

tooth form of 80 per cent. It will be noted by comparing different combinations of gears that the increase in strength is greatest for pinions, which are almost invariably weaker than the gears they run with.

To understand the importance of this consideration of strength, it may be mentioned that if comparisons are made between a 15-tooth 6-pitch 14½-degree gear and one with 20 teeth 8-10 pitch of the stub-tooth standard,

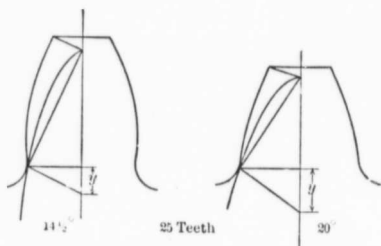


Fig. 8.—The Strength of a 14½ Degree Tooth and a Stub Tooth Compared by the Wilfred Lewis Method; the Strength is measured by Dimension *y*.

both having the same diameter, it can be shown that the stub-tooth, though shorter and of finer pitch, has 20 per cent. greater strength, and while the bearing surface per tooth is shorter, the total area of bearing surface is 6 per cent. greater.

Some of those who are not entirely familiar with this system of gear teeth have made the mistake of thinking that it consists simply of the shorter tooth than the standard form, while retaining the same pressure angle, and have, therefore opposed it on the ground that the arc of action, in the case of a small pinion, is not equal to the pitch arc, and that the action is therefore, not continuous, because one tooth is out of action before the next tooth takes up the load.

It should be thoroughly understood, and we wish to emphasize the fact as much as possible, that the increased angle of obliquity is an essential and vital part of the stub-

tooth system, and that with this increased angle, the arc of action is as long as that of the 14½-degree tooth.

That this form of tooth is growing in favor is shown by the fact that fully one third of the cutters made by the advocates of this system are now of the stub tooth form.

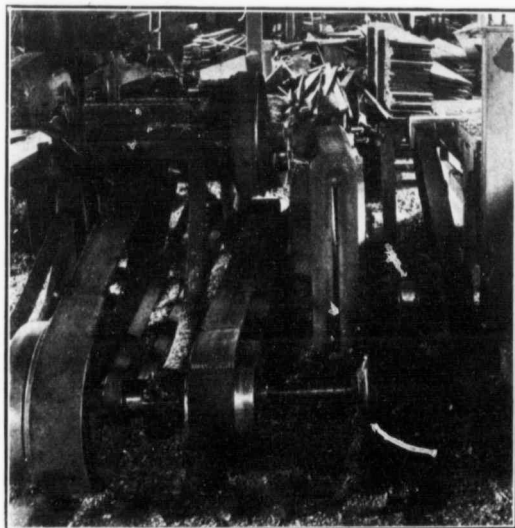
Electric Drive in Woodworking Plants

In many respects the conditions encountered in lumber mills present problems in power transmission that are not found in other industries. The inflammable nature of the material used, the size of the work handled and the severe power demands for starting and operating wood-working machinery of necessity require a motive power that is not only immune from fire risk, but one that will withstand heavy fluctuations in load and operate the various machines with as little obstruction to the handling of material as possible.

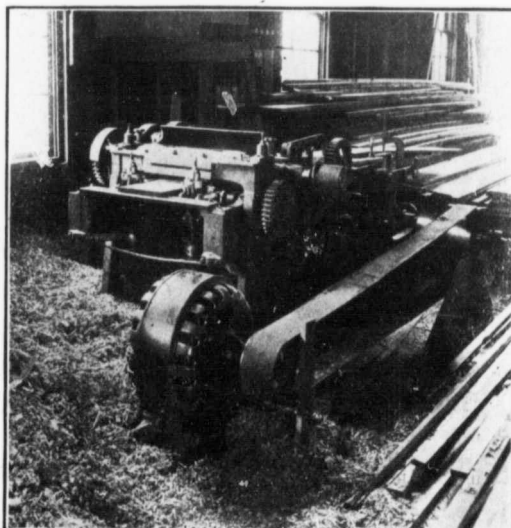
These conditions have only been partially fulfilled in the past by the use of overhead belting and shafting driven from a central source of power, which is transmitted through numerous countershafts to the final point of application. In such installations there is an excessive loss of power by overcoming friction, which is increased by the slipping of belts and the severe fluctuations of load. Belts and shafting also obstruct the free handling of material and add to the fire risk on account of the accumulation of dust and grease on pulleys and around bearings.

The foregoing conditions led to a demand for some method of operation that would in the main eliminate many of the objectionable features, and electric drive was the natural outcome. By its adoption the various floors and sections can be subdivided so that any machine or group of machines may be operated independently, producing a flexibility which is especially valuable in overtime work, when power requirements are small. Further, the use of electric motors to a large extent eliminates the use of overhead belting and shafting, which removes the objectionable features attending its use.

The accompanying illustrations show how one firm



Rip Saw Driven by 3 h.p. Induction Motor.



Wood Planer Driven by 15 h.p. Induction Motor.