them should have good centers, drilled at the bottom, and reamed accurately true with each other, and to accurately fit the lathe centers. Finally, no one is fit to be called a lathesman who does not know that clean centers are an absolute necessity, if good, or even decent lathe work is to be done.

It is, however, the common experience of those who cut gears, do cylindrical grinding, or universal milling machine work for others, that they get a very considerable proportion of work that has been turned in other shops with centers that are entirely unfit to be run upon the centers of their machines.

There are a surprisingly large variety of ways in which the "jammer" can botch the job of centering lathe work, and some of the principal ones are graphically illustrated and held up to ridicule in this book, whose author evidently treats the subject from the standpoint of a mechanic who has suffered from the carelessness of those who, calling themselves machinists, yet utterly neglect this, one of the first and most important requirements of good machine construction. It seems strange that men whose business it is to know, and many of whom do know, the importance of having accurately fitted bearings in machinery, seem to be entirely ignorant of the fact that good lathe work cannot be done without good centers that have good bearings in the work. This book will help to make such men realize the importance of this feature of the business which they should have been thoroughly informed about during the first six months of their apprenticeship, but one difficulty lies in the fact that most of the men who need instruction on this point seldom or never read anything pertaining to their business, and are unlikely to give this book the attention they should give it. They work for "The Makeshift Manufacturing Co.," and the outside world and its doings is all a blank to them.

What this little book has to say about the relative merits of hard and soft live centers is also instructive, and ought to help in raising the average quality of lathe work, and at the same time cheapening its cost.

In the American Machinist of October 31, 1889, there was an article advocating a rational system of taper shanks to be applied to lathe centers, drills, milling arbors, etc. By this system the designating number of each shank indicates its size at both ends, and its length; thus, a No. 10 taper shank would be $\frac{10}{10}$, or 1 inch diameter at the small end; $\frac{10}{8}$, or 1¼ inches diameter at the large end, and $\frac{10}{2}$, or 5 inches long. This gives a taper of one in twenty, or $\frac{6}{10}$ inch per foot.

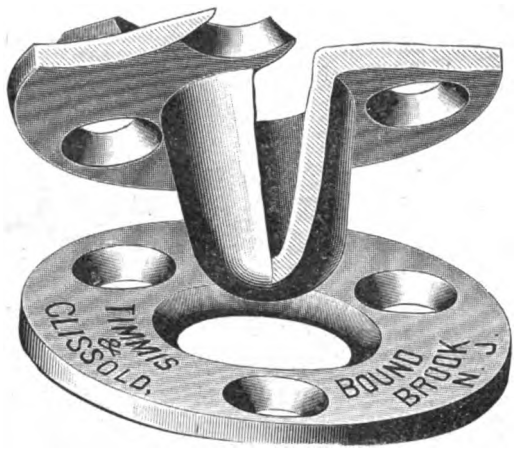
In this book the general adoption of this as a standard taper shank, under the name of the "Jarno taper," is advocated, and Mr. Leland sends us copies of several letters from well-known mechanics and machinery-building firms endorsing its adoption, and pledging the influence of the writers towards bringing it into general use. It is to be hoped that as far as possible their practice will pull with their influence.

We understand that the Leland & Faulconer Mfg. Co. have definitely adopted this taper, and will use it exclusively. How general its use may become no one can say. If it is but partially accepted it will but add another to the already too great variety of tapers, but if it could, in time, supplant all the others for general use, machine constructors and machine users would certainly be relieved of a present fruitful source of trouble and annoyance, numbers of taper would mean something definite, tapers would be uniform, and taper reamers could be much more readily made a commercial article.

If twist drill manufacturers would supply drills with this shank at the same price as others, and if those who buy lathes, milling machine drill presses, etc., would order them fitted with such tapers, we should soon have this as the regular standard, but some pressure must be exerted by some one n that direction.

An Indicator for Machine Work.

This instrument, of which we give several illustrations, showing its construction and application, is of use in adjusting work, or in testing the accuracy of work upon lathes, planers or other machine tools. Its function is to indicate minute inaccuracies or differences, either of concentricity or of parallelism, in lathe work or any untruth of plane surfaces in the planer or shaper or similar machine. The shank of the instrument, Fig. 1, is to be held as a cutting tool is held in the tool post of a lathe or in the tool holder of any machine. Upon the end of the shank is mounted a hollow steel box turning, with an amount of friction which is adjustable, upon the large central screw. The top of this box is graduated and the indications of the instrument are read from the movements of a pointer at the end of a lever moving in the thin slot which is seen. At the front of the instrument is seen a thumbscrew with a projecting point. This thumbscrew is the feeler of the instrument, or the part to come in contact with the work to be adjusted, or whose accuracy is to be ascertained. Several different shapes of these thumbscrews are provided for different services. A second hole will be noticed just above the hole from which the thumbscrew projects. This second hole gives a different leverage, and, consequently, a different reading. With the screw in the lower hole a movement of $\frac{1}{1000}$ of an inch will cause the pointer to move $\frac{1}{12}$ of an inch, while with the screw in the upper hole $\frac{1}{1000}$ of an inch movement of the screw moves the indicator $\frac{1}{8}$ of an inch, or double as far. The operation will be understood upon looking at Fig. 2. It will be noticed that the movement of the feeler is not in a straight line. This is taken advantage of in the use of the instrument, as either the end thrust may be indicated or a thrust downwards upon the head of the feeler. The graduations read both ways from the center, giving a range of $\frac{7}{1000}$ in each direction from the center or $\frac{14}{1000}$ from the end, when the feeler is in the hole shown. The friction mounting of the box enables it to be set at any angle or to be swung out of the way.



Brass Dowels.

Some of the modes of using the instrument are shown. In Fig. 3 a piece of work is being set upon a face plate so that a center punch mark upon it will be true. For this purpose the spindle with conical point and springing end movements is used. This spindle is furnished with the indicator. Fig. 4 shows the indicator in use for truing the hole in a gear in a lathe chuck. Without changing the indicator in the tool post it will also true the face of the gear. Fig. 5 shows the indicator truing an angle iron upon a planer. Numerous illustrations might be given of the application of the indicator, but they will be evident to any mechanic.

The indicator which we have had the pleasure of examining exhibits excellent workmanship. It is made by John Bath, Hyde Park, Mass.

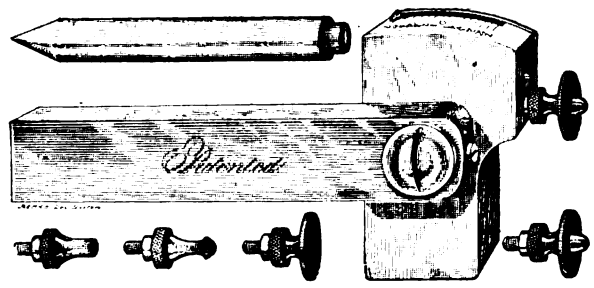


Fig. 1.

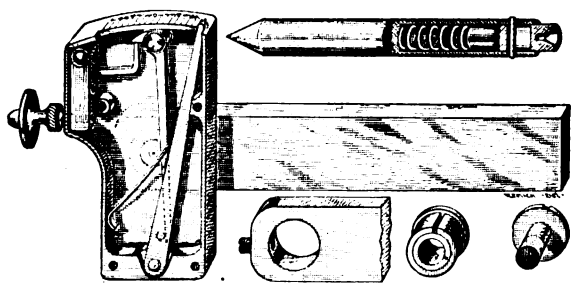


Fig. 2.

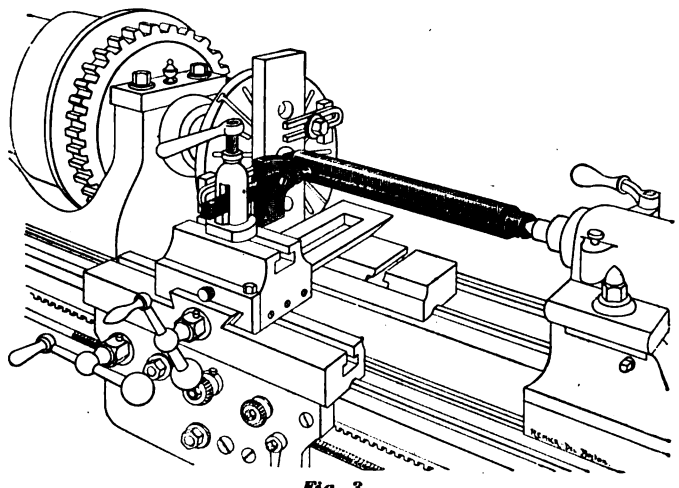


Fig. 3.

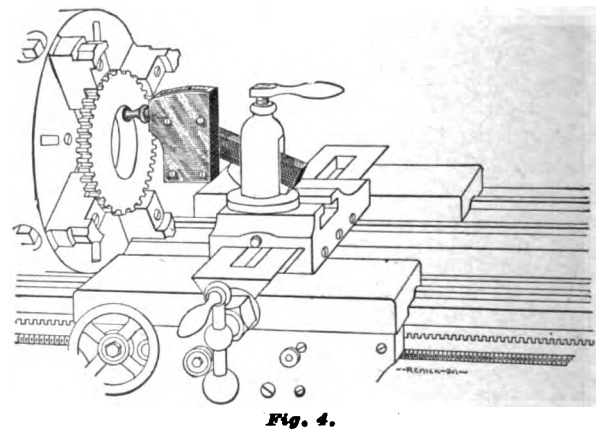


Fig. 4.

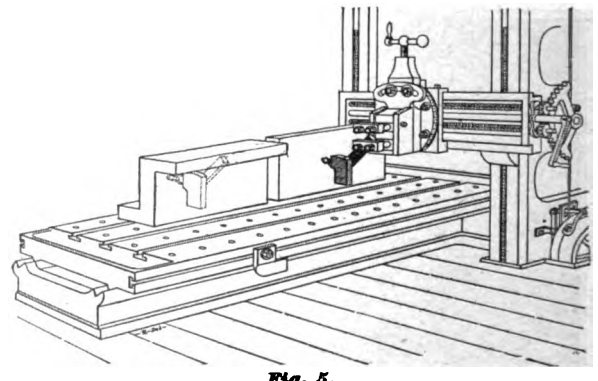


Fig. 5.

Indicator for Machine Work.

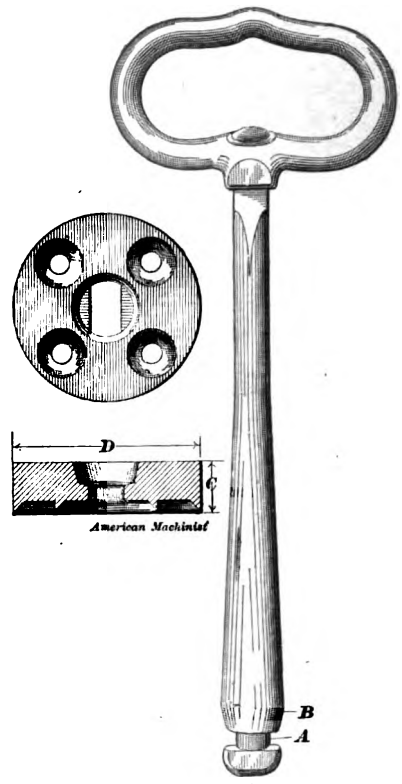
Brass Dowel for Patterns.

We illustrate herewith a brass dowel suitable for large patterns. Both parts of this dowel are made of brass, which, while it has sufficient strength, will not corrode. The female part of the dowel is of sheet brass, the other a brass casting, finished to fit, and both are fitted to the pattern by using an extension bit. The engraving shows the dowel full size.

It is made by Timmis & Clissold, Bound Brook, N. J.

Rapping Plates and Lifting Bars.

We illustrate herewith a rapping plate for patterns, and a lifting bar, which, as will be seen, are so arranged that the plate can be applied to the pattern by boring a seat with an extension bit, and there being no threads, a quarter turn of the hook locks it or releases it from the pattern. The plates are made of gray iron, malleable or steel, and the bars are drop forged. The handle, when it is pushed down upon the bar, fits over the square shown, and thus enables the locking to be done, but when lifted is free to turn in any position. The object of the slight upward bend in the middle of the upper portion of the handle is to prevent slipping when the hook of a hoist is attached.



Rapping Plate and Lifting Bar.

The form adopted is that which experience has shown to be well suited to the purpose.

The manufacturer is W. S. Hawker, 620 McLain street, Dayton, Ohio.

A Novel and Remarkable Engine.

"A New Departure in Steam Engine Economy" was a part of the title of a recently published paper by Professor Jamieson, of the Glasgow and West of Scotland Technical School. This paper is the subject of editorial remark in *The Engineer*, London, in a recent issue, and a number of