J. D. JACKSON.

CALIPER SCREW GAUGE.

APPLICATION FILED JUNE 7, 1921.

1,436,260. Patented Nov. 21, 1922.

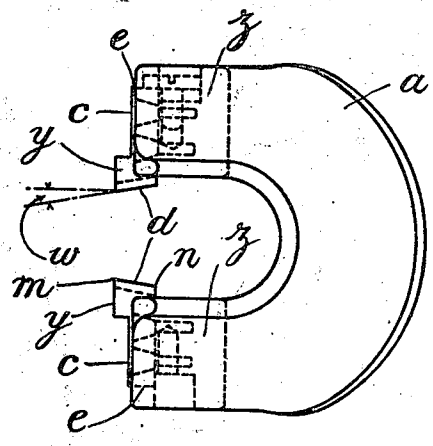


FIG: 1.

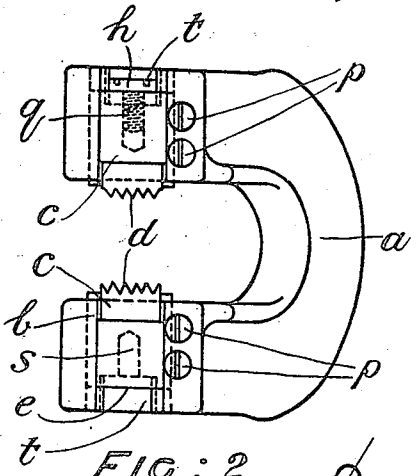


FIG: 2.

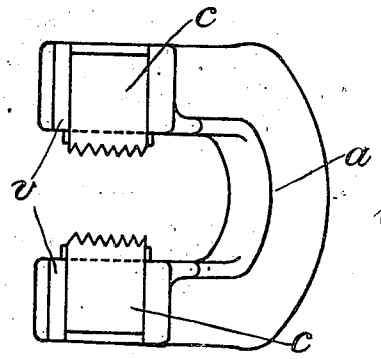


FIG: 5.

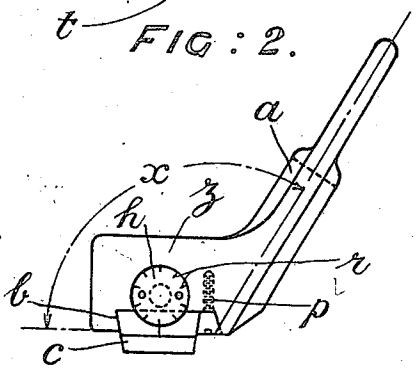


FIG: 3.

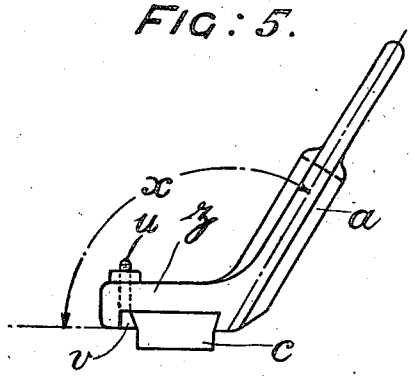


FIG: 6.

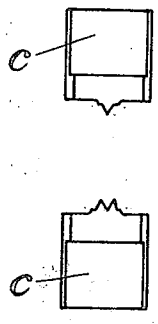


FIG: 4.

Inventor:
Joseph Duncan Jackson
By Pfederstein & Fairbanks.
Attorneys.

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UNITED STATES PATENT OFFICE.

JOSEPH DUNCAN JACKSON, OF GLASGOW, SCOTLAND.

CALIPER SCREW GAUGE.

Application filed June 7, 1921. Serial No. 475,610.

To all whom it may concern:

Be it known that I, JOSEPH DUNCAN JACKSON, a subject of the King of Great Britain and Ireland, residing at 103 Barloch Street, Possilpark, Glasgow, Scotland, have invented certain new and useful Improvements in Caliper Screw Gauges; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The present invention relates to caliper screw gauges.

The constructional features which characterize the invention will be described in the following specification and the invention defined in the annexed claims.

In the accompanying drawing which illustrates the invention:—

Fig. 1 is a side elevation of a "go" gauge constructed in one convenient form according to the invention.

Fig. 2 is a front elevation of the same.

Fig. 3 is a plan of the same.

Fig. 4 shows in front elevation the anvil pieces of a "not-go" gauge in their correct relative positions.

Figs. 5 and 6 are respectively front elevation and plan of a modified construction of gauge.

Referring in the first place to Figs. 1, 2, and 3, *a* is the frame which may be a casting or a drop forging. The frame is formed offset as shown, the arms *z*, *z* being arranged at an angle *x* of one hundred and twenty degrees to the U-shaped portion of the frame which connects them together. Recesses *b* are accurately machined and ground in the arms. In these recesses are placed anvil pieces *c*. Each anvil piece has the thread form cut in its working face *d* absolutely true to the standard form of thread to be gauged. The thread form is cut straight, (not curved) and is formed with a clearance angle *w*. In the present example the clearance angle is 10 degrees. The working face of each anvil piece is made absolutely true with respect to the back face *e*, that is the edges *m* and *n* of the working face are absolutely parallel with the back face. The side faces are made absolutely true, i. e. at right angles with, the back face.

The side faces may conveniently be ground by placing the two anvil pieces on a magnetic table, that is a table (of a type well known) which holds the pieces in place by magnetic action. This table is adapted to be moved in relation to a grinding disc or the like. The anvil pieces are placed on this table with the working faces *d* in engagement with each other, and with the back faces *e* (and consequently also the faces *d*) absolutely true with respect to the motion of the table. The table is then actuated so as to grind the side faces of the anvil pieces. These faces are ground absolutely true with, i. e. at right angles with, the back faces. They are ground also with the correct bevel. In this operation a jig may, with advantage, be employed.

p, *p* are tapered headed locking pins which are employed to hold the anvil pieces in the recesses in the frame. *q* is an adjusting screw with graduated head *h* provided for the fine adjustment of the anvil piece in the recess in the frame. A similar screw is provided for the other anvil piece, but is omitted from the drawing for the sake of better explanation. In each case the threaded portion of the screw screws into a tapped hole *s* in the frame, and the head *h* of the screw works in a circular recess *t* cut in the frame and bears on the top of the anvil piece. *r*, *r* are the graduations on the head of the screw. By turning either screw through a known angle, as indicated by the graduations on its head, the anvil piece which it operates may be accurately adjusted.

The anvil pieces are placed in the recesses *b* in the frame. The adjusting screws are screwed into the frame, and the locking pins *p*, *p* are screwed up to exert a light grip on the anvil pieces. The anvil pieces are then correctly adjusted as regards their distance apart—as regards a "go" gauge—by engagement with a standard slip gauge equal to the core diameter of the thread to be measured. The locking pins are then tightened.

In the case of a "not-go" gauge, the anvil pieces are adjusted as regards their distance apart in a similar manner and employing a suitable standard not-go slip gauge.

The anvil pieces of a "not-go" gauge are shown in Fig. 4. The one anvil piece is provided with only a single thread form and the other with only two consecutive thread forms, as shown in the figure.

Of the two locking pins employed for each anvil piece one is preferably threaded right hand and the other left hand.

Referring now to Figs. 5 and 6, a modified construction of gauge is here shown. In this case the anvil pieces are held in the recesses in the frame by means of binding slips v, which are formed with inclined faces adapted to engage with the inclined sides of the anvil pieces as shown. These binding slips are pulled back and are held in place by bolts or studs u. In this form of construction also, micrometer-headed adjusting screws may be employed if desired. In either construction, a micrometer-headed adjusting screw may, if desired, be provided for one anvil piece only.

I have found that the angle x is of great practical importance. I am of opinion that an angle of 120 degrees is generally a good angle for such gauges. By making this angle about 120 degrees, a very good light is obtained on the contact surfaces of the gauge with the screw under test; this is not obtained when the anle is 90 degrees.

The clearance angle w may be varied from 10 degrees to suit the requirements or desiderata in particular cases.

Gauges according to the present invention are applicable either to right or left hand screw threads.

Gauges according to the present invention allow of great speed being attained in the inspection of screws and the quick detection of faults. Their construction also tends to long life, simplicity in setting, and speed in checking the gauge.

The purpose of the clearance angle is twofold.

The first purpose is this. Screw threads cut straight (that is in straight lines—not helices) cannot engage properly with screw threads of the same contour (form and size of thread) cut helically (as is done on a cylindrical rod to form a "screw")

One method of overcoming this difficulty in a caliper gauge would be to construct the "anvil pieces" of very thin plate so that the acting surface is only an edge. Such a construction would not however be good for practical reasons.

Another method of overcoming the defect is that adopted according to the present invention. The working face of each anvil piece is made with a clearance angle. By a clearance angle is meant an angle sufficiently great (depending on the nature of the thread) to ensure that only the protruding edge will engage with the work to be tested. This effects the same result in gauging.

The second purpose of the clearance angle is this.

If at any time the gauge is found on test to be inaccurate, due to wear or other cause, all that is necessary is to take out the anvil pieces, grind their front faces, (that is the faces y, y in Fig. 1) and readjust them in the frame.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a caliper screw gauge, the combination, with a frame having two arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces, towards each other, cut in thread form with a clearance angle, means for moving the said anvil pieces in the said arms to and from each other, and means for locking the said anvil pieces to the said arms.

2. In a caliper screw gauge, the combination with a frame having two arms and a portion connecting together the said arms and arranged at an angle of one hundred and twenty degrees with the said arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces, towards each other, cut in thread form with a clearance angle, means for moving the said anvil pieces in the said arms to and from each other, and means for locking the said anvil pieces to the said arms.

3. In a caliper screw gauge, the combination, with a frame having two arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces, towards each other, cut in thread form with a clearance angle, screws with graduated heads for adjusting the positions of the said anvil pieces in the said arms, and means for locking the said anvil pieces to the said arms.

4. In a caliper screw gauge, the combination, with a frame having two arms and a portion connecting together the said arms and arranged at an angle of one hundred and twenty degrees with the said arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces, towards each other, cut in thread form with a clearance angle, screws with graduated heads for adjusting the positions of the said anvil pieces in the said arms, and means for locking the said anvil pieces to the said arms.

5. In a caliper screw gauge, the combination, with a frame having two arms and a portion connecting together the said arms and arranged at an angle of one hundred and twenty degrees with the said arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces towards each other, cut in thread form with a clearance angle, means for moving the said anvil pieces in the said arms to and from each other, and tapered pins for locking the said anvil pieces to the said arms.

6. In a caliper screw gauge, the combination, with a frame having two arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces fac-

ing each other, the working face of the one anvil piece being cut with only a single thread form, and the working face of the other anvil piece being cut with only two consecutive thread forms, and the working faces of both anvil pieces being cut with a clearance angle, means for moving the said anvil pieces in the said arms to and from each other, and means for locking the said anvil pieces to the said arms.

7. In a caliper screw gauge, the combination, with a frame having two arms and a portion connecting together the said arms and arranged at an angle of one hundred and twenty degrees with the said arms, of anvil pieces slidably carried by the said arms, one by each arm, and having working faces facing each other, the working face of the one anvil piece being cut with only a single thread form, and the working faces of both anvil pieces being cut with a clearance angle and the working face of the other anvil piece being cut with only two consecutive thread forms, means for moving the said anvil pieces in the said arms to and from each other, and means for locking the said anvil pieces to the said arms.

I hereby sign my name to this specification.

JOSEPH DUNCAN JACKSON.