Plane Talk for Better Lumber

Continuing Peter Koch's discussion on better ways of planing lumber in the mill. A brief look at some important factors such as *two-way thicknessing*, rate of output, and economy.

by **PETER KOCH**
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In the conventional cutterhead arrangement the presure on the lumber passing through the planer is exerted downward—forcing the stock against the lower bed line first. The effect is as follows:

1. The top cylinder must remove the excess thickness, if any, to produce a finished face. The lower cylinder then takes a fixed cut from the back or lower side of the lumber regardless of whether the face has been surfaced or not.
2. If the stock is too thin to be surfaced on the face, it will be made still thinner by the cut from the lower cylinder causing unnecessary waste.
3. Because the upper cylinder cuts while the lumber is still rough on the back, it may produce a wavy surface on the face.

"Two-Way Thicknessing"

On the *Two-way Thicknessing* planers the bottom cylinder cuts first, and pressure is exerted upward against the top platen which is solidly locked in a position which reserves the thickness necessary for surfacing the face, face up, afterward. These planers operate as follows:

1. A varying, unmeasured cut, heavy only if stock is thicker than necessary, is taken on the *bottom cylinder* against a solid overplate: i.e., the *lumber is measured* and thicknessed, first from the back against a solid plate above. Thus, the surplus stock, if any, is taken from the heart, or low grade side of stock having a face side.

This method of taking the most material from the back has another advantage due to the fact that all lumber, after it is run through a planer, will warp or cup to a certain degree toward the side from which the planer takes the heavy cut. As this is the case, instead of flooring being cupped toward the face side which spoils the matching, it is cupped toward the back and the matching remains perfect. As the machines never remove a heavy cut from the face side, no stock warps toward the face, but instead, all warpage is toward the back, leaving the edges turned away from the face and joints closed rather than open.

Again, if the stock is *too thin* to allow for planing fully both sides, only a light cut or no cut will be removed from the back, depending upon its varying thicknesses along the board, because it will be pressed upward—measured—against the upper bedplate by the upward pressure means and the bottom chip-breakers and held there until it passes the bottom cylinder.

Thus, the lumber will purposely be left rough, or partially rough, on the back, and not be made thinner without any good reason. Stock will be skip-spot-planed on back, only at such places in the board

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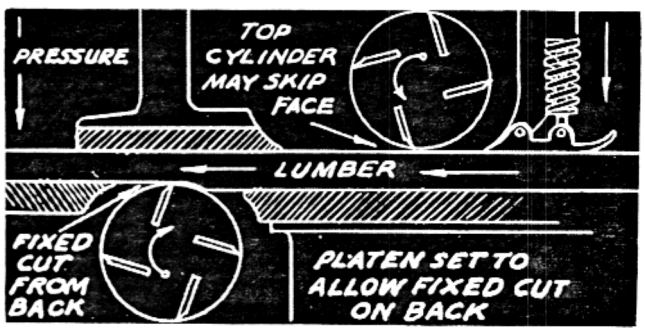
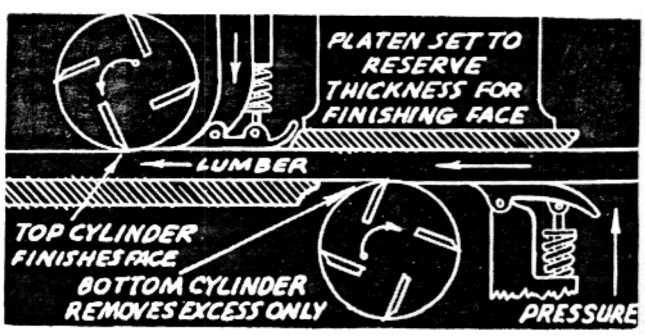
Conventional planer head arrangement.



***Two-way thicknessing* planer head arrangement.**



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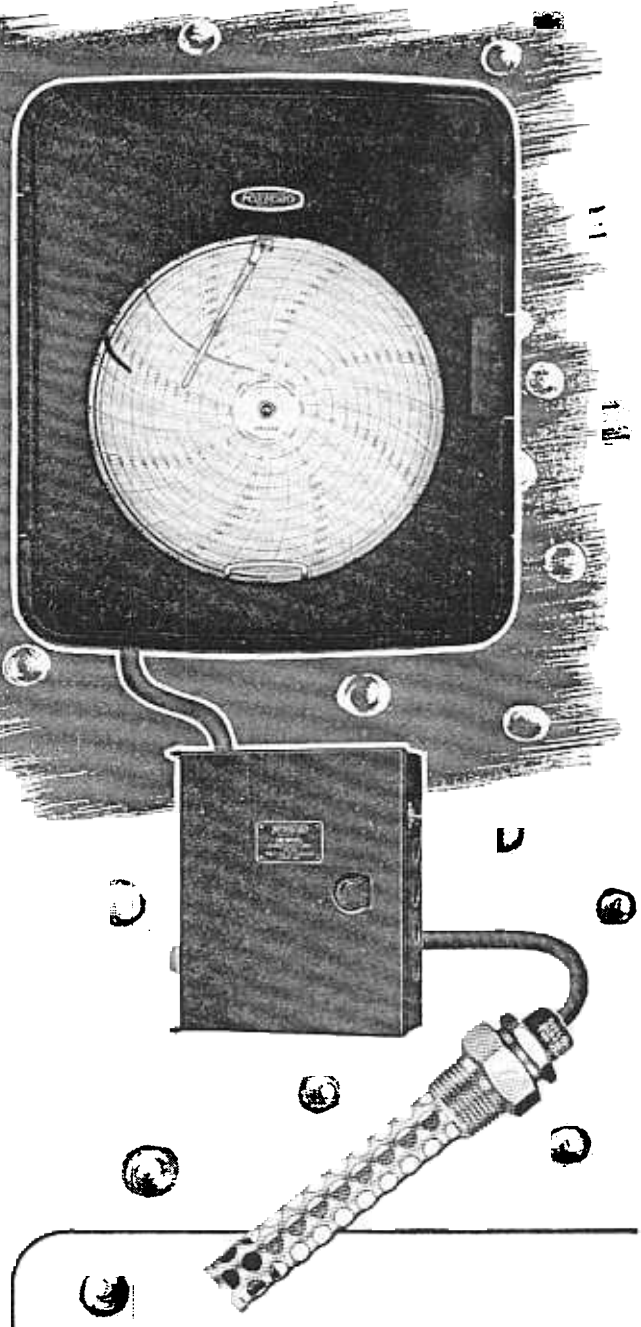

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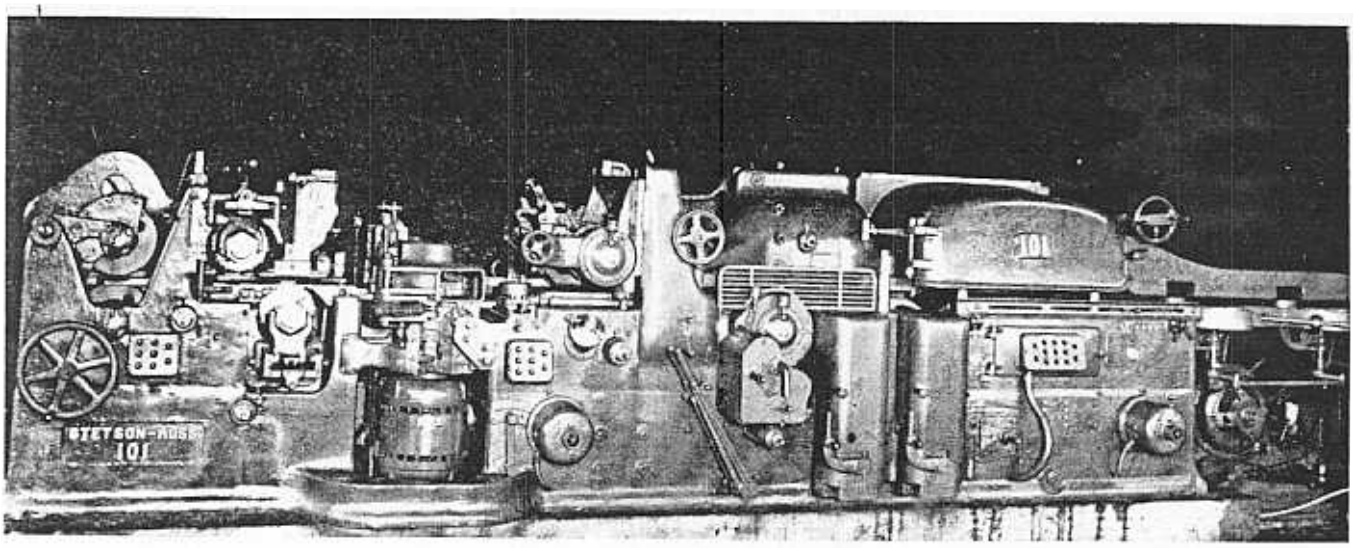

A *two-way thicknessing* planer which has breech-loading profilers and motorized hoists for top cylinder and endless feed bed. (U.S. and Canadian patents.)

where the stock may exceed the finished thickness, plus reserve for the face cut.

2. After the lumber passes the bottom cylinder, it is flexed, or pressed down by the top chipbreakers, its pre-thicknessed back being against the bed under the top cylinder, and is finally and perfectly thicknessed from the face by the top cylinder. Thus again, the board, not the cut, is measured. That is what is meant by the term *Two-Way Thicknessing*.

By this method and means the board is measured twice and thicknessed twice so that the measured board, not the measured depth of cut, gets first consideration. The board is always enhanced in value. Rough flooring stock may be too thin to dress on the back and too thin to allow for a full cut on the face, but when it reaches the top cylinder, it is again measured and only that amount of lumber left in excess of the given thickness at which the machine is set will be planed from the face, regardless of whether it is planed all the way or skip-spotted on the back, and hence will go into First Grade Flooring, as permitted by the grading rules. It is fully up to thickness and the value is there. But, if the board is thinner than the finished thickness, it will come out of the machine rough on both top and bottom of the board, and can be used for other purposes. It has been measured twice and discarded.

The bottom cylinder, which cuts last on the other type of machine in most common use cuts against the pressure bar after the lumber is thicknessed. Warped, crooked, or knotty lumber has a tendency to push this pressure bar up and, if the bar is set tight, some portions of such lumber are crowded down into the bottom cylinder and planed too thin. Frequently it is impossible to feed the lumber through the machine without excessive breakage. To permit feeding, the pressure bar must be raised to increase the size of the opening and to relieve this condition. This also causes unevenly thicknessed lumber and sniped ends.

Furthermore, the only thicknessing cut is made while the back is rough and the lumber is not traveling in a true line when the face is being planed. In order to finish the back of lumber, the bottom cylinder of the other planer must be set to take a certain predetermined thickness of cut—a measured fixed cut. Then, regardless of the thickness of the lumber itself, the bottom cylinder takes its measured fixed cut, making a thin board and destroying a vital portion of stock which should have been reserved for the face.

Economy of Operation

It is mere idle speculation for practical engineers to consider the ultimate surface quality and dimensional accuracy obtainable in the planing process unless the economic feasibility of such an operation is considered. There are many factors involved in the selection of adequate planing machines for economical operation, but a partial list of the desirable characteristics must include high utilization of material, high rate of output, versatility of set up, ease of maintenance, simplicity and safety of operation, and initial cost compatible with rate and quality of output.

Utilization of Material

To consider the first of these desirable qualities, utilization of material; there is no more lumber saving principle of planing wood than that discussed previously in this article. In long term tests this *"Two-Way Thicknessing"* process it has been proved that, compared to conventional planing methods, it is possible to saw lumber no less than three percent thinner than standard practice, and still maintain a quality and grade of output superior to the conventional machines. This 3 percent saving in stock is

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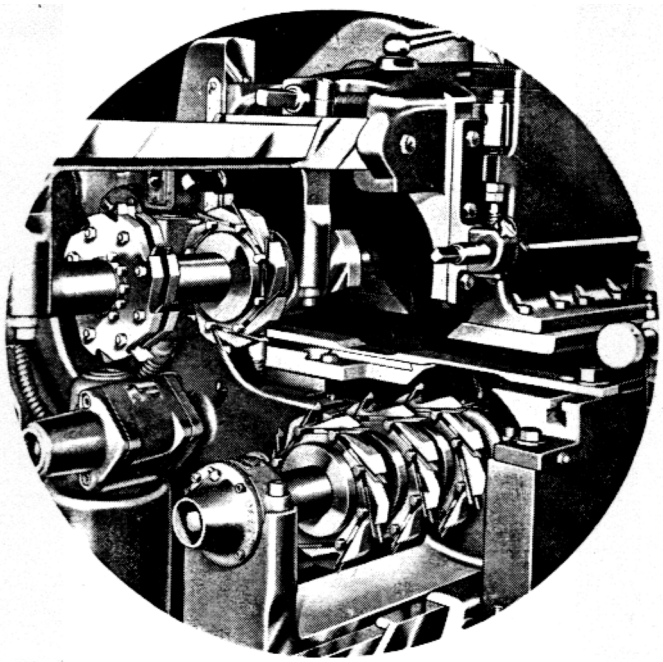

Cartridge type profile yoke units, previously set up, ground and jointed in the grinding room.

further bolstered by the upgrading of intermittently under-thickness stock and by the advantage of super accurate thicknessing.

There yet remains a major problem to be solved however, in the disposal of the chips. While in a small percentage of the nation's planing mills these chips are utilized for briquettes, the machinery has yet to be developed for the small operator to take advantage of the economic utilization of chips that is known to be possible. Perhaps the next step will be the development of a small scale integral briquetting machine to take the place of the intricate and horsepower consuming blower systems so common to the modern planing mill.

Rate of Output

Perhaps the factor foremost in most superintendent's minds is the problem of speed—rate of output. It may well be said that the conception of the lumber package and the development of efficient infeeding equipment has done more to speed up the lumber planing process than any other single factor since the inception of jointing. It goes without saying that the outfeed handling must be geared to the rate of input.

Although much has been accomplished to reduce the machine *down time* due to grinding and jointing, there is a great deal yet to be developed. The application of carbide tipped knives will no doubt become more widespread as the years go by and may be expected to drastically reduce the time consumed in both the grinding and jointing process.

Stock breakups have always been a pitfall to high speed operation and are most successfully combatted by closely coupled machines and by provision for quick and accurate size setting and resetting.

Versatility

As the refinement of machine design proceeds, the accent shifts from speed to versatility. Operators are interested in a machine's capacity to run a multiplicity of patterns with a minimum of *down-time*. Notable among the comparatively recent developments along this line is the use of push button controlled motors to hoist the top rolls, cylinder, and profiler, and to traverse the outside head.

Quick pattern change has been further accelerated by the use of tapered spindles for the sideheads, which self-center a cutter-head that has been jointed in the grinding room prior to use. Perhaps the development of most importance to quick pattern change is the versatile profile yoke or *cartridge* unit. This profile yoke unit consists of an aluminum yoke which slides into the machined ways of the profiler. Mounted in this yoke are a pair of precision ball bearings in which the profile arbor runs. At one end of the arbor is a pin type coupling which couples this unit to the driving motor when it is slipped into place.

The advantage of this slip-in yoke system lies in the fact that a complicated, multi-knife, profile pattern can be set up, mounted on the arbor, ground, jointed, tested, and reground to the joint if necessary—all in the grinding room, well in advance of the pattern change. Thus when the time comes to change patterns, the old yoke is slipped out and the new one slipped into place in a matter of seconds. The time consuming and costly practice of setting up and jointing a head on a fixed profile arbor in the machine is eliminated.

Ease of Maintenance

Of considerable importance in the selection of any machine is the consideration of maintenance. In relatively recent years, individual motors have largely replaced belts, push buttons are replacing hand cranks, ball bearings continue to replace babbitt bearings, and breakdowns of expensive machinery have been minimized by sealed in splash lubrication of important moving parts, replacing unsealed grease lubrication. It is to be expected that central lubrication and pressure oiling systems will soon be in the picture.

Simplicity and Safety of Operation

A major current trend is toward simplicity and safety of operation. Machine designers are gradually thinning out the number of men necessary to the operation of a planing mill. A few highly trained operators and a grinding room specialist have, in modern operations, supplanted the hoard of semi-skilled and unskilled workers that surrounded the old time planer and matcher. While the planing mill is, and always has been, a place of high occupational hazard it need not continue to be so. Perhaps the design improvement longest overdue in this respect is the development of an effective method of sound proofing the high speed planer and matcher. It is hard

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to imagine a factor more damaging to plant efficiency and individual mental efficiency than the all-pervading and ear shattering whine of a sixteen knife planer and matcher operating at high speed.

Coupled with this incredibly high noise level is the extreme temperature fluctuation in northern latitude mills necessitated by the customary open planer shed construction and the high rate of air exchange occasioned by the intakes to the blower system, which ordinarily are located at each planer head. More attention to proper lighting and some consideration of color conditioning would not be amiss in most modern mills. As the lumber industry becomes more stabilized it is to be hoped that mill engineers will concentrate more on the efficiency of the plant personnel as well as on the efficiency of the machines.

Having considered three phases of planing machine requirements, namely factors affecting quality of finish, dimensional accuracy, and economy of operation, one can see that there is much yet to be done in the long march toward higher quality lumber obtainable at lower cost. Machine selection is no longer a matter of obtaining a machine with the lowest initial cost but rather a problem of balancing tooling investment against quality and rate of output.

THE END