

The first of these, the careful balancing of the knives, should be attended to religiously every time they are removed and ground. Don't take it for granted that because you have ground away only a little of the knife and have ground it the same from end to end that you haven't changed its weight perceptibly, but weigh and balance each time. The ideal balance, of course, would be to have all four of the knives on a head exactly the same weight, but this is not essential. The one thing that is essential, however, is to have the knives balanced in pairs, that is, the knives that go opposite each other on the head must weigh exactly the same; also, the bolts and the washers used to hold them on should weigh the same.

There is a story related by a knife salesman on this point that contains a moral. He sold a set of knives to a box factory, and when they came to use them there was a complaint that the knives didn't run well, that they hadn't been balanced up or something. He went out into the factory and investigated and found that, while the knives had been carefully paired and balanced at the factory, the man in putting them on the planer had mixed the pairs. He had one out of each pair matched up with one of the other pair, so that when the knives were fitted on the cutter head they were out of balance. When the knives were properly fitted in pairs, however, they ran very smoothly.

The moral to this story contains a plain injunction to keep your knives marked up in pairs so that you can readily identify them, balance them in pairs, and put them on that way. And to balance these things means to do it nicely.



Do not simply make a bluff at it and think that you have got it very nearly, and that's good enough. The speed of a planer cutter head is such that only a few ounces of weight could make a whole lot of trouble when it gets to going good, so that very delicate scales should be used for balancing and very careful attention given to see that they balance perfectly.

Setting planer knives on the head so that all four knives will cut just alike is a subject that has called forth a world of discussion during the past three years. And, incidentally, it has been developed out of this discussion that about the most delicate job in mechanical adjustment is to set four planer knives on a cylinder head so that every one will do its share of the work. There are some authorities on this subject who contend that it is absolutely impossible for any man with the best implements furnished to set four planer knives on a head so that all will cut alike. Each will do some work, but the finishing touches on the surface are usually made by some one knife extending just a little further out than the others. On the other hand, there are men who maintain that they can set them positively so they will cut all alike. It is a sufficiently difficult problem, however, that at least one well-known manufacturer of planing machines has brought out a machine which carries an appliance for jointing the knives off after they are set to the head.

After seeing one of these machines work and noting the difference in the surface of the stock after the knives have been jointed off while running as compared to ordinary dressed lumber where those precautions have not been taken, it is easy to believe that it is impossible to set all four knives alike. The machine that has had the knives jointed off after the knives have been set cuts absolutely smooth on the surface, shows no waves, and no planer marks whatever. This

is a thing it is almost impossible to do in setting knives with the best of gauges. Generally there will show slight waves, but the more pains taken with the knives the less perceptible are these waves.

So that is a point that too much pains cannot be taken with. It is not sufficient to take an ordinary rule and measure from the lip of the cutter head and let the edge of the knife extend a certain distance. This may do for a start, to set all the knives on and bolt them down temporarily, but then the machine should be gone over and the knives carefully gauged by any one of the various methods in common practice for this purpose. Generally, the more care exercised in the gauging the better will be the work. Also, after you run the knives awhile and then whet them they should do smoother work. The knife extending the farthest and doing the heaviest cutting will naturally dull most, and in the course of whetting them down to an edge they are brought into more exact gauge. This is a strong argument in favor of keeping the knives on the machine and running them as long as possible before changing. Not that it is good to run them dull, but it is an argument in favor of using a concave in the bevel quite freely, so that knives can be repeatedly whetted and kept on the machinery for a little longer time than usual. They do better work and get trued up in the process of wearing and whetting so the operator should be reluctant to take them off until grinding becomes imperative.

Some day, possibly, we will have a new type of cutter-head or a grinding machine for sharpening, so that knives can be set on these heads and then ground to true face and edge right on the machine. Then the knife-setting problem will be solved, and it will be possible to get all four knives cutting alike, and to get lumber practically free from what are termed washboard planer marks. Meantime, however, the price of smooth work at the planer is careful setting as outlined above.

Probably everybody operating a planer knows that the pressure-bar should come down firmly on stock its full width and hold it from shaking, but should not be tight enough to cause undue friction and make it difficult to feed the stock through. Also, it is pretty well known that the chip breaker should come down firmly in the same way, and should be as close as practical to the cutting point, but what many people seem to forget, overlook, or else have failed to learn, is that the adjustment of the bottom rollers in a planer bed are about as important as the adjustment of the pressure-bar and the chip breaker. To get the best results the rollers should be as low as possible, extending just enough above the bed to facilitate the feeding through the machine (Fig. 2). It would really be better, so far as the qualities of the work are concerned, if there were no rollers in the bottom bed and have the stuff feed through flat on the table.

This is not practical, however, because it is impossible to feed the stock through flat on the bed.

Within certain limits the higher the rollers, the higher the stuff is off the bed the easier it feeds. This makes a temptation for the planer men, especially if they have trouble feeding the stock through, to raise the bed rollers up until the stock rocks a little and makes wavy work at the end. About the best advice that can be offered is to keep letting the rollers down, and, of course, keep them in line with the bed, each end the same height in relation to the bed as the other, and let them down where the stuff drags on the bed until it takes a little oil now and then to make it feed through. If it gives too much trouble raise the rollers a little, but remember that the closer down you can keep the stuff to the bed the better you can do your work. Let your