

PATENT SPECIFICATION

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DRAWINGS ATTACHED

1 265 994

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(54) IMPROVEMENTS IN DIAL ASSEMBLIES

(71) We, GAMET PRODUCTS LIMITED, a British Company, of Hythe, Colchester, 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 dial assemblies which are readily adjustable for indicating measurements of linear movement of a member on either one of two systems of units.

In certain machines in the machine tool industry, it is necessary for adjustment of members to be made by rotation of a hand wheel. Such members may be moved by rotation of a lead screw rotated by the hand wheel. Machines manufactured under the Imperial system of measurement would have the lead screw pitch in fractions of an inch and the dial, associated with the hand wheel, would be calibrated accordingly. However, it may be desired to measure movements of the member by rotation of the hand wheel in Metric units without the necessity of changing the lead screw and it is the main object of this invention to provide a dial assembly which will enable movements of the member to be measured in either one of both scales without changing the lead screw.

According to the present invention there is provided a dial assembly for use on a machine tool, including a first gear wheel adapted to be fixed for rotation with a shaft of the machine tool and a second gear wheel fixed for rotation with a dial having graduations on both the Imperial and Metric scales marked circumferentially thereon, an idler pinion constantly in mesh with both the first and second gear wheels, said idler pinion being carried by a pinion carrier frictionally driveable by rotation of the shaft, and a clutch member slidable parallel to the axis of the shaft and capable of selectively preventing or permitting rotation of the pinion carrier about the shaft, whereby, when the position of the clutch permits rotation of the pinion carrier about the shaft, the first and second gear wheels rotate in

unison and a measure of the rotation of the shaft is given on one scale on the dial and when the position of the clutch prevents rotation of the pinion carrier about the shaft the first and second gear wheels rotate at different speeds and a measure of the rotation of the shaft is given on the other scale on the dial, the first and second gear wheels having different numbers of teeth providing a conversion ratio from one unit measurement to the other.

In a further feature of the invention, the first gear wheel is keyed to a sleeve which is keyed to the shaft, the said sleeve carrying the second gear wheel and the dial and also the pinion carrier.

In a still further feature of the invention, the clutch member forms part of a clutch movable to selectively expose one of the two scales simultaneously with preventing or permitting rotation of the pinion carrier, the clutch also having datum marks against which readings on the two scales may be taken.

In order to illustrate the invention, one embodiment thereof will now be described, by way of example only, with reference to the accompanying drawing, in which:—

Figure 1 is a longitudinal cross-sectional view of a dial assembly in accordance with the invention mounted on a shaft;

Figure 2 is a fragmentary view of Figure 1 showing the sliding clutch in its alternative position;

Figure 3 is a plan view of Figure 1; and

Figure 4 is a plan view of Figure 1 with the clutch in the position illustrated in Figure 2.

A shaft 1 is driven, possibly through reduction gearing, by a hand wheel (not shown) and this shaft 1 drives, also possibly through reduction gearing, the lead screw of a machine to which anchor plate 2 is fixed. Fixed by pin 3 to shaft 1 is a sleeve 4 to which a first gear wheel 5 is fixed for rotation with shaft 1. Also carried by sleeve 4 but free to rotate independently thereof is a second gear wheel 6 fixed for rotation

with a dial 7. This dial 7 has two sets of graduations marked circumferentially thereon, the Imperial scale being indicated at 8 in Figure 3 and the Metric scale being indicated at 9 in Figure 4. Also carried by sleeve 4 is a pinion carrier 10 having an idler pinion 11 constantly in mesh with gear wheels 5 and 6. The pinion carrier 10 has a ball 12 loaded by spring 13 whereby the pinion carrier may be frictionally driven by shaft 1. A clutch 14 is movable axially of shaft 1 by finger grip 15 from the position illustrated in Figure 1 in which dog 16 is out of engagement with teeth 17 on pinion carrier 10 and teeth 18 on anchor plate 2 to the position illustrated in Figure 2 in which the clutch is engaged and vice versa.

The lead screw has a pitch on the Imperial scale and with the position of the clutch 14 as illustrated in Figure 1 and Figure 3, rotation of shaft 1 will cause rotation in unison of the gear wheels 5 and 6, the pinion 11 and pinion carrier 10 and also the dial 7. With the clutch in this position, the Imperial scale 8 is exposed as shown in Figure 3 and readings may be taken.

If the clutch is moved to the position illustrated in Figures 2 and 4, the pinion carrier 10 and hence pinion 11 will be prevented from rotation about shaft 1 and hence when shaft 1 is rotated by the hand wheel, the gear wheel 5 will rotate at a different speed to gear wheel 6 thus giving the desired conversion ratio from Imperial to Metric units. With the clutch in this position the Metric scale 9 is exposed and readings on this scale may be taken.

The gear wheels 5 and 6 have a different number of teeth one to the other, the gear ratio being related to the Imperial pitch of the screw and the desired Metric units. If conversion is desired from Metric to Imperial units of like order then the gear wheels 5 and 6 will be reversed.

The provision of sleeve 4 is not essential to the performance of the invention; the gear wheel 5 may be keyed directly onto the shaft 1 or some other member fixed for rotation with shaft 1.

50 WHAT WE CLAIM IS:—

1. A dial assembly for use on a machine tool, including a first gear wheel adapted to be fixed for rotation with a shaft of the machine tool and a second gear wheel fixed for rotation with a dial having graduations on both the Imperial and Metric scales marked circumferentially thereon, an idler pinion constantly in mesh with both the first and second gear wheels, said idler pinion being carried by a pinion carrier frictionally driveable by rotation of the shaft, and a clutch member slidable parallel to the axis of the shaft and capable of selectively preventing or permitting rotation of the pinion

carrier about the shaft, whereby, when the position of the clutch permits rotation of the pinion carrier about the shaft, the first and second gear wheels rotate in unison and a measure of the rotation of the shaft is given on one scale on the dial and when the position of the clutch prevents rotation of the pinion carrier about the shaft the first and second gear wheels rotate at different speeds and a measure of the rotation of the shaft is given on the other scale on the dial, the first and second gear wheels having different numbers of teeth providing a conversion ratio from one unit measurement to the other.

2. A dial assembly as claimed in Claim 1, in which the first gear wheel is keyed to a sleeve which is keyed to the shaft, the said sleeve carrying the second gear wheel and the dial and also the pinion carrier.

3. A dial assembly as claimed in either Claim 1 or Claim 2, in which the clutch member forms part of a clutch movable to selectively expose one of the two scales simultaneously with preventing or permitting rotation of the pinion carrier, the clutch also having datum marks against which readings on the two scales may be taken.

4. A dial assembly for use on a machine tool having a hand wheel for rotating a shaft which drives a lead screw having a pitch in the Imperial system of measurement, including a sleeve adapted to be keyed to the shaft for rotation therewith, a first gear wheel keyed to the sleeve, a second gear wheel fixed for rotation with an annular dial having graduations on both the Imperial and Metric scales marked circumferentially thereon, an idler pinion constantly in mesh with both the first and second gear wheels, said idler pinion being carried by a pinion carrier frictionally drivable by rotation of the shaft and a clutch comprising a clutch member slidable parallel to the axis of the shaft and capable of selectively preventing or permitting rotation of the pinion carrier about the shaft, whereby, when the position of the clutch permits rotation of the pinion carrier about the shaft, the first and second gear wheels rotate in unison and a measure of the rotation of the shaft is given on one scale on the dial and when the position of the clutch prevents rotation of the pinion carrier about the shaft the first and second gear wheels rotate at different speeds and a measure of the rotation of the shaft is given on the other scale on the dial, the first and second gear wheels having different numbers of teeth providing a conversion ratio from Imperial to Metric units.

5. A dial assembly as claimed in Claim 4, in which the pinion carrier houses a spring loaded ball urged against the sleeve

whereby the pinion carrier is frictionally driven by rotation of the shaft.

5 6. A dial assembly substantially as herein described with reference to the accompanying drawing.

7. A machine tool having a dial assembly as claimed in any one of the preceding claims fitted thereto.

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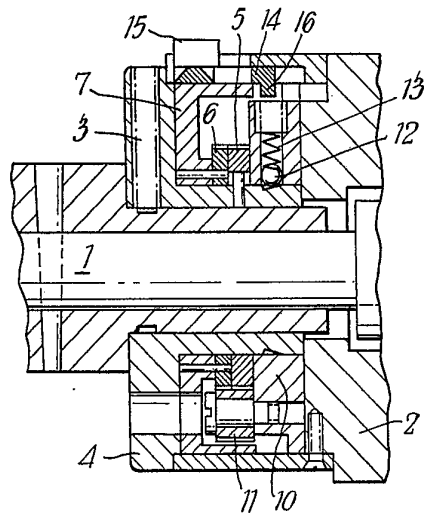


FIG. 1

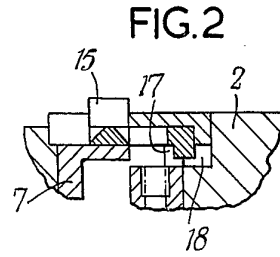


FIG. 2

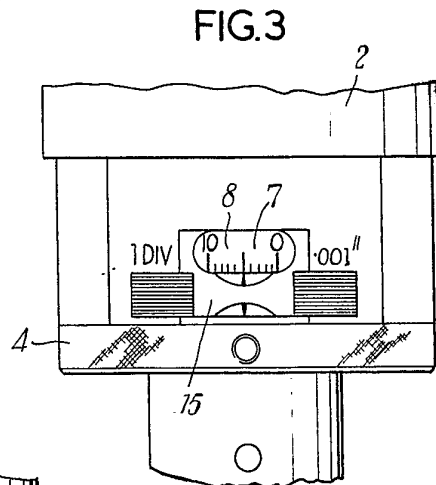


FIG. 3

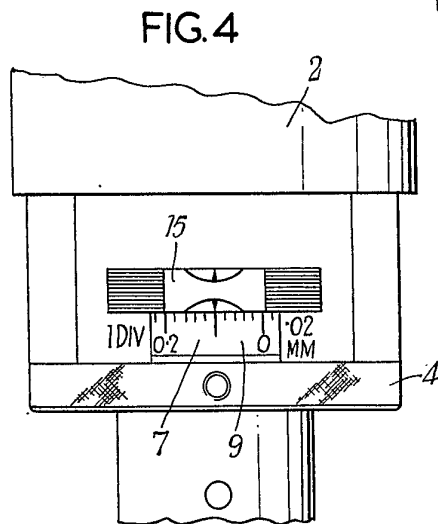


FIG. 4