March 29, 1932. C. G. JOHNSON 1,851,283

GAUGE

Filed April 24, 1924

Fig. 1.

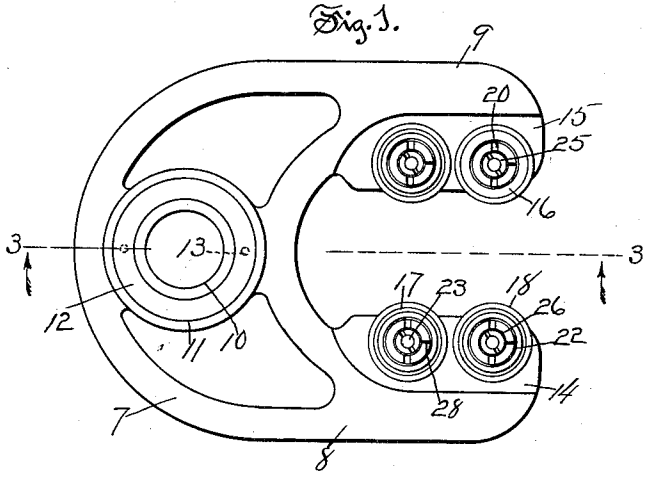


Fig. 2.

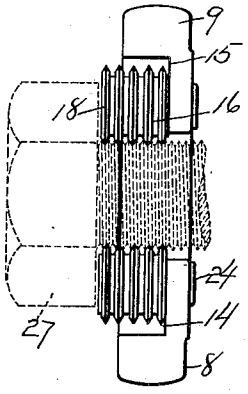


Fig. 3.

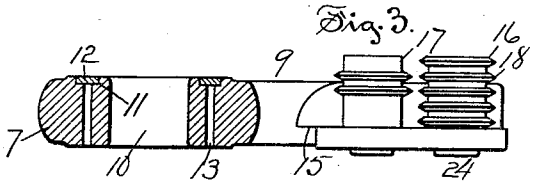


Fig. 4.

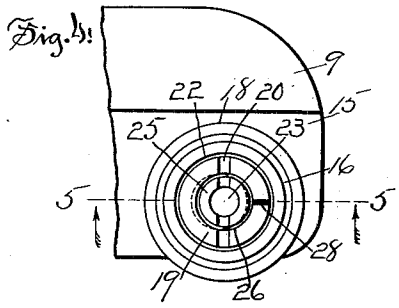


Fig. 5.

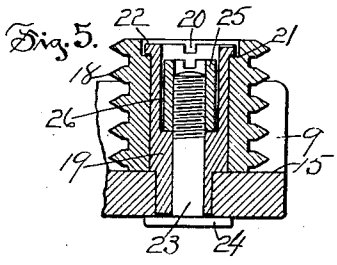
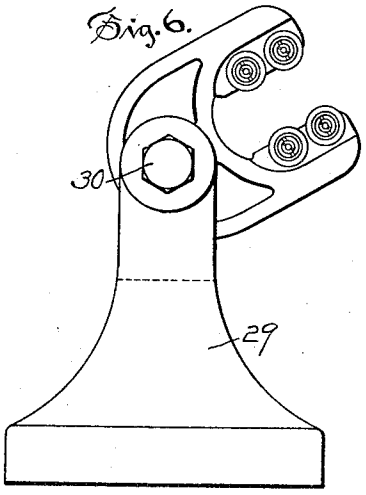


Fig. 6.



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Patented Mar. 29, 1932 1,851,283

UNITED STATES PATENT OFFICE

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GAUGE

Application filed April 24, 1924. Serial No. 708,725.

My invention relates to the class of devices more especially used for gauging screw threads for the purpose of determining certain characteristics thereof, and an object of my invention, among others, is to provide a device of this class that shall be extremely accurate in operation and one with which the operations may be rapidly performed; and a further object of the invention is to provide a device of this class by the use of which various characteristics of a screw thread may be determined and one that shall require no especial degree of skill in its operation.

One form of device embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained, is illustrated in the accompanying drawings, in which—

Figure 1 is a front face view of my improved gauge.

Figure 2 is an end view of the gauge illustrating its operation.

Figure 3 is a view in section on a plane denoted by the dotted line 3—3 of Figure 1.

Figure 4 is a view, scale enlarged, illustrating the manner of mounting one of the gauging rollers.

Figure 5 is a view in section on a plane denoted by the dotted line 5—5 of Figure 4.

Figure 6 is a detail view illustrating a holder for my improved gauge.

The invention illustrated and described herein embodies certain improvements upon the thread gauge forming the subject matter of my former Patent No. 1,660,335, issued February 28, 1928, the principle elements of the present structure being the same as those described in such patent, the invention herein residing in certain details in construction of the mounting of several of the gauging elements of the device.

In the accompanying drawings the numeral 7 indicates the body or stock of my improved gauge that is preferably of U-shape and having branches 8—9 that serve as supports for the gauging devices. The stock has an opening 10 and a groove 11 preferably concentric with the opening 10, said groove containing a designating plate 12 upon which any desired markings relating to the gauge may be placed. Removal plate holes 13 are formed through the stock from the back thereof in line with said groove so that by the insertion of an instrument through said holes the plate may be forced from its seat and replaced by another plate whenever desired, the plate fitting the groove tightly enough to enable it to be forced into place and securely held therein by friction.

Each of the branches 8 and 9 is provided with ledges 14—15, the recessed faces or shelves of which are disposed below the plane of said branches, and a pair of gauging rollers 16 is mounted, one roller of said pair on each of said ledges. Likewise a pair of similarly formed back or guard rollers 17 is mounted, one roller of said pair on each of the ledges of the two branches of the gauge, said rollers co-operating with each other in the gauging operation. Each of the rollers is provided with a plurality of gauging ribs 18, that in the majority of cases, though not all, are arranged in staggered relation, that is, the ribs of the rollers on one of the branches are not in line with the ribs of the rollers on the other branch.

As above mentioned, the faces or shelves of the ledges constitute positioning surfaces for the gauging rollers, which rollers are located adjacent to the walls or edges of the ledges. These walls or edges of the ledges act as shields for the gauging rollers to protect such rollers from injury as by forcible contact with other elements. This continuous wall to act as a shield is preferred, but I anticipate that other forms of shields may be employed to protect the gauging rollers and prevent contact of foreign elements therewith.

Each of the rollers is mounted on a bearing sleeve 19, the reduced end of which is located in a hole in one of the ledges 14 or 15, and as shown in Figure 5 of the drawings, the body of the sleeve thereby being eccentric to said hole, and the reduced eccentrically arranged end of the sleeve providing a shoulder on the body resting upon the ledge. The outer end of the sleeve has a slot 20 by means of which it may be rotated. This end of the sleeve is

headed providing a shoulder 21 resting against the bottom of a recess 22 in the end of the roller in which the sleeve is located, the distance between the under side of the head and the ledge being slightly greater than the distance from the bottom of the roller to the bottom of the recess 22 so that the roller may be rotated freely upon the bearing constituted by the body of the sleeve. A fixed bearing pin 23 is projected into the sleeve, said pin preferably having a head 24 resting against the outer surface of one of the branches 8 or 9, the inner end of the pin also preferably being threaded to receive a nut 25 located within a recess 26 in the sleeve 19, the end of the nut having a slot by means of which it may be turned and when turned into place against the bottom of the recess 26 the sleeve will be held securely in place. When the nut is loosened by means of the slot therein, the sleeve may be turned and the eccentricity of the body thereby provides means for changing the distance of the roller from a roller arranged on the opposite branch of the gauge.

Each of the rollers 16, in order to secure maximum results as to accuracy, is provided with a number of ribs 18, five being shown on the rollers herein, and the rollers and ribs are so constructed that they may be engaged with threads on a device, as a bolt, close to the head 27 of such bolt, and in order to provide compactness of the tool and avoid undue projection of the rollers beyond the face of the tool, the ledges 14—15 are provided whereby the rollers are so depressed that their outer ends rise but a slight distance above such face.

The back rollers 17 may have any suitable number of ribs, but as these rollers serve a function as guard rollers to prevent passage of devices of improper size that may have passed the rollers 16 it will be found that a less number of ribs may be employed than are used upon the gauging rollers 16, in the structure herein shown these guard rollers 17 having two ribs each. The several rollers shown herein are known in shop vernacular as go and no-go rollers 16 and 17, respectively.

After the gauge has been set for any specific purpose the pieces to be gauged are presented to the rollers 16 and if they pass between the rollers 16 and are stopped by the rollers 17 the pieces will be of proper size. In order to adjust the rollers for any specific purpose the nut 25 is loosened and the sleeve 19 may then be turned by means of a screw driver in the slot 20 to locate the gauging or guard rollers in proper position with respect to each other and the nut 25 is then tightened to hold the parts securely in place.

In order to determine the position of the sleeve 19 as to the eccentric portions thereof an indicating notch 28 is formed in the end of the head of the sleeve, and preferably midway between opposite ends of the slot 20, and as shown in Figures 1 and 4 of the drawings. In forming the gauge said notch will preferably be located at the point of greatest eccentricity of the sleeve, or opposite the point of least eccentricity of the sleeve, and in this way the exact position of the sleeve may be readily determined and it will then be apparent which way the sleeve may be turned to increase or decrease the space between the rollers. Means other than the indicating notch may be employed to denote the position of the eccentricity of the sleeve, in fact the slot 20 may be positioned with this end in view.

In order that the rollers 16 may readily adjust themselves to proper positions to permit passage of a device of proper size being gauged and without binding or friction, the distance between the ledges 14 or 15 and the shoulder 21 hereinbefore referred to of a sleeve 19 is made enough greater than the distance between the lower end of the roller and the bottom of the recess 22, to enable the roller to have enough endwise play to adjust itself to the position of the threads and thus permit the threads of a piece of proper size to readily pass.

A material feature of this invention resides in a set of "go" members constructed to correctly gauge elements, as forms, dimensions, etc., lengthwise of a screw and transversely of the thread, and a set of "no go" members constructed solely to engage elements crosswise of the screw and in the direction of depth of the thread. The "go" members of the gauge comprise a number of ribs extending along the members for a distance at least equal to the thickness of a threaded member, as a nut, to be engaged by the bolt, the threads on which are being cut, and preferably these ribs will extend for a distance somewhat greater than that mentioned. The "go" members being set to gauge a thread of a certain size, if having a lesser number of ribs than as just mentioned, might denote that a thread was being perfectly formed, but upon the insertion of the bolt in the nut designated for it, it would be found that the bolt would not enter entirely through the nut. This is for the reason that the ribbed portion of short dimension either engaged only a perfect portion of the thread of the bolt, or perhaps a defect so minute as that the gauge would permit it to pass. This minute defect, however, occurring at intervals along the thread would multiply the defect sufficiently to prevent passage of the bolt between the gauging members if the gauging ribs engaged the thread for a substantial part of its length.

Therefore, it is material that the ribbed portions of the gauging members be of a length sufficient to certainly detect any vital defects in the thread, thereby rendering the latter faulty so far as elements extending lengthwise of a bolt are concerned.

The gauging members being correctly set to gauge a thread of a certain size, if it be found

that the bolt being threaded will not pass the "go" set of members, it is permissible, within certain defined limits, to make the bolt smaller in diameter. This being done sufficiently to enable a bolt to pass the "go" members of the gauge would determine that such bolt will engage the threads of a nut for which it is intended, and therefore that the bolt has been perfectly formed might be erroneously concluded.

This, however, is not so, as the bolt with its lesser diameter may now be too small, and this would not be determined by the "go" members. The "no go" members of the gauge now become essential. Containing a small number of ribs, one, or two at the most, they will not check errors as to elements lengthwise of the thread but will check them crosswise of the bolt or in the direction of depth of the thread only, and preferably errors as to size in diameter. If the bolt being formed is too small in diameter, this, not having been determined by the "go" members of the gauge, will be indicated by the "no go" members of the gauge. If the bolt will pass between the "no go" members, it is too small in diameter, although the "go" members have indicated that it was correct in other respects.

It is therefore material that the "go" members shall be composed of a large number of ribs to check accuracy as to elements extending lengthwise of the bolt and that the "no go" members shall consist of one, or at most two ribs, to check inaccuracies solely as to elements crosswise of the bolt, as of diameter.

As a convenient means for holding the gauge for gauging operations I have provided a standard 29 that is forked at its upper end to receive the gauge, and as shown in Figure 6 of the drawings, a clamp bolt 30 being employed to secure the gauge in proper position.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative, and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim—

1. A gauging tool comprising a stock with opposed branches extending therefrom in spaced relation, ledges formed on the facing edges of said branches and each ledge having its face depressed below the plane of the corresponding face of its branch, and gauging members mounted on said ledges.

2. A thread gauging tool comprising a stock with opposed branches extending therefrom in spaced relation, ledges formed on the facing edges of said branches and each ledge having its face depressed below the plane of the corresponding face of its branch, a gauging member mounted on one ledge and having thread engaging ribs extending around the periphery thereof, an opposing gauging member on the other ledge, and means providing a relative adjustment between the said gauging members toward and from each other.

3. A gauge comprising a stock having opposed branches located in spaced relation, a gauging member, elongated mounting means for said member supported solely at one end in one of the branches and including a portion in the branch relatively eccentric to the member mounting portion outside the branch, rotation of the said portion in the branch being adapted to adjust the said member toward and from the other branch, means passing through the mounting means for retaining the latter in adjusted position, and an opposing gauging member located on the other branch.

4. A gauge comprising a stock having opposed branches located in spaced relation, a gauging roller, a one-piece member supported solely at one end in one of said branches and having a relatively eccentric portion extending outwardly therefrom and supporting the roller thereon, rotation of the member being adapted to adjust the roller toward and from the other branch, means concentric to the gauging roller for retaining said member in adjusted position, and an opposing gauging member on the other branch.

5. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, an elongated bearing member secured at one end to one of said branches and having its opposite end unsupported, a gauging member mounted on said bearing member and having thread engaging ribs extending around the outside thereof, means for retaining said gauging member on said bearing member, and means passing through the bearing member for fastening the latter to its branch.

6. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, a bearing sleeve secured at one end to one of said branches and having a shouldered head at its other end, a gauging roller mounted on the sleeve and having a recess to receive said head and a shoulder underlying the shoulder on the head, and means housed substantially entirely within the sleeve for securing said sleeve in place.

7. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, a ledge formed on the inner edge of one of said branches and having its face depressed below the plane of the corresponding face of the branch, a headed gauge member support secured at one end to said

ledge and projecting therefrom with its opposite end unsupported and extending only a short distance beyond said corresponding face of its branch, and a gauging member mounted upon said support and having a recess in one end to receive the head of said support by means of which the member is secured in place.

8. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, a pair of headed gauge roller supports each secured at one end to the same one of said branches and projecting therefrom with their opposite ends unsupported, gauging members mounted on said supports, one gauging member being provided with a different number of thread engaging elements from the other thread engaging member, said members being adjustable toward and from a cooperating member in the opposed branch.

9. A screw thread gauging tool comprising a stock with branches extending therefrom, a set of supports spaced lengthwise along one of said branches and each secured at one end to that branch and supported therefrom with its opposite end unsupported, gauging rollers mounted on said supports, the outer roller being provided with a plurality of annular thread engaging ribs extending circumferentially around its periphery, and the inner roller being provided with a closely adjacent pair of annular ribs extending circumferentially around its periphery, said rollers being adjustable toward cooperating gauging members mounted in the opposed branch.

10. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, a bearing member mounted on one of said branches and including a bearing portion for a gauging member, said bearing member being rotatably adjustably connected to its supporting branch by an eccentric journal, means concentric with the said bearing portion for retaining the bearing member in adjusted position, said bearing member having a tool engaging portion for accomplishing adjustments and an indexing mark visible with a tool in place to denote the eccentric position of the bearing member, and a gauging member mounted on said bearing portion.

11. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, a bearing sleeve mounted on one of said branches and having a portion arranged eccentrically with respect thereto and including a roller bearing portion, said bearing and sleeve having a recess therein and being rotatably adjustably connected to its supporting branch by said eccentrically arranged portion, a screw threaded pin passing through said branch and extending into said sleeve and having a head resting against said branch, a nut fitting the screw threaded end of said pin and located in said recess, and a gauging roller rotatably mounted on said sleeve.

12. A screw thread gauge comprising a plurality of pairs of thread gauging members, each member having cooperating thread gauging elements, one pair of said members having a relatively large number of said thread gauging elements, and the other pair having two closely adjacent thread gauging elements.

13. A screw thread gauge comprising a plurality of sets of thread gauging members, each of said members having cooperating thread gauging elements, one of said sets having circular thread gauging ribs extending over a length at least equal to the length of the threads being gauged, and another of said pairs having not more than two thread gauging ribs on each member thereof.

14. A screw thread gauge comprising a plurality of sets of thread gauging members, each gauging member having a plurality of thread gauging elements, one of said sets having a relatively large number of thread gauging elements, and the other having not more than two of said thread gauging elements, one member of each pair being adjustable to vary the distance between the members of each pair.

15. A screw thread gauge comprising a supporting frame, supports secured at one end only to said frame and projecting therefrom, sets of screw thread gauging members mounted on said supports, each of said thread gauging members having thread gauging elements thereon, one pair of said members having a relatively large number of said elements, and the other pair of said elements having relatively few closely adjacent gauging elements.

16. A gauging tool comprising a stock with opposed branches extending therefrom in spaced relation, supports secured at one end in said branches, the other ends of the supports being unsupported, gauging members mounted on said supports, and shields located on said branches to prevent contact of foreign elements with said gauging members at the sides opposite the facing edges of said branches.

17. A screw thread gauging tool comprising a stock with branches extending therefrom in spaced relation, one of said branches having a hole therein, a shouldered gauging member support secured in said hole with its shoulder resting against the face of said branch, the opposite end of said support being unsupported, a gauging member mounted on said support, and a cooperating gauging member on the opposite branch.

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