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(56) Documents cited

GB 1231172	**GB 0735830**
GB 0876235	**GB 0602392**
GB 0750957	**GB 0597296**

(58) Field of search
G1M

(54) Improvements in vernier caliper gauges

(57) A vernier caliper gauge has three points of contact which take the form of legs, having feet or terminations, in the shape of either balls or thimbles 8. The two forward legs are fixed to a main graduated frame 3 but the third leg can be moved accurately along this main frame and is associated with a vernier scaled cursor 4.

For easy manipulation in situations of repetitive production the instrument can be scaled in Groove Numbers but its lower scale can be calibrated in terms of either metric or imperial measure. The moving parts of the gauge can be moved micrometrically and subsequently locked in position by screws 5 and 7 if desired.

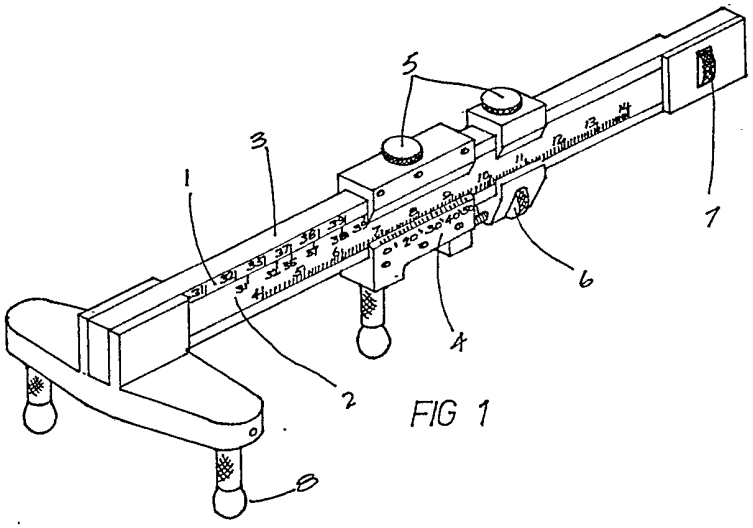

FIG 1

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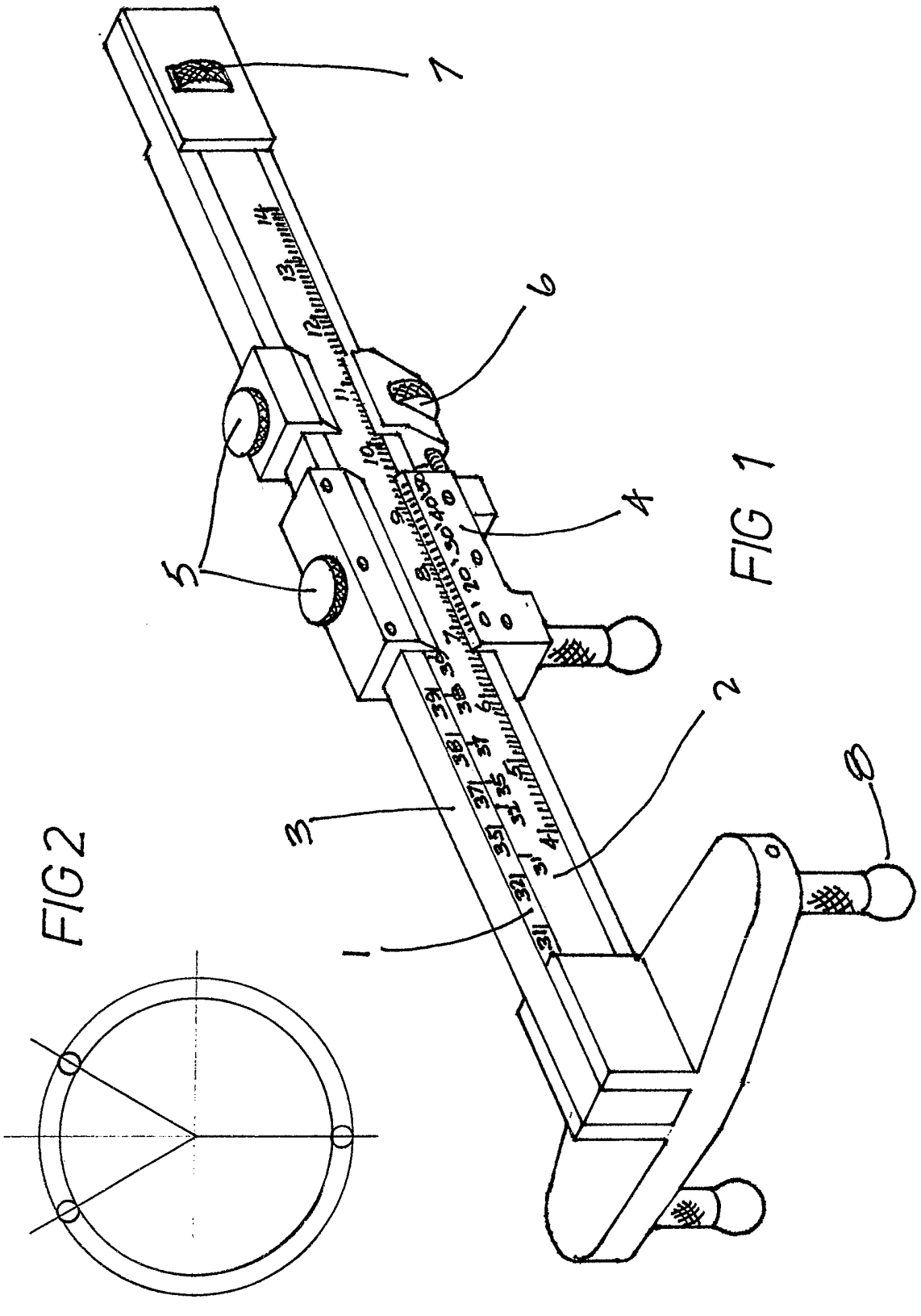

FIG 1

FIG 2

SPECIFICATION

Improvements in vernier caliper gauges

This invention relates to a vernier caliper gauge, which can be produced in many sizes, and which has been designed to measure the diameters of ring joint and other profiled grooves.

In this context a groove means a channel formed in the face of a pipe flange or valve or other flat faced component and is not related to the grooves which are produced in engineering on the edge of a component such as a pulley wheel.

At present the procedure of measuring the diameter of such grooves, on components of all sizes, is either to use a standard type vernier caliper and measure the distance across a pair of steel balls (of known diameter) placed accurately along the diameter of the component or to modify the standard caliper gauge so that it possesses either ball ends or thimble ends on the caliper legs.

Both these methods give rise to much inaccuracy because, in addition to the weight of the gauge, it is difficult to hold the balls or the modified legs of the gauge on a true diameter and at the same time ensure that the gauge is at a normal to the flange face itself.

The manipulative awkwardness of the above mentioned modified calipers, which gives rise to the inaccuracies in measurement, is overcome in the present invention which is herein described.

According to this invention there is provided a vernier caliper gauge which has three point contact in the form of three legs which can be terminated with either thimbles or balls, preferably the latter. Provision is also made to allow the measuring scale to be movable so that it can be adjusted to zero for each measurement.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which

Figure 1 shows the gauge in perspective.

Figure 2 illustrates how it is impossible to use the gauge in groove measurement without it being both normal to the plane of the flange and in true alignment to the diameter of the pitch circle.

Referring to the gauge drawing there is provided a scale of Groove Numbers I which are used to align with Groove Numbers of the moveable Scale 2. The main frame 3 of the caliper gauge is channelled so that the moveable Scale 2 can accurately slide within it.

The vernier Scale 4 slides on the main frame and can be fixed in any position by the use of a locking screw 5.

When not locked in position the sliding vernier Scale 4 can be fine adjusted by means of the transporting screw 6.

The thumb screw 7 serves both as a main scale mover and scale lock.

The gauge is applied to the groove measurement as shown in Figure 2 where it can be seen how the location balls 8 of the three feet engage in the channel of the ring joint.

The pitch of the ball ends 8 is such that they locate in several groove diameters and interchangeable balls of various diameters allow for different groove widths.

The method of employment of the gauge is very simple and consists of aligning the groove number on the main Scale 2 with the corresponding groove number on the Frame 3 and locking with 7.

The instrument is now located in the groove to be measured by moving the vernier scale 4 as necessary and making fine adjustments with 6.

The groove diameter can be read from the scaled part of 2 (metric or imperial) and the figure compared with the product drawing.

Very little skill is required to achieve a quick result, with repeatable accuracy, even when used on a groove in a component which may be vertical on the lathe.

This embodiment of the three point contact vernier caliper gauge is only one of many variations and others will be apparent to those who are skilled in the art.

CLAIMS (Filed on 11.1.84.)

1. A vernier caliper gauge having three points of contact, in the form of three legs, which can be terminated in the shape of either balls or thimbles, the latter being interchangable in the form of different sized sets.

2. A vernier caliper gauge, substantially as in Claim 1, in which the two forward legs are fixed to a main frame and the third leg, associated with a cursor, which can be moved along a rail in the main frame.

3. A vernier caliper gauge, substantially as in Claims 1 and 2, in which groove numbers on the main frame can be aligned with corresponding groove numbers engraved on a moveable scale which is channelled in the main frame.

4. A vernier caliper gauge, substantially as in Claim 2, in which the cursor of the third leg is calibrated for use in the form of a vernier scale.

5. A vernier caliper gauge, substantially as in all of the above claims, in which the moveable parts can be micrometrically moved and subsequently locked in position as desired.

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