

ery will adhere to the custom of putting too small receiving pulleys on to their machines, to indicate to the purchaser that little power is required to operate them. I have a feeling of pride in having the acquaintance of an eminently practical man who takes off a pulley 6" diameter by 4" face on a circular-saw arbor, and substitutes a pulley 9" in diameter by 6" face.

A few words as to hemlock-tanned leather, or leather tanned by the use of half hemlock and half oak bark. I do not consider them as worthy of much consideration, as many makers of that class of belting stock have been obliged to abandon its manufacture during the past forty years. It is a less costly and less enduring product. It goes without saying that a well-made "hemlock" belt is better than a poorly-made "oak" belt; duly considering all the processes involved in the making of each.

I would maintain that a skilled maker of oak-tanned belting can meet any and all legitimate requirements, whatever they may be. Some uses of a belt demand that it shall be much softer than for other purposes; some that it shall be elastic; other cases need a very rigid and non-elastic belt. For quarter-twist belts, owing to the firmness of oak-tanned leather, the belts should be specially shaped by the maker for that use, both in the length of the belt and at the ends.

Referring again to the subject of oils on leather; mineral oils always act to negative oxidations of the oils in the currying process; hence they are detrimental for that use. If added after the currying process is completed, then they tend to undo the currying by softening the oxidized oils.

A question not to be ignored relates to the action of air and other influences in keeping belts from full contact with the top side of a receiving pulley, when belts are run at very high speeds; this is caused by the massing of air at this point; by excessive crowns in pulleys, giving much convexity to the belt to hold air on or in its concave side; by the rigid character of many belts, and by centrifugal force.

Much leather belting is made, which, when finished, has a very rigid character. It has gone into the hands of users in that condition for these reasons: First, because a desire has grown with some users to have belts extremely rigid against stretching—apparently forgetting that such rigidity ensures that a belt shall have a comparatively short life. Second, to make a belt very supple and very uniform, in its body, and over its whole surface, necessitates expensive methods in currying. The continued demand for lower and lower prices has induced the leaving out of that amount of careful hand labor which always gives suppleness to leather, if otherwise well qualified; and in place of it has come a "machine" surface finish, which, to the eye, passes for the genuine article. This suppleness—sometimes called mellowness—gives to the leather due pliability, and such belts run satisfactorily at high speeds.

While the "suppleness" of belt leather has been denominated "mellowness," it should be stated that there is a resistance to flexion, in the best leather, due to its components of fibres, interlaced, in all directions, and a body of flexible gum, which while it readily bends, yet it as readily returns to its initial shape; but the best is fully appreciated only through experience.

Rigid belts are sometimes made pliable by saturation with "belt oil," but the inevitable result, in time, is a disorganized belt; slipping will come, and the addition of more oil only results in its acting as a lubricant, by piling up on the surface.

There is some doubt in my mind as to the desirability of perforating belts, or the drilling of pulley faces, to overcome the difficulty mentioned, so far as it comes from the air, which is not so much a real difficulty when properly made belts are used as it is with rigid belts.

Free oils added to curried leather, give "momentary" added strength by filling all the pores to distention, thus locking fibres to place; and by softening the fibres and allowing a strain—for instance, at lace holes—to be distributed over very many fibres.

As friction is due—largely—to the unevenness of two surfaces in contact under motion, and as the best tractive quality of belts comes from the evenness and smoothness of the two surfaces of belt and pulley face, it easily follows, from what I have said, that the value of the tractive force of a belt on a pulley face is due, first, to atmospheric pressure; second, to the tractive adhesion of the leather fibres and the oxidized oil of the currying process.

THE PREVENTION OF ACCIDENTS FROM RUNNING MACHINERY.

A German commission was appointed to investigate accidents in mills and factories, and draw up a series of rules for their prevention. Some of these rules are as follows:

SHAFTING.

All work on transmissions, especially the cleaning and lubricating of shafts, bearings and pulleys, as well as the binding, lacing, shipping and unshipping of belts, must be performed only by men especially instructed in, or charged with such labors. Females and boys are not permitted to do this work.

The lacing, binding or packing of belts, if they lie upon either shaft or pulleys during the operation, must be strictly prohibited. During the lacing and connecting of belts, strict attention is to be paid to their removal from revolving parts, either by hanging them upon a hook fastened to the ceiling, or in any other practical manner; the same applies to smaller belts, which are occasionally unshipped and run idle.

While the shafts are in motion they are to be lubricated, or the lubricating device examined only when observing the following rules: (a) The person doing this labour must either do it while standing upon the floor, or by the use of (b) Firmly located stands or steps, especially constructed for the purpose, so as to afford a good and substantial footing to the workman. (c) Firmly constructed sliding ladders running on bars. (d) Sufficiently high and strong ladders, especially constructed for this purpose, which, by appropriate safe guards (hooks above or iron points below), afford security against slipping.

The cleaning and dusting of shafts, as well as of belt or rope pulleys mounted upon them, is to be performed only when they are in motion, either while the workman is standing: (a) on the floor; or (b) on a substantially constructed stage or steps; in either case, moreover, only by the use of suitable cleaning implements—duster, brush, etc.—provided with a handle of suitable length. The cleaning of shaft bearings, which can be done either while standing upon the floor, or by the use of the safe guards mentioned above, must be done only by the use of long-handled implements. The cleaning of the shafts, while in motion, with cleaning waste or rags held in the hand, is to be strictly prohibited.

All shaft bearings are to be provided with automatic lubricating apparatus.