

bearing pulleys around which is adapted to be stretched a band-saw, means for effecting the to and fro movement or adjustment of said carriages, the vertically adjustable guides or frames supporting said carriages and means for adjusting said frames, whereby the saw can be manipulated so as to present its relatively inner and outer surfaces or sides to a movably mounted anvil sufficiently elevated to permit the saw to freely pass thereunder, substantially as set forth.

SURFACE PLANING MACHINE.

THE engraving herewith presented represents a newly designed surfacer and planer, to plane $24\frac{1}{2}$ inches wide and from one-sixteenth to eight inches thick on hard or soft wood. The frame is cast in one piece, wide at the base, very heavy. The table or bed is also cast in one piece, planed true, and is dovetailed into the frame, with extra long bearings, as wide apart as the width of the frame will allow, making the table as steady as if it and the frame were cast in one piece. Any wear can be taken up by means of gibs and set-screws. The table is raised and lowered by means of the large crank-handle shown, an indicator on side of frame showing the exact thickness the machine is set to plane.

The cylinder is double-belted, having a pulley at each end. It is made of the best forged steel, with extra large journals, which run in extra long, self-oiling boxes, lined with babbitt and provided with improved oil wells and oil cups. Both pressure-bars work very close to the knives, and are adjustable to the timber independently of each other and the feed rolls, thus insuring steadiness, even when planing very short and thin stuff. The pressure-bars are self-adjusting, always regulating themselves to the various sizes of thick and thin lumber being planed.

The feed is driven from the cylinder, and is quickly stopped or started by means of the belt tightener. The feed consists of four large steel rolls, powerfully geared. The feed rolls are set as close to the cylinder as possible and arranged to hold the board firmly to the bed. The upper in-feeding roll is fluted and held down by connected levers and weights; the out-feeding roll is held down by large coiled steel springs, making a strong and positive feed. There are two changes of feed—fast and slow.

SOME FACTS ABOUT PLANING MILLS.

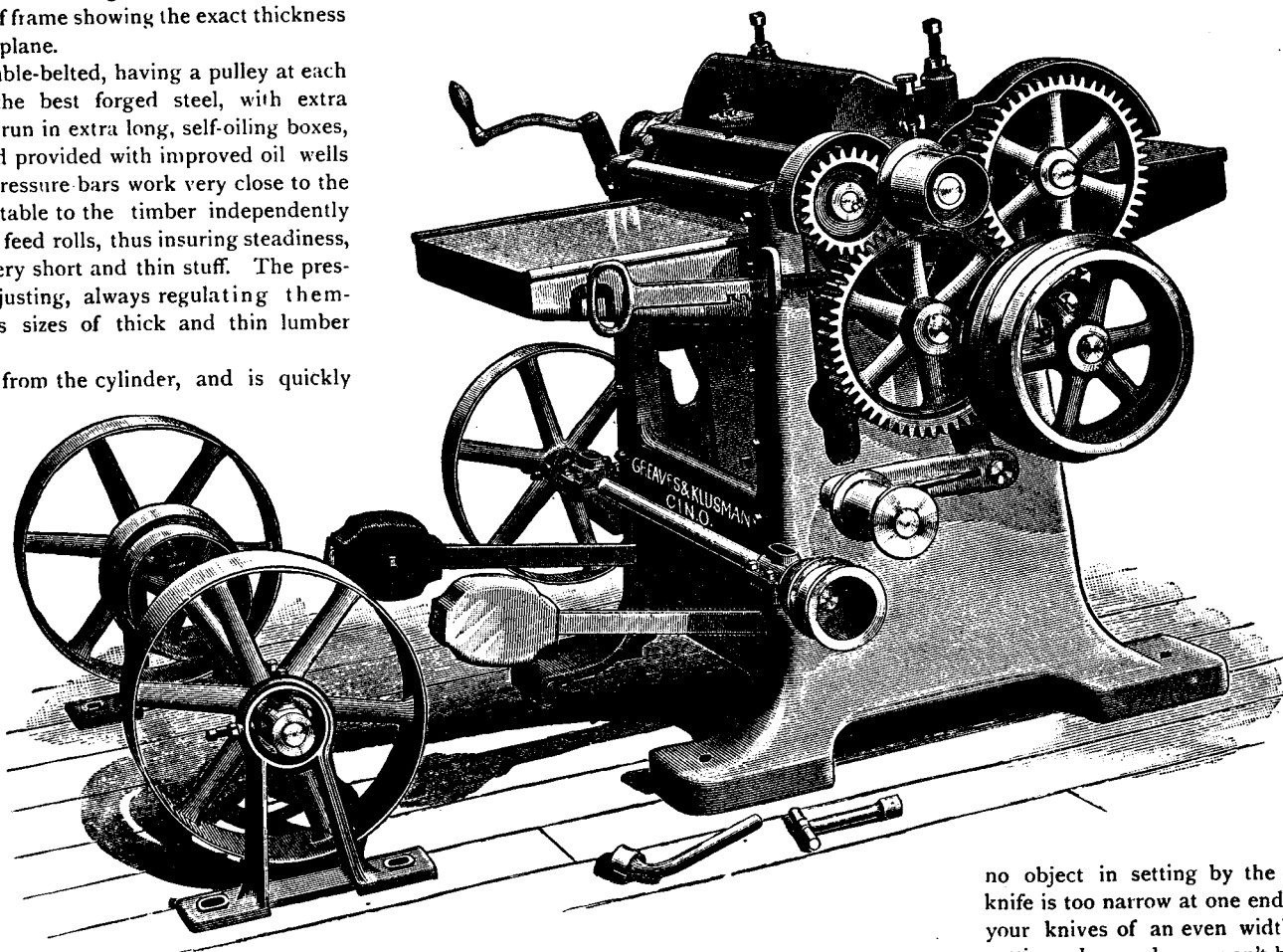
IT is quite amusing, says a writer in the Wood Worker, to go around among the different planing mills in the country and see the different methods of getting out work and the different ways of putting up the tools. Some will insist that theirs is the only right way; others will be equally sure their way is correct. They may both be right, for in different localities the conditions vary and the different machines have individual peculiarities that should be humored in order to get the most out of them. Also the different kinds of timbers worked require a little different bevel to the knives at times, to do the best work without breaking out.

Speaking of knives, it is amusing to notice the different ways of grinding and "balancing" them. And let me say here that I think one of the worst failings in planing machines, and the one causing the most trouble in getting smooth work, is not having the knives properly balanced. There are a good many men who read this perhaps who were doing this class of work when I was a very small boy, and are still in the same business and balancing in the same old way their fathers did, who will say they guess they know how to balance a set of

knives, still they probably never balanced a set of knives in their lives that were any where near a running balance; they may have weighed the same, but where was the metal distributed? Was it evenly through the width of the knife? I trow not.

It was my good fortune, or ill fortune, whichever you like, to run across one of these knife-balancing cranks who thought he knew all there was about the business and could not be convinced to the contrary, even with the strongest evidence. He used to grind his knives, then take them to the balance scales and try them. If one was somewhat heavier than the others, he took the heavier one to the drill press, put in about a five-eighths drill and drilled or started a hole about the center of the width of the knife and at whatever position in the length of the knife he thought heaviest, drilling out enough metal to bring the weight to the same as the others; perhaps he drilled clear through the knife, perhaps only an eighth of an inch. He was very particular to get just enough to balance evenly, then paired them up and laid them away for use.

Are they balanced, or not balanced? that is the question.



SURFACE PLANING MACHINE.

I say most assuredly not, yet others will say that I am "way off," for don't the scales show that? I admit that, but let me ask, if you tie two pieces of iron, both of equal size and weight, to a cylinder, one with a string six inches long and the other with one four inches long, then revolve that cylinder at a pretty lively rate, would it run steadily and not tremble? Will not the one farthest from the center exert the most force upon the cylinder to draw it out of line? If both pieces of iron were an equal distance or in the same circle, they would run steadily. Now if this is the case, why should it not be so with planer knives? It looked wrong to me at the start to see them balance by drilling, for if you take out the metal in the body of a knife you get comparatively near the center of cylinder and the nearer you get to the center the less the centrifugal force. Does it have the same effect if you take the metal from the center of the knife that it does to take it off the cutting edge?

I will give my way of reasoning it out: Take a set of knives as they come from the maker. If he is a good reliable man the knives are even in thickness, thoroughly balanced, and you put them on the planer. They run well, but perhaps after a week or two or three days' use they need grinding and are taken off, ground and tried on the scales. One of them is a trifle the heaviest.

Now why is it the heaviest? Because it has been worn off the back, or is it because it is worn or ground too much at the cutting edge? I claim it is worn at the cutting edge. Perhaps one knife wears faster than the other, or is filed a trifle more. My way to make the matter right is to grind enough off the cutting edge to make them balance; then your knife is kept the same thickness throughout and retains its full strength, while if you bore from one to ten holes in the width of the knife, it weakens it. I have actually seen knives drilled so they pricked through the knife, the holes running the length of the knife from one to two inches apart. It strikes me that would be a very weak knife for heavy work.

Another thing I see many grinders do, is to set the knife on the grinder by the cutting edge. Where you use a machine as you do a matcher, for instance, sometimes only from four to six inches in width, of course they wear faster on that end of the knife. I believe it is a mistake to set by the cutting edge of such a knife. I have seen knives that were a half-inch wider at one end than the other. This is wrong, as there is much

more weight at one end of the cylinder than the other, and when you revolve it about 5,000 times a minute it amounts to something.

I think the proper way is to set your knife by the back. Have some pieces of wood or metal of different thicknesses, two of each thickness. Slip one under each knife, choosing one thick enough to raise the knife to the proper height for grinding; then you have a knife the same width all through and the same thickness. A very little practice will teach you just when to stop grinding and have your knives evenly balanced; if one is a trifle heavy, put it on again and grind lightly until they balance. I can see

no object in setting by the cutting edge, for when the knife is too narrow at one end it is thrown aside. Keep your knives of an even width, balance by grinding the cutting edge, and you won't be far from a good running balance. Your knives will look better, also, than if they looked like a wedge and were full of drill holes.

I don't pretend to be an expert in this line and have only given my way of reasoning in the matter. If I have reasoned wrong I shall be glad to be corrected and will take it kindly. It is perhaps in the same way that some men say a saw is no good unless it is hand-filed, but after seeing filers file saws until they were nearly a quarter of an inch out of round, I prefer a saw-grinder.

I call to mind a case where we had a saw that did fairly good work in soft wood, but one day some hard maple came in to be sawed and the saw did not seem to take hold right. I put it on a grinder as an experiment and ground one-half a day on it before I got every tooth pointed up. It worked all right then. Before there were not over five teeth that cut at all, so I am a convert to saw grinding. Of course there are filers who can keep their saws all right by hand-filing, but there are many more that can not.

There is a great difference in the bevel to give cutters. I find the best way to determine what bevel to use is to try them until you get the one that stands up best for your work and lumber, then keep it. One thing we should all avoid: don't get into a rut and think you have the whole thing down so fine you can not be taught any further.