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2,941,304

HELICAL THREAD GAUGING ROLLS

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FIG. 1.

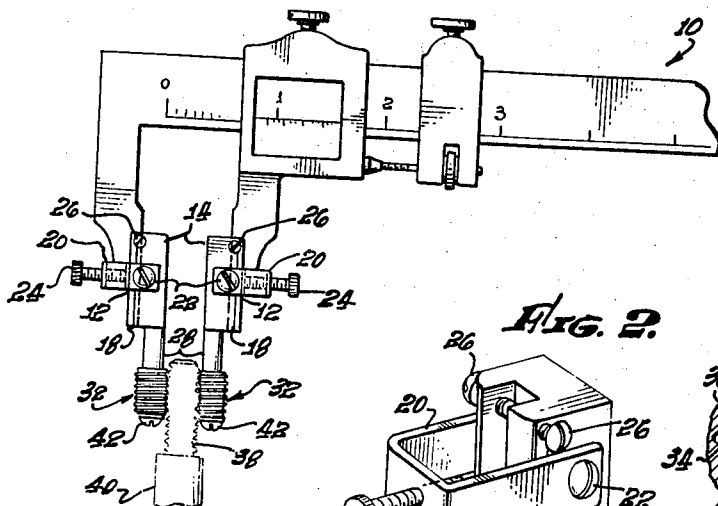


FIG. 2.

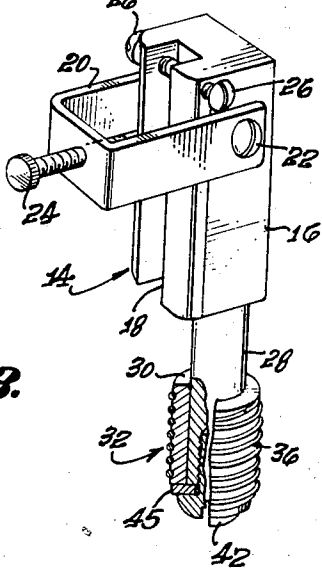


FIG. 4.

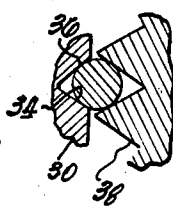


FIG. 3.

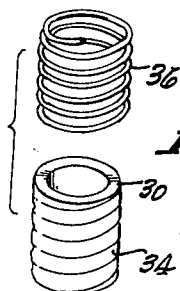


FIG. 6.

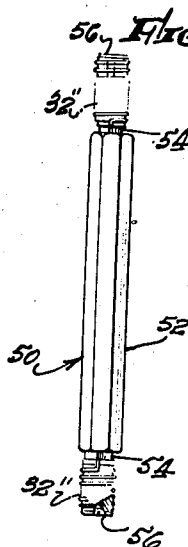
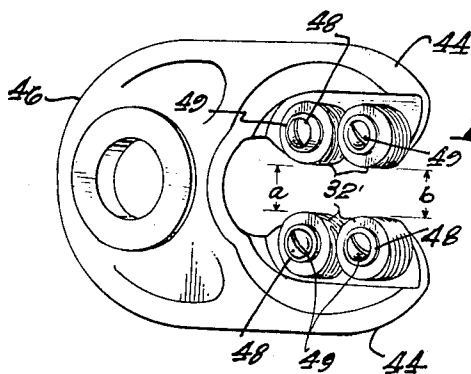


FIG. 5.



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HELICAL THREAD GAUGING ROLLS

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6 Claims. (Cl. 33—199)

This invention relates to new and improved helical thread gauging rolls.

A number of different types of structures for measuring the pitch diameter and the pitch of screw threads on various types of bolts and the like are manufactured and sold in the United States at the present time. Conventional thread gauging rolls for these purposes are formed so as to have ridges and grooves located on the outside thereof. Structures of this category can be characterized as being relatively expensive to manufacture since they are normally formed out of high grade steel or the like on a thread grinder to very close tolerances.

A basic object of the present invention is to provide thread gauging rolls which are less expensive to manufacture than the above and other related types of thread gauging rolls known at the present time. Another object of the present invention is to provide thread gauging rolls which, in spite of their inexpensiveness, are accurate and are very simple to manufacture. Further objects of this invention involve the use of thread gauging rolls as hereinafter described with attachments for use with vernier calipers or the like, in U-shaped snap gauges, and in thread plug gauges of the so-called "go" and "no go" category.

Other specific objects of the present invention as well as many advantages of it will be more fully apparent from the remainder of this description, the appended claims, and the accompanying drawing in which:

Fig. 1 is a top elevational view showing the use of attachments and thread gauging rolls of the present invention with vernier calipers;

Fig. 2 is an isometric view, partially in section, showing an attachment and a thread gauging roll as illustrated in Fig. 1;

Fig. 3 is an expanded isometric view showing the two parts of a thread gauging roll of this invention;

Fig. 4 is a partial cross sectional view illustrating the operation of a thread gauging roll of this invention;

Fig. 5 is a perspective view of a U-shaped snap gauge employing thread gauging rolls as defined herein; and

Fig. 6 is a top plan view of a thread plug gauge employing thread gauging rolls of this invention.

In all figures of the drawing like numerals are used to designate like parts when convenient for purposes of illustration and explanation. It is to be understood that this invention is not limited to structures such as are specifically illustrated inasmuch as the proportional sizes of the parts shown, such as for example, an attachment for use with a vernier caliper, or the thread gauging rolls described may be changed considerably so as to adapt the invention for use with different sized equipment and in measuring threads of various dimensions. All such modifications involving essentially a change in size, and not affecting the operating characteristics of the part involved are to be considered as falling within the scope of this invention.

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As an aid to understanding the present invention, it may be stated in an essentially summary form that it involves thread gauging rolls each of which includes: a metal cylinder; a groove located on the outside of this cylinder so as to extend in a helical path around it; and a wire coil positioned on the cylinder so as to be held by the groove in such a manner that this wire coil extends from the cylinder itself so as to be capable of being used in measuring. The invention also encompasses the use of thread gauging rolls as described in various operative mechanisms as will be hereinafter discussed. For a complete summary of the invention reference is made to the appended claims setting forth in detail the features of this invention.

The invention is best explained by referring directly to the accompanying drawing. In Fig. 1 there is shown a vernier caliper 10 of conventional design and construction. Upon this caliper there are formed projecting bar-like ends 12 used in measuring; upon these ends there are located attachments 14 of the present invention which are designed so as to convert the caliper 10 so that it may be used in measuring the pitch diameter of threads. Each of the attachments 14 is built about an attaching member or block 16 having an elongated slot 18 located therein. The ends 12 are adapted to fit within these slots 18 and to be held firmly against the blocks 16 by means of yokes 20. As is best seen in Fig. 2 of the drawings the yokes 20 are pivotally attached by means of screws 22 to the blocks 16, and are provided with adjusting screws 24 used in securing the blocks 16 and the ends 12 to one another in the obvious manner. If desired, further screws 26 may be used so as to secure the blocks 16 to the ends 12; also, if desired, various spring means may be provided on the sides of the slots 18 so as to insure a snug fit against the ends 12, although this is not normally necessary.

When the attachments 14 are positioned as indicated, shafts 28 extend from these attachments in such a manner as to rotatably support hollow metal cylinders 30. These cylinders form the center or basic parts of thread gauging rolls 32 of the present invention and fit closely against the shaft 28. Around the outside of each of the cylinders 30 there is formed a small groove 34 extending in a helical path and having a uniform pitch. Preferably the grooves 34 are formed as with a lathe or grinding apparatus in a conventional manner so as to have a number of adjacent turns spaced from one another located around the cylinder 30 as shown in the drawing. A small wire coil 36 is adapted to be held within each of the grooves 34 so as to extend radially therefrom and so that adjacent turns of the coil 36 are spaced from one another as shown in the drawing. These coils 36 are preferably formed in the manner of coil springs out of wire having a uniform circular cross-sectional configuration. Preferably the wire used for the coils 36 is very accurately formed as to diameter.

When the coils 36 are formed in the manner of coil springs they may be conveniently threaded upon the grooves 34 so as to be resiliently held on the cylinders 30. If desired, they may be secured to these cylinders by various conventional means such as, for example, an adhesive, solder or the like, although this is not generally necessary. It should be specifically noted that the coils 36 project from the cylinder 30 as illustrated in Fig. 4 so that the threads 38 on a bolt 40 or the like fit against the sides of the wire employed during use of the rolls 32. Thus, more than half of the wire used projects beyond the surface of the cylinder 30. Preferably the wire is engaged by the thread at the pitch diameter of the part being measured.

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The use of the thread gauging rolls 32 is considered to be obvious from a consideration of Figs. 1 and 4 of the drawings. When the attachments 14 are attached as previously indicated to the caliper 10 this caliper may be adjusted so that the threads 38 on a bolt 40 may be engaged by the wire employed for the coils 36. By proper adjustment of the caliper 10 a measurement is then obtained on the caliper which corresponds to the pitch diameter of the threads 38 on this bolt 40. The reading obtained upon the caliper may then be corrected by an amount corresponding to the dimensions of the rolls 32 in order to obtain the actual pitch diameter of the threads 38.

Since the pitch of the threads formed upon a bolt of any given external diameter may vary and since it is conventional to place threads upon bolts of many different diameters, it is preferred to supply a number of different rolls of different thread pitches similar to the rolls 32 along with the attachments 14. Thus, a complete set of rolls 32 can be supplied with two attachments 14 so that a single caliper can be used to measure any desired pitch diameter. These rolls 32 may be interchanged upon the shaft 28 by merely removing screws 42 from the ends of these shafts. These screws 42 normally serve to hold the rolls 32 in position. If desired, conventional washers 45 can be supplied.

If desired, the grooves 34 can be other than of a single pitch variety; in this case several interlocking coils 36 are used, one coil in each groove. The method of construction employed in this case is the same method of construction as described in the foregoing. A structure of this category can be conveniently used in measuring double pitch threads or the like. It is not to be assumed that the rolls 32 are useful in only measuring pitch diameter. Because of the construction of these rolls they can also be employed to check the pitch of a thread.

It is also not to be assumed that the attachments 14 and the rolls 32 are limited to use in measuring external threads, inasmuch as they can be used also in measuring internal threads.

If desired, thread gauging rolls as described can be mounted upon the ends 44 of a U-shaped frame 46 in a snap gauge (Fig. 5). In this case the frame supports four shafts 48 arranged in pairs across the ends 44. Thread gauging rolls 32' are rotatably mounted upon these shafts by screws 49 and all of these rolls are preferably of the same diameter. The distance *b* between the outer pair of rolls 32' is slightly greater than the distance *a* between the inner pair of rolls 32'. With this type of structure a bolt or the like may be passed through the initial set of rolls and will be stopped from passing through the second set of rolls if the pitch diameter of the threads on it is within a permissible range of tolerances. This type of structure is also useful in checking thread pitch. If desired, various adjusting means can be provided for setting the position of the rolls 32' on this gauge, or different sized rolls can be employed with it.

In Fig. 6 of the drawing there is shown a thread plug gauge 50 of the present invention having a handle 52 to the ends of which are rigidly secured shafts 54. On these shafts thread gauging rolls or cylinders 32'' are mounted by means of screws 56 in such a manner that these rolls or cylinders are incapable of rotation. Preferably the two rolls or cylinders 32'' differ slightly from one another in diameter corresponding to what are termed "go" and "no go" sizes so that this plug 50 may be used in inspection production work such as is shown in Fig. 5 of the drawings.

Those skilled in the art to which this invention pertains will realize from the foregoing that the present invention is very simple, and that the thread gauging rolls described herein are extremely easy to manufacture to close tolerances. Further, these thread gauging rolls are very accurate and efficient for the purpose intended. An important commercial advantage of the invention lies in the

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fact that the coils employed can be easily replaced when worn; thus, it is not necessary to discard a complete worn gauging element. Since the present invention is susceptible to modification without departing from the essential concept explained herein, it is to be considered as being limited only by the appended claims.

I claim:

1. An attachment for use in measuring the pitch diameter of threads upon a member which comprises: a block; means for securing said block to a measuring instrument; a shaft extending from said block; a hollow metal cylinder positioned around said shaft; means defining a groove on the outside of said cylinder, said groove extending in a helical path around said cylinder so as to have adjacent turns spaced from one another located around said cylinder; and a wire coil positioned on said cylinder, said wire in said coil being of larger diameter than the depth of said groove, said wire coil being located so as to be held by said groove and so as to extend from said cylinder, said coil having adjacent turns spaced from one another.

2. A snap thread gauge of the class described which comprises: a generally U-shaped frame having ends; four shafts mounted parallel to one another on the ends of said frame, two of said shafts being positioned on one of said ends and two of said shafts being positioned on the other of said ends, so that said shafts are positioned in adjacent pairs, one of said shafts of each of said pairs being located on each of said ends; a metal cylinder located on each of said shafts; means defining a groove on the outside of each of said cylinders, said grooves extending in helical paths and having a uniform pitch, each of said grooves having adjacent turns spaced from one another located around said cylinder; and a wire coil positioned around each of said cylinders, said wire in said coil being of larger diameter than the depth of said groove, said coils being located so as to be held by said grooves and so as to extend from said cylinder, said coils each having adjacent turns spaced from one another.

3. An attachment for use in measuring the pitch diameter of threads upon a member which comprises: a block; means for securing said block to a measuring instrument; a shaft extending from said block; a hollow cylinder positioned around said shaft; means defining a helical groove on the outside of said cylinder, said groove having a uniform pitch; and a coiled wire spring positioned on said cylinder, said wire in said spring being of larger diameter than the depth of said groove and having a uniform cross-sectional configuration, said spring being located on said cylinder so as to extend into said groove so as to be held thereby and so as to extend from said cylinder.

4. A snap thread gauge of the class described which comprises: a generally U-shaped frame having ends; four shafts mounted parallel to one another on the ends of said frame, two of said shafts being positioned on one of said ends and two of said shafts being positioned on the other of said ends so that said shafts are positioned in adjacent pairs, one of said shafts of each of said pairs being located on each of said ends; a metal cylinder located on each of said shafts; means defining a helical groove on the outside of each of said cylinders, said grooves having a uniform pitch; and a coiled wire spring positioned on each of said cylinders, said wires in said springs being of larger diameter than the depths of said grooves and having a uniform cross-sectional configuration, said springs being located on said cylinders so as to extend into said grooves so as to be held thereby and so as to extend from said cylinders.

5. A thread plug gauge of the class described which comprises: an elongated handle; a cylinder attached to each end of said handle, said cylinders having slightly different diameters; means defining helical grooves on the outside of each of said cylinders, said grooves each having a uniform pitch; and a coiled wire spring positioned on each of said cylinders, said wires in said springs

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being of larger diameters than the depths of said grooves and each having a uniform cross-sectional configuration, said springs being located on said cylinders so as to extend into said grooves so as to be held thereby and so as to extend from said cylinders.

6. A thread plug gauge of the class described which comprises: an elongated handle; a cylinder attached to each end of said handle; said cylinders having slightly different diameters; means defining grooves extending around said cylinders in a helical path so as to have adjacent turns spaced from one another located around said cylinders; and a wire coil located on each of said cylinders so as to be held by said grooves and so as to extend from said cylinder, the diameter of the wire in each of said coils being greater than the depth of the groove

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in which said wire is located, said coils each having adjacent turns spaced from one another.

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