

but all these can not fully compensate for the one thing which he lacks. The designer also must have more than a knowledge of kinematics and the strength of materials. These will enable him to design a machine, but unless he applies additional practical shop knowledge, it will not be a commercially successful machine. *There are in existence many beautifully worked out pieces of machinery, designed by highly educated men, which accomplish in a very satisfactory manner the object for which they were designed, but which were never put on the market because they were so costly to the manufacturer that they could not compete with other similar machines of more practical design. Indeed, a great deal of the machinery that is in use will, upon close examination, be found to contain parts which could be made very much more cheaply, and in many cases better, if the designer had had a more intimate knowledge of machining, pattern making, and foundry practice. A lack of thoroughness in the drawing room leads to tremendous expense in the shop, because it keeps on multiplying as long as the designs are in use. A designer should, therefore, be first of all a thoroughly trained shop man. These things will be required to even a greater degree of the chief engineer of the future. The general manager himself will be a far more efficient man if he has, in combination with his other abilities, a thorough knowledge of the things that the men under him are doing. This knowledge will aid him, not only to form a better judgment of matters for which he is responsible, but will also enable him to make correct decisions more quickly, and thus economize his valuable time.*

VIEWS OF INDUSTRIAL EDUCATION COMMITTEE.

The following abstracts from the report of the Committee on Industrial Education presented at the annual meeting of the National Association of Manufacturers, New York, May 1908, have a close bearing on co-operative education, and coming from such a source should have some weight:

"The technical colleges, ridiculously enough, still withdraw young men for four years or more from all contact with commercial production so that they may be prepared for commercial production. The hard headed manufacturer complains that the technical college graduate as he comes out of college is a pretty poor sort of finished product as far as his commercial value to his employer is concerned.

"The colleges attempt to correct this error by erecting shops, where their students are taught to use tools, but the traditional teachers do not, and simply cannot operate such shops on a commercial basis, so that even in college or university shops the work is a little better than advanced kindergarten work.

"The college cannot teach, and does not teach any thing more than the scientific theories of engineering, together with a certain amount of cultural work. Therefore the graduate student comes to the employer without any sense of business and entirely ignorant of the problems of labor, and without any knowledge of the every day methods of production.

"We realize that when the average student has graduated from the present kind of college courses, he is of an age and habit of mind that will prevent him learning elementary parts of the practical and business side of his career. He is of an age that prevents him asking foolish questions. His book learning makes him think only of the big things. He wants a big salary to start with and thinks he is entitled to it and it takes him a long time to readjust himself to hard commercial conditions and to get a true perspective of his own value to the commercial world. The

co-operative engineering course at Cincinnati overcomes these difficulties."

WHY NOT THIS SYSTEM IN TORONTO AND MONTREAL?

An investigation of the conditions by the University authorities and the Canadian Manufacturers' Association would determine whether such a system of co-operative engineering education is possible in Toronto and Montreal. There is no doubt that such a course would enable the Universities in Toronto and Montreal to do broader work in technical education. There is no doubt that many manufacturers throughout Canada would be glad to get graduates from such a course. There is no doubt that there are many manufacturers in both these cities and districts who would be glad to co-operate in such a course. The question is whether these cities are large enough industrially—whether there are a sufficient number of manufacturers in the different lines who would take an interest—to make such a course successful. Cincinnati is a large city, with many large industries. Places can be found for the students with comparatively little difficulty. It is possible that the same might not hold in Toronto and Montreal.

However: it is a big question, and is worthy of the most careful consideration and investigation by the University authorities in these two cities, and the Canadian Manufacturers' Association.

[In future issues we will take up other phases of industrial and technical education which will be of interest to manufacturers and others.—EDITOR.]

A Patent Milling File

The accompanying illustration is of a new file, the "Dreadnought" patent milling file, manufactured in Canada by J. H. Hanson Tilley Co., Limited, Montreal.

This file has semi-circular teeth on both sides, cut exceptionally deep. A special back or holder is used in conjunction with the file. The filings produced by



The "Dreadnought" Milling File.

this file are of the nature and shape of turnings or shavings produced by a lathe or milling machine, and this has led to the name hand milling tool being applied to it.

This file can be resharpened four or more times, the cost being it is claimed about one-half that of re-cutting an ordinary file. The shape of the teeth make the file self-cleaning, which is of great advantage especially with soft metals.

This file will cut soft and tool steel, cast and wrought iron, bronze, brass, lead, aluminum, wood, slate, marble, etc.

The file is made both in regular and fine cuts.

The mind travels instinctively from the known to the unknown, and a sure way of carrying conviction is to postulate the statement you wish believed and remembered on some widely known parallel fact or belief.—Edward Litton.