occur in a properly-constructed, designed and well-stretched belt. Yet, should it become necessary to shorten one of these belts, it may be done by using clamps. Care should be taken and the laps made as long as possible, and sufficient time given the work before removing the clamps.

While endless belts are to be preferred for almost all work, yet in many places the time, care and experience required to join them is such that recourse is had to the more convenient method of lacing or fastening with clamps or hooks, and of all the different methods the writer has been more successful with and prefers lacing. But even such a simple piece of work as that of joining a belt by means of lace—a narrow strip of rawhide—is sometimes done in a manner to very materially reduce the life of the belt, and very seldom is sufficient time or care given to this work. The ends of the belts should be cut exactly square, using an ordinary tri-square for this purpose. Punch the holes exactly opposite each other in the two ends of the belt to be joined. It is best to use an oval punch for this purpose, the longest diameter of holes being parallel with the belt. Two rows of holes should be made in each end of the belt, the same being staggered. The edges of holes should all be at least seven-eighths of an inch from the end or side of belt; be sure and keep the belt square, and lace both ends equally tight. The laces should not be crossed on the side that runs next to the pulley, but on that side laces should run parallel with the belt. Fig. 1 shows the inside

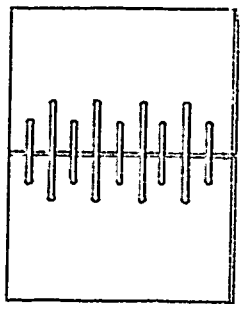

Fig. 1—Side of lacing running next to pulley.

of the lacing, or the side that should run next to the pulleys, and Fig. 2 shows the outside of the lacing, the side that is not in contact with the pulley.

In placing the belt on pulley, put it on so that pulley in slipping will run with, and not against, splice or joint. While authorities differ as to which side of the belt should be placed next to the pulley, the writer's experience has been that

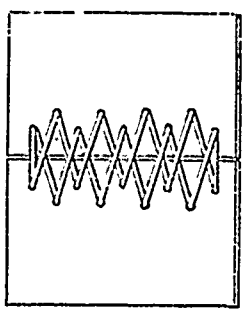

Fig. 2—Outside of lacing.

the best results are obtained when the grain side is placed next to the pulley. Experience has proven that it will drive more than when the flesh side is in contact with the pulley, and that the belt will last longer.

If the belt is to be crossed, do not put it on in such a manner that at the places of passing joints or laps will meet and be turned up and ruined in a short time.

How to place a belt on a pulley is one of the little things one can become an adept in only by practice. If the belt is a heavy one and the pulley runs at a high speed, it is best to slow down the machine, then place the belt on the loose pulley or the pulley at rest. Secure a firm footing, and with the right hand slowly work the belt up to top of pulley, when a quick jerk down or up, according to the direction the pulley is running, will throw the belt on. When the belt is heavy, or the operator lacks experience, it is best to shut off the power, place the belt on pulley as far as possible, then take a small leather belt, or even a rope, double it, slip one end through the arms of the pulley and around the belt and rim of the pulley, and the other end through the loop formed by the double of the small belt or rope; then stand on the floor on the opposite side and draw on the small belt or rope, when the belt will be drawn to the rim of the pulley. When the machine is placed in motion, the belt may be slipped on without any trouble; then, by letting go of the small belt or rope when the belt is on the pulley, the noose will be undone and the small belt will be free.

If the belt does not stay on the pulley, do not erect guards to keep it on, as they are an eyesore, and soon wear the belt out. Besides, the guards simply cure an effect, while the cause remains. The cause may be that the pulley is not in line, or that the belt is not joined squarely, or one side is stretched more than the other. Sometimes a belt running at high speed, transmitting scarcely any power, will wave from one side of the pulley to the other, and if a load is not thrown off will eventually come off. In places where it was not convenient to either put in pulleys of larger diameter, or even wider belts, and where the use of resin, oil and other adhesive matter would not cause the belt to adhere to the pulley, the difficulty has been overcome by running a narrow belt, drawn tightly, with ends laced, over the main belt. In one place where occurred a continual slipping of a ten-inch belt, the writer took an old two-inch belt, placed it upon the ten-inch, and the two belts carried the load for years without trouble.

MACHINERY BEARINGS.

Any mechanic will inform you that the common plummer-block should be a little easy at the sides, and that the bearing should receive oil from the top. He seldom knows the reason for this rule, however, and though his ignorance does not prevent his mill shaft bearings running cool, not "knowing why" makes him experience trouble with many bearings not so simply loaded.

John Dewrance, in a paper on the subject, detailed experiments which ought to clear ideas and rectify erroneous practices.

Bearings were clamped upon a shaft so that the load upon its underside was this same clamping pressure, while on the top this was augmented by weight of brasses, clamps and springs.

An oil hole at the top refused entirely entry to oil, which could be given, however, at either side. The bearing—which ran fairly cool—ejected oil under a pressure of 2,300 lbs. per square inch through the upper oil hole. The bearing was then taken out and surface dressed in order to obtain still greater pressures; but when replaced, instead of this great positive ejecting pressure, there was a suction at the upper oil hole measured by a vacuum gauge at thirty inches; the whole still running cool and well. The blocks when taken out showed at first sight no explanation for so great a change in pressure, but close examination made the matter clear. The under side of the top brass at first was not quite flat, the central portion taking all the load; this sprung the brass and ground the central part; so, when replaced under diminished load, there was a vacant space around the oil hole, where formerly had been the greatest pressure.

In any bearing to run cool and well means that a film of oil keeps forcibly apart the sliding pieces. The total pressure on this oil must be the total load. The surface tension of the oil and capillarity alone provide the power the oil has to resist this pressure, therefore the pressure is the greatest where space between the surfaces is least. And since, moreover, oil is carried on by sliding, it follows that to keep up the supply the space must taper to the point of greatest pressure.

If we lay a flat plate on a well oiled shaft, and gauge the pressure at a hole drilled through it, as we approach the point of nearest contact pressure will rise, to fall again and fall down below zero as we pass it.

Tapering spaces must then be provided in all our bearings of this class; and oil supplied at that point where the load is least. The series of experiments referred to was first taken up in order to discover whether "brasses" of different metals differed in their capacity for bearing loads without increase or friction. As one might have anticipated, it was found that no such difference existed; so long as a sufficient film of oil remains it matters little—in this connection—what the metals are. Given that they are strong and stiff enough the one great point is that the bearing should be softer than the shaft; for then at times of failure in the oiling the shaft is coated with the scraped-off softer metal, more or less evenly around its surface. But if the shaft should be the softer of the two, its heaped-up scraping will accentuate local unevenness in the bearing.

The main point in the paper is, however, the light thrown on the simple point of oiling. In ordinary mill shaft plummer blocks this is done rightly from the top. At first our railway axle bearings were likewise—but wrongly—fed; that fault was soon detected and set right; but still mechanics' ignorance upon the subject causes much trouble with some engine bearings; and since it is a fact that pressures over one ton per square inch can be endured by properly constructed brasses, while costly troubles are often caused by far less loads, the question certainly deserves attention until our errors are set right.

Mr. John McKay, representing the Standard Dry Kiln Co., of Indianapolis, Ind., paid a short visit to Canada recently, en route to his home in Boston. Mr. McKay knows pretty nearly all about lumber drying, and claims to represent the best apparatus on the market for that purpose. His company has recently made a number of large sales on the Pacific Coast, including British Columbia, in addition to filling orders for Russia and Mexico. Mr. McKay states that his company have received a large number of enquiries as a result of their advertisement in The Canada Lumberman.