



Date of filing Complete Specification : Aug. 6, 1953.

Application Date : Oct. 28, 1952. No. 27074/52.

Complete Specification Published : Dec. 15, 1954.

Index at Acceptance :—Class 106(2), H7.

COMPLETE SPECIFICATION.

Improvements in or relating to Linear Dimension Gauges.

We, A. CAPP & SON LIMITED, of Verdict Gauge Works, Thames Road, Crayford, Kent, a British Company, and ARTHUR CAPP, a British Subject, of the Company's address, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement :—

This invention relates to linear dimension gauges comprising a body portion and a relatively movable spring-pressed feeler or finger operatively connected to an indicator needle or the like through the intermediary of an oscillatable lever and a helix of wire or other suitable material mounted on a rotary shaft to which the indicator needle or the like is secured, the arrangement being such that any deflection of the feeler or finger is transmitted through the oscillatable lever and through the wire or like helix to produce a corresponding rotation of the rotary shaft and deflection of the needle or like indicator attached thereto.

A linear dimension gauge as above is described in prior Patent Specification No. 468,243. In this prior proposal the oscillatable lever is mechanically connected to one end of the helix which latter co-operates with a pin or projection extending substantially at right angles from the rotary shaft to which the needle or its equivalent is secured.

The object of the present invention is to provide a linear dimension gauge as above referred to which can be produced more cheaply than hitherto and is of lighter construction and will consequently produce a more sensitive response than similar gauges hitherto proposed.

With the foregoing object in view in a linear dimension gauge of the kind referred to made according to the present invention, the helix is fitted tightly on the rotary shaft so as to be in driving engagement therewith and

the oscillatable lever engages freely at one end between adjacent turns of the helix, whereby oscillating movement of the lever produces a corresponding rotation of the helix and of the rotary shaft and consequently of the indicator needle or the like.

The end of the oscillatable lever which engages between adjacent turns of the helix may be a pin-like extension of the lever comprising, for example, a wire rigidly fixed to one end of the lever and bent at its free end around the rotary shaft.

In the accompanying drawings which illustrate how the invention may be carried into effect :—

Figure 1 is a plan view and Figure 2 an underneath plan view of the device ;

Figure 3 is a side elevational view of the device with the cover plate removed so as to expose the internal mechanism ;

Figures 4 and 5 are constructional detail views on an enlarged scale illustrating the main feature of the present invention, Figure 5 being a section taken on the line V—V, Figure 4 ; and

Figure 6 is a sectional view illustrating another constructional detail of the device.

Referring to the drawings, the device comprises lever 1 mounted at its outer end for oscillation on a fixed horizontal pivot 2 at one end of the body portion 3 of the gauge, the feeler or finger 4 being secured to this end of the lever 1 in the manner hereafter described. The other or inner end of the lever 1 has rigidly secured thereto one end of a short length of wire 1¹, constituting an extension of the lever, which wire is bent at its free end as clearly shown in Figure 5 to engage between adjacent turns of a relatively rigid helix 5 made, for example, of piano wire. This helix 5 is mounted on a rotary shaft 6 carried in bearings in the body portion 3 and having secured thereto at its upper end a needle 21 or the equivalent co-

[Price 2s. 8d.]

Price 4s 6d

operating with a graduated circular dial 22 located under a glass cover 7 in a circular casing 8 secured to the body portion 3 of the gauge. The helix 5 is made with a slightly smaller (e.g. by 1,000th of an inch) internal diameter than the diameter of the rotary shaft 6 on which it is to be mounted, and is subsequently slid on to the rotary shaft. The helix shaft unit thus produced provides a result similar to that which be obtained by machining a helical groove on the surface of the rotary shaft, but it is cheaper to produce and the construction is substantially lighter, resulting, in practice, in a more sensitive response of the instrument.

The feeler or finger 4 is of relatively short length as compared with the length of the lever 1 and is preferably secured to the lever as shown in detail in Figure 6 in such a manner as to be readily removable. As shown in Figure 6, the fixed horizontal pivot 2 is in the form of a screw, the head of which bears on a seat 13 in the annular end 12 of the feeler, the inner milled surface of the end 12 being held in frictional contact with a milled surface of the outer end of the lever 1 by means of a spring clip 15 secured at one end by a screw 16 to the lever 1 and pressing at its other end on the annular end 12 of the feeler 4. The spring clip 15 can be rotated about the axis of the screw 16 out of engagement with the annular end 12 of the feeler or finger 4 so as to permit of its ready removal. This method of attachment of the feeler or finger 4 to the lever 1 enables fingers having outer ends of different shapes suitable for different kinds of work to be readily attached to the lever 1 as and when required, whilst the inclination of the feeler or finger to the lever may be varied as required, since the feeler or finger is held in frictional contact only with the lever. The scale may be graduated in one thousandth part of an inch and the lengths of the feeler or finger 4 and the lever 1 and the pitch of the helix 6 may be so selected that a complete revolution of the needle corresponds to thirty one thousandth parts of one inch.

In order that the needle may be readily set to the zero position on the scale, the casing 8 together with the scale contained therein may be arranged to be rotatable with respect to the needle and body portion 3 of the gauge about the axis of rotation of the shaft 6 and the needle.

In order that the gauge may be readily used with the scale in a convenient position for reading whether the nature of the work necessitates the gauge being operated by an inward or outward or a downward or upward pressure on the outer end of the feeler or finger, means are provided for reversing the action of the spring 10 on the lever 1. The spring 10 is preferably a small blade or wire spring formed with a loop 17 at one end

engaging a pin on the lever 1 at a point adjacent its outer end and secured at its other end to a rotary plate 18 in a recess 11 in the body portion 3. This rotary plate 18 has top and bottom straight edges 19, 19¹ and can be turned through an angle limited by the corners of the edges 19, 19¹ by means of a small lever 20 (Fig. 2), on the outside of the body portion 3 so as to cause the spring 10 to exert either an upward or a downward pressure on the lever 1. Thus, when the gauge is being used to test, for example, the upper surface of a body, the spring 10 is adjusted by means of the small lever 20 and rotary plate 18 to exert an upward pressure on the lever 1 (Fig. 3), whilst when the gauge is being used to test, for example, the lower surface of a body, the spring 10 is adjusted by operating the lever 20 to rotate the plate 18 in an anti-clockwise direction from the position shown in Figure 3 so as to exert a downward pressure on the lever 1, it not being necessary to reverse the gauge as a whole which would render reading of the scale somewhat difficult.

The helix 5 and the major portion of the lever 1 as well as the spring 10 acting thereon and the rotary plate 18 are housed in the recess 11 in the body portion 3 behind a sliding cover plate, which is not shown in the drawings.

In use, deflections of the feeler or finger 4 will cause corresponding deflections of the lever 1 in a vertical plane about the fixed horizontal pivot 2, under the control of the spring 10 acting on the lever 1, and will produce a corresponding rotation of the helix 5 and of the rotary shaft 6 carrying the needle, causing corresponding rotary deflections of the needle with respect to the scale.

The invention permits the helix and rotary shaft assembly to be mounted as a unit, separately from the oscillatable lever, in the body of the instrument, the oscillatable lever 1 being subsequently mounted in position with its end, or the extended end thereof, engaging between adjacent convolutions of the helix.

What we claim is:—

1. A linear dimension gauge comprising a body portion and a relatively movable spring-pressed feeler or finger operatively connected to an indicator needle or its equivalent through the intermediary of an oscillatable lever and a relatively rigid helix of wire or other suitable material mounted on a rotary shaft to which the indicator needle or the like is secured, wherein the helix is fitted tightly on the rotary shaft so as to be in driving engagement therewith and the oscillatable lever engages freely at one end between adjacent turns of the helix, whereby oscillatory movement of the lever produces corresponding rotation of the helix and of the

rotary shaft and consequently of the indicator needle or the like.

2. A linear dimension gauge according to Claim 1, wherein the end of the oscillatable lever which engages between adjacent turns of the helix is a pin-like extension of the lever.

3. A linear dimension gauge according to Claim 1, wherein the end of the oscillatable lever which engages between adjacent turns of the helix comprises a wire rigidly fixed at

one end to the lever and bent at its free end around the rotary shaft.

4. A linear dimension gauge according to any one of Claims 1—3, substantially as described herein with reference to and as illustrated in the accompanying drawings.

For the Applicants,
COPE & CO.,
Chartered Patent Agents,
65 Victoria Street, London, S.W.1.

PROVISIONAL SPECIFICATION.

Improvements in or relating to Linear Dimension Gauges.

We, A. CAPP & SON LIMITED, of Verdict Gauge Works, Thames Road, Crayford, Kent, a British Company, and ARTHUR CAPP, a British Subject, of the Company's address, do hereby declare this invention to be described in the following statement:—

This invention relates to linear dimension gauges of the kind comprising a body portion, a relatively movable spring-pressed feeler or finger operatively connected to an indicator needle or its equivalent through the intermediary of an oscillatable lever, a relatively rigid helix of wire or other suitable material movably mounted axially on a rotary shaft to which the indicator needle or the like is secured, the arrangement being such that any deflection of the feeler or finger is transmitted through the oscillatable lever and through the wire or like helix to produce a corresponding rotary deflection of the rotary shaft and of the needle or like indicator attached thereto.

A linear dimension gauge of the above kind is described in prior Patent Specification No. 468,243. In this prior proposal the oscillatable lever is mechanically connected to one end of the helix which latter co-operates with a pin or projection extending substantially at right angles from the rotary shaft to which the needle or its equivalent is secured, the arrangement being such that deflection of the lever produces a corresponding axial movement of the helix which acts on the pin or projection to produce a corresponding rotary deflection of the shaft and of the needle relatively to a scale mounted on the body of the instrument.

The object of the present invention is to provide a linear dimension gauge of the kind above referred to which can be produced more cheaply than hitherto and is of lighter construction and will consequently produce

a more sensitive response than similar gauges hitherto proposed.

With the foregoing object in view in a linear dimension gauge of the kind referred to made according to the present invention, the displaceable lever is not positively connected to the helix but its end is extended so as to penetrate between adjacent convolutions thereof, and the helix is fitted tightly on the rotary shaft so that the axial displacement of the helix under the action of the displaceable lever is converted directly into a rotary deflection of the shaft without the interposition of any pin or other projection on the shaft.

In carrying the invention into effect, the helix is formed from a suitable wire or the like and made with a slightly smaller (e.g. 1,000th of an inch) internal diameter than the diameter of the rotary shaft on which it is to be mounted, and is subsequently slid forcibly on to the rotary shaft. The helix shaft unit thus produced provides a result similar to that which would be obtained by machining a helical groove on the surface of the rotary shaft, but is cheaper to produce and the construction is substantially lighter resulting in practice in a more sensitive response of the instrument.

The invention permits the helix and rotary shaft assembly to be mounted as a unit, separately from the oscillatable lever, in the body of the instrument, the oscillatable lever being subsequently mounted in position with its end or an angular pin-like extension thereof engaging between adjacent convolutions of the helix.

For the Applicants,
COPE & CO.,
Chartered Patent Agents,
65 Victoria Street, London, S.W.1.

This drawing is a reproduction of
the Original on a reduced scale.

