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2,370,503

GAUGING DEVICE

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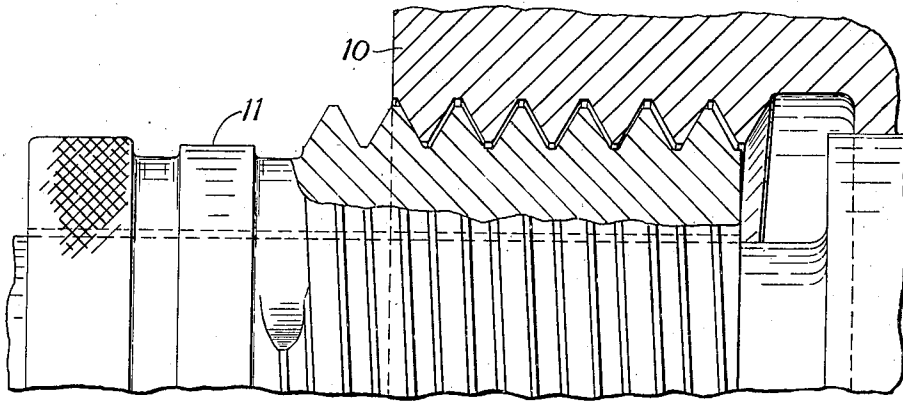


FIG. 1

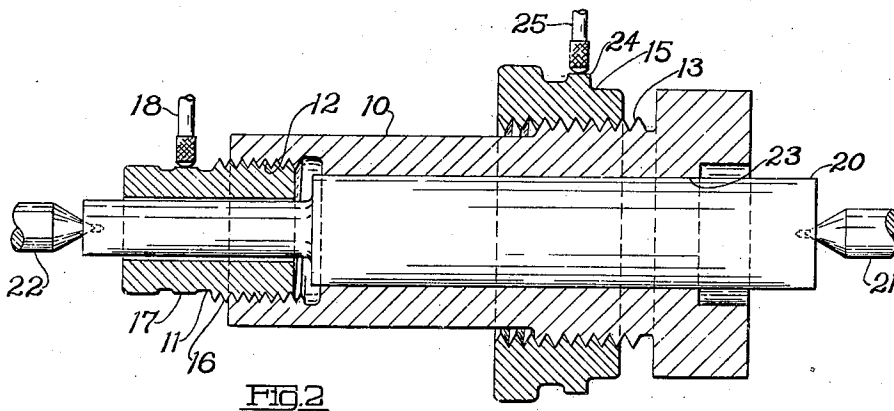


FIG. 2

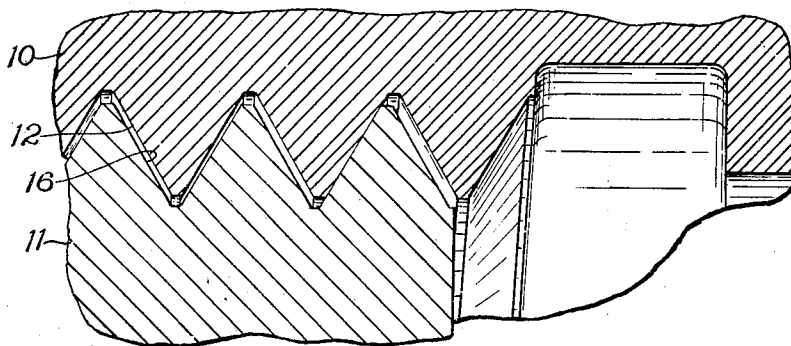


FIG. 3

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GAUGING DEVICE

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4 Claims. (Cl. 33-199)

This invention relates to gauges and more particularly to thread gauges.

One object of the invention is the provision of a thread gauge so arranged and constructed as to readily determine the concentricity of a screw thread with respect to some other portion of the piece on which the thread is provided.

Another object is the provision of a gauging member having a threaded portion adapted for snug threaded engagement with the screw thread of a workpiece and also having reference means whereby the longitudinal axis of the thread member is located, the threads of said member having a lead which is slightly different from the lead of the threads on the workpiece.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawing, in which,

Fig. 1 is a side elevation, partly in section, showing a portion of a thread gauge embodying the present invention and illustrating its association with a threaded part the concentricity of which is to be determined;

Fig. 2 is a central vertical section through the gauging device and the workpiece associated with it; and

Fig. 3 is an enlarged sectional view showing how the threads on the gauging member cooperate with the threads on the workpiece.

Referring more particularly to the drawing, in which the same reference numerals have been applied to like parts in the several views, 10 generally designates a workpiece having a threaded portion the concentricity of which should be accurately determined with respect to some other portion of the workpiece. 11 designates a threaded gauging member employed in accordance with the present invention to accurately determine the concentricity of the threads on the workpiece. For purposes of illustration of one embodiment of the invention, the workpiece is provided with an internal thread 12 and an external thread 13, while the gauging device employed in conjunction with these threads comprises a threaded plug 11 which cooperates with the threads 12 and a threaded ring 15 which cooperates with the threads 13. The plug 11 is provided with external threads 13 which are substantially uniform in pitch diameter and in lead but which have a lead slightly different from the lead of the threads 12. As shown, the lead of the threads 16 is slightly less than the standard thread spacing of the internal threads on the workpiece, and the pitch diameter of the threads 16 is also slightly

less than the pitch diameter of the threads on the workpiece, so that a tight fit between these threads is obtained only on opposite sides of spaced threads of the plug after several of the threads are engaged. The difference in pitch is only a small fractional part of the distance between adjacent threads on the plug so that a suitable number of threads of the plug will enter the threads of the workpiece, and the degree to which the gauging member enters before a tight fit is obtained depends upon the amount of variation in thread spacing on the workpiece threads from a normal or intended thread pitch. Thus if the threads on the workpiece are expected or intended to have a thread spacing of some standard value whereas as a matter of fact the particular workpiece gauged has a slightly greater thread spacing, or lead, the threaded plug 11 will not enter quite as far as it would if the threads were of standard spacing. The length of the thread on the plug is sufficient, however, to insure a tight or a snug fit between the threaded plug and the workpiece even if the pitch spacing of the threads on the workpiece is a permissible amount less than the true or intended pitch.

As will be apparent, since the thread lead on the gauging plug does not correspond with the true or intended thread lead on the workpiece, the two parts may be threaded together very readily and will have a firm or snug connection avoiding any possible play or misalignment with respect to one another. The plug 11 is provided with some means or reference surface which is exactly concentric with the threads on the plug; and as shown, this means is afforded by an annular surface 17, accurately made so as to be truly concentric with the threads 16. Thus by measuring the eccentricity of the cylindrical surface 17 any indications or readings so obtained represent the amount of eccentricity of the threads 12 with respect to some other surface on the workpiece. By rotating the workpiece and the gauging plug about an axis, with a work contacting plunger 18 of a suitable indicating gauge bearing against the surface 17, the pointer on the gauge, if it maintains a stationary position, will show that the axis about which the workpiece is rotated is truly concentric with the threads 12 on the workpiece.

The workpiece may be rotatably held by means on an arbor 20 arranged between centers 21 and 22 so that the arbor can be readily turned about its own longitudinal axis by the person making the test. The arbor fits in a cylindrical passage 23 of the workpiece with no play existing between

these parts. As the workpiece and the threaded plug 11 are rotated, the gauge operated by the work contacting plunger 18 will give an indication of the concentricity of the threads 12 with respect to the passage 23, any variation of the gauging plunger from a normal position showing the amount of eccentricity that exists between the axes of the threads 12 and the surface to be compared with it.

The threads 12 may be compared with some other threaded portion of the workpiece such as the threads 13 to determine whether the threaded portions 12 and 13 are truly concentric with one another or to determine the amount of eccentricity that may be present. For this purpose a gauging member 15, in the form of a threaded ring having threads the lead of which is slightly different from that of the threads 13, and having a pitch diameter slightly in excess of the pitch diameter of threads 13 is adapted to be screwed on the workpiece and have a tight fit with it after several threads of the workpiece are engaged. The ring 15 is provided with a cylindrical surface 24 which is made accurately concentric with the internal threads on the ring. When the workpiece is rotated, with a gauging plunger 25 of a suitable indicating gauge bearing against the surface 24, the indications of the gauging pointer will accurately show the degree of eccentricity of the threads 13 with respect to the center about which the workpiece is revolved. By comparing the readings of the two gauges operated by the two gauging plungers 18 and 25 the exact amount of eccentricity of the two threaded portions of the workpiece may be accurately determined.

As will now be apparent the gauging member or members employed with the workpiece are provided with threads that may be readily threaded into or on the workpiece with a very free running fit until opposite sides of the threads of any threaded portion come up tightly into engagement and prevent all play with respect to the innerconnected portions. The indicating gauge or gauges employed in conjunction with the portions of the workpiece to be compared bear against a cylindrical surface or surfaces so that any suitable gauging or indicating device can be used.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is

not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Gauging means for use in determining the concentricity of a screw thread of a workpiece with respect to a different portion of the workpiece, comprising a threaded member adapted for snug threaded engagement with the said screw thread and having reference means definitely locating the longitudinal axis of said member, the threaded part of said member having threads of substantially uniform diameter the lead of which is slightly different from the standard lead of the threads on the workpiece.

2. Gauging means for determining the concentricity of a screw thread of a workpiece with respect to a different portion of the workpiece comprising a threaded plug adapted for threaded engagement with the said screw thread and having a reference surface exactly concentric with the threaded part of said plug, the threaded part of said plug having straight threads of substantially uniform pitch diameter and with a lead which is slightly less than the standard lead of the threads on the workpiece to engage the workpiece threads, only on opposing sides of spaced threads of the plug.

3. A gauging plug for use in determining concentricity of a straight screw thread of a workpiece comprising a threaded plug adapted for threaded engagement with said screw thread and having an annular surface beyond the thread on the plug which is exactly concentric with the plug thread, the threaded part of said plug having straight threads slightly smaller in pitch diameter than the threads of the workpiece and with a lead which is slightly different from the lead of the threads of the workpiece.

4. A gauging ring for use in determining concentricity of a straight screw thread of a workpiece, said ring having internal threads of substantially uniform diameter the lead of which is slightly different from the standard lead of the threads on the workpiece to provide snug engagement with the workpiece threads only on opposing sides of spaced threads of the ring, said ring having a reference surface definitely locating the longitudinal axis of its internal threads.

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