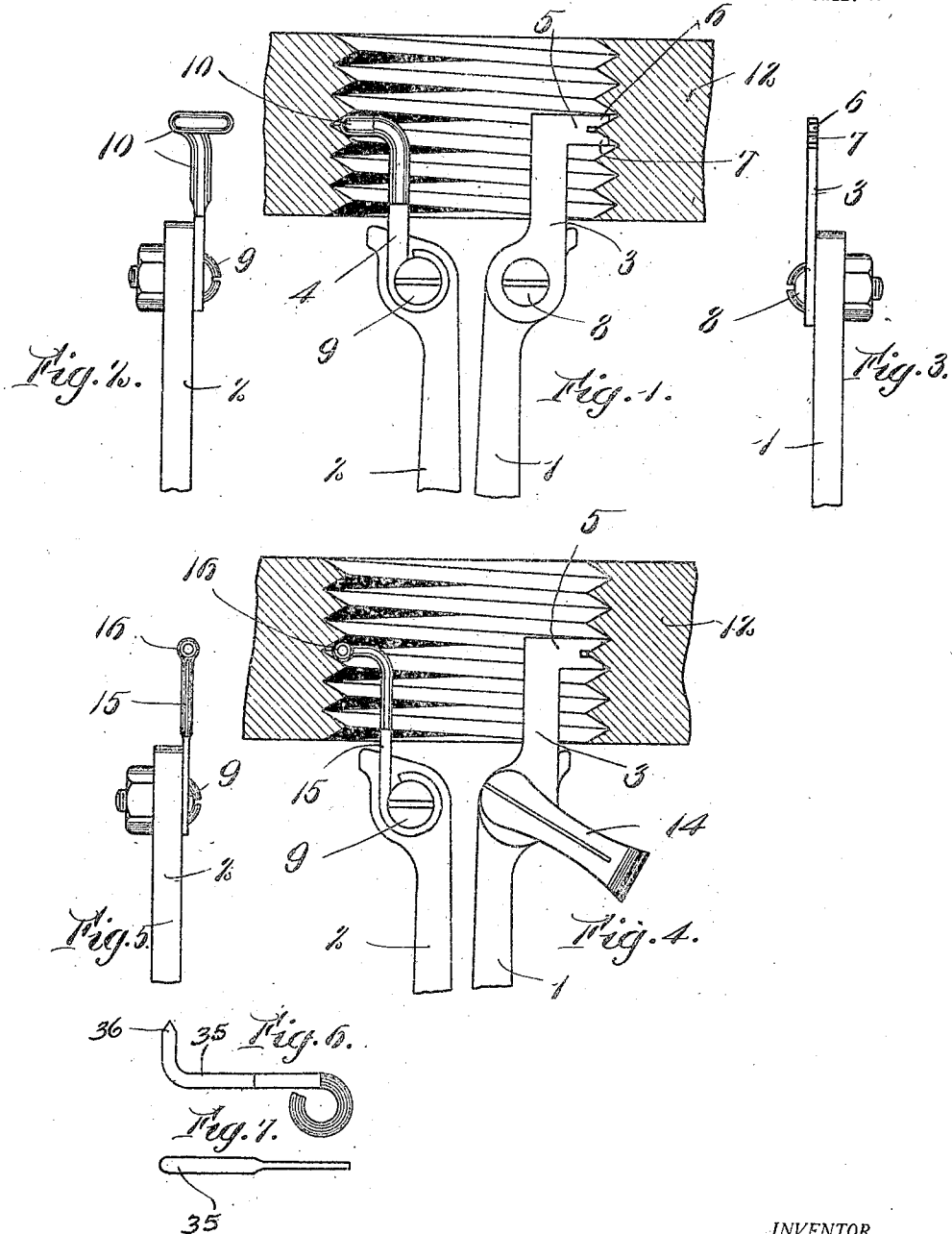


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 THREAD MEASURING APPARATUS.
 APPLICATION FILED NOV. 10, 1919.

1,377,959.

Patented May 10, 1921.

2 SHEETS—SHEET 1.



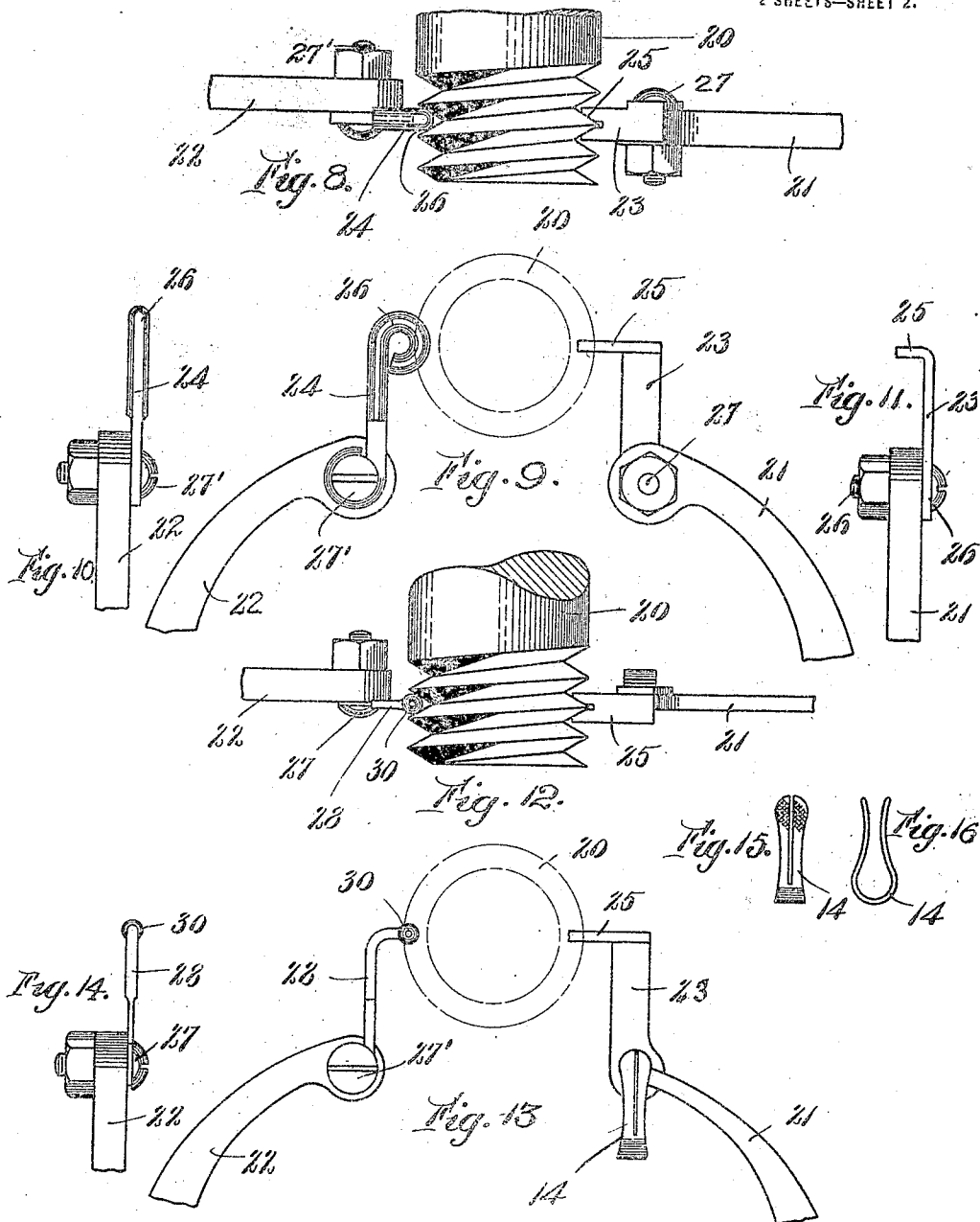
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THREAD-MEASURING APPARATUS.

1,377,959.

Specification of Letters Patent.

Patented May 10, 1921.

Application filed November 10, 1919. Serial No. 336,908.

To all whom it may concern:

Be it known that I, AXEL E. BJORKMAN, a citizen of the United States, and resident of Cliftondale, Saugus, in the county of Essex and State of Massachusetts, have invented an Improvement in Thread-Measuring Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My present invention is an improved and novel thread measuring apparatus, comprising novel and special types of devices for measuring an internal or external thread, and includes a novel method of operating same.

An important feature of the invention consists in providing specially formed measuring devices of the general type of calipers, and to fit the legs of the calipers with devices, preferably detachable and interchangeable, specially adapted to contacting with threads of a bolt or nut, both external and internal, and to secure a measurement of the same diametrically across the axis of the bolt or nut being measured, *i. e.*, from near the top to near the bottom substantially on the pitchline. These thread contacting devices, also, effect their measurement along substantially the midway portion between the top and bottom of each thread. This feature is important, as I am thus enabled to utilize my thread measuring tools on any angular thread, particularly of the standard types of threaded devices, *viz.*, either the standard V-thread, the U. S. standard, or the Whitworth, the latter two having slightly truncated or rounded tops and bottoms.

It is of great importance, in devices of this kind, to enable a quick and ready adjustment of the thread contacting members to be made, and also to maintain them in adjusted position, and important objects of the present invention include these features. It is also a feature of my present invention to enable the thread contacting members to be made so as to be readily attached to a standard pair of calipers, by utilizing spring clips or the like for this purpose, as will be more fully explained.

Other features, novel combinations and important details will be hereinafter more fully pointed out and claimed.

Referring to the drawings, illustrating preferred embodiments;

Figure 1 is a view showing a nut in cross section with my improved apparatus applied thereto;

Figs. 2 and 3 are side views;

Fig. 4 is a view similar to Fig. 1 wherein the thread contacting members are detachably held, and with a slightly different thread contacting member for the internal thread;

Fig. 5 being a side view; and

Figs. 6 and 7 being details, side and end views respectively; of a modified form of member.

Fig. 8 is a view of my improved measuring apparatus applied to the external thread of a bolt;

Fig. 9 being a view at right angles to the position shown in Fig. 8;

Figs. 10 and 11 are detailed side views of the devices;

Fig. 12 is a view similar to that shown at Fig. 8, with a modified form of thread contacting member for the outer measurement;

Fig. 13 being a plan view;

Fig. 14 being a side view;

Figs. 15 and 16 being side and plan views of a spring clamp to hold the thread measuring member detachably to the leg of a measuring device or caliper.

As shown in the drawings, my devices consist in cooperating members adapted for accurate measurement of both internal and external threads and the measuring devices themselves can be utilized to take off or transfer measurements from one to the other. For example, as will be explained more fully. Referring to Figs. 1-5, illustrating the measurement of internal threads, 1 and 2 indicate the end portions of the legs of any desired or standard type of caliper or measuring instrument. Attached to the extreme ends of these legs, is a top thread measuring member 3 and a bottom thread measuring member 4. The member 3 preferably is formed with a right angle extension, as indicated at 5, having forked and beveled faces 6 and 7, preferably of suitable angle to cooperate with the usual type of thread, *viz.*, substantially 60° or when measuring Whitworth threads, of approximately 55°. Any other desired angle can be provided. The member 3 is secured to the leg 1 by a set screw or bolt 8, as shown in Fig. 1. The member 4 is similarly secured to its leg 2 by a screw 9, and has its thread measuring portion curved and of suitable diameter as

shown at 10 to fit within and contact against the sides of the threads near the pitchline, typical standard V-threads being here shown in the nut 12, the latter appearing in cross section.

Referring to Fig. 4, the nut 12 is here shown with the top thread measuring member 3 of similar form to that just explained, but this member may be attached to the leg 1 by a spring clip 14, which engages and holds securely the member 3 to the leg 1 and yet can be readily detached and a longer, shorter, or different thread contacting member 3 attached, if desired. To the leg 2 I have shown a slightly different form of thread contacting member 15, which may be secured to the leg 2 by the bolt 9 as above explained. This member 15 has a short extending arm terminating in a round or ball-like portion 16, also adapted to contact with the threads near the bottom, but at a sufficient distance to permit of use in the various kinds of threaded forms above explained. I prefer to provide these thread contacting portions so that they will measure substantially the walls of the threads, practically midway between the top and bottom, this facilitating the transfer of measurements for both internal and external threads, and increasing accuracy. Figs. 6 and 7 illustrate a modified form of member 15 to be explained.

The tools for measuring external threads on a bolt 20, are shown in Figs. 8-14, inclusive, wherein the legs 21 and 22 of a pair of calipers of usual type carry thread contacting members 23 and 24 respectively, the member 23 having a forked extension 25 adapted to fit on the outer sides of the top of a thread similar to the portion 5 of the internal thread measuring member. In this form, the member 24 is curved at its thread contacting end, as shown at 26 and adapted to fit within the threaded walls diametrically opposite the forked portion 25 of the member 23, as clearly shown in Figs. 8 and 9. These members are also held to the legs of the calipers by bolts 27 and 27' respectively. As shown in Fig. 12, a slightly different internal thread measuring member 28 is used having a ball 30 thereon, similar to the contact portion 16, already described, and as clearly illustrated in Figs. 12 and 13. As illustrated in Fig. 14 and as shown in detail in Figs. 15 and 16, the spring clip 14 may be utilized in this apparatus as well as in that described in measuring the internal threads, to hold the member 23 to the leg 21 of the calipers.

It will thus be seen that I have devised an improved and novel type of thread measuring apparatus, wherein the thread contacting members 3, 4 and 15, of Figs. 1 and 4, and 25, 26 and 30 of Figs. 8 and 12, may be utilized, each member being detach-

able and readily applied to and held on the leg of the caliper. Each member also can be quickly trued up or alined when desired, both with regard to the leg of the caliper carrying it and with regard to each other on both legs of the caliper, to see that a true and correct measurement diametrically across the bolt or nut will be secured. Furthermore, in practice, the operation of these members permits measurements to be quickly taken from one apparatus to the other, to reproduce the desired threaded bolt or nut. Thus, for example, if it is required to reproduce a nut to fit the bolt 20, the bolt measuring calipers can be readily adjusted to the diameter of threads in said bolt. Thereupon the nut measuring calipers can be fitted to those just taken from the bolt, the forked member of one fitting upon the rounded member of the other, and similarly the rounded measuring member will fit in the other forked member. The thread cutting tools can thereupon be set to either, and a thread formed, whereupon it can be accurately tested, and further clearance given on the threads where desired, until a perfect and accurate reproduction is made. This is most important where it is necessary in work of this kind to reproduce a bolt or nut and it is not feasible to have the other member for which the reproduction is made, available in the shop, but where it must be at a distance. My invention thus enables a new method of reproducing such work to be employed, eliminating the former difficulties of "cut and try" processes. By first measuring one threaded member—either the bolt or nut—and then transferring these measurements from the calipers adjusted thereto, to the pair of calipers for the other threaded member and the threading tool set in accordance therewith, I can accomplish the work of making a nut for a given bolt, or a bolt for a given nut, much quicker, more accurately and with greater ease than heretofore possible. It will be appreciated that the thread contacting devices of the nut measuring calipers for example, cooperate with the thread contacting devices of the bolt measuring member, and hence measurements from one pair of calipers can thus be taken by the other with great accuracy.

As shown in Figs. 6 and 7, a member similar to the member 15 is illustrated, but with the end portion 36 pointed. This thread contacting member may be utilized when desired to apply the apparatus to a very small aperture and to secure a fine measurement on a small thread.

It will also be appreciated that while I have described the apparatus as intended primarily for taking measurements of threaded members, and that it is of special

usefulness and value in this work, the invention is also capable of use on work involving the transfer or taking of measurements upon plain spindles, wedges or the like, to which it is desired to fit a cooperating part or member, and I desire that the scope of the invention be considered as covering such work, whether actually threaded or not.

10 My invention is further described and defined in the form of claims as follows:

15 Thread measuring apparatus of the kind described, having a pair of legs, a thread measuring member secured to each leg and projecting at an angle thereto, said members having right-angled thread contacting portions extending a substantially greater

distance than the height or depth of the threads to be measured, a V-shaped end on one thread measuring member and a rounded portion on the end of the other thread measuring member in alinement with the bottom of the V-shaped end of the other member, said members being so proportioned as to contact with the approximate pitch diameter of the thread to be measured.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

AXEL E. BJORKMAN.

Witnesses:

JAMES R. HODDER,
HAROLD J. CLARK.