be very careful about attempting difficult combinations. The experienced manufacturer knows exactly what these things mean in the way of cost and risk, and never undertakes them unless there is a better price obtainable for the article produced from the special combination, and a sufficient and satisfactory outlet for the balance of the stock produced while the specialty is being made.

To arrive at the board measure contents of each thickness produced by special manipulation of any board used, the rough measure of the board must always be made up, when the resulting thicknesses are figured together, nor must the saw kerf be forgotten, one-half of it belongs to each piece produced, therefore, the fractions which represent the different pieces must, when added together, equal the rough thickness of the original piece from which they were manufactured.

STAVE MILL REFUSE.

The successful management of a stave and heading factory depends largely on the profitable sale of the refuse—wood unfit for cooperage stock. A part of every block is refuse, even in stock of the choicest selection. When the rough stock is inferior, the percentage of refuse is, of course, largely more than in good wood. When there is a good and profitable sale for stove wood, the problem is partly solved, because the "clippings"—waste from the edge of the staves in jointing—are small and dry and make the best of kindling wood for starting fires. I have seen fires made with clippings that baked the most delicious biscuits, fried the sweetest pork chops and boiled coffee that was unsurpassed in the neighbourhood. When a man or a woman breaks clippings awhile to use in a stove, or handles them