

DRAWING INSTRUMENT

This invention relates to a drawing instrument, for example, a pair of compasses and is more particularly but not exclusively concerned with compasses having a hole in one leg into which a pencil, or other writing
5 implement, may be introduced, and adjustable means on the leg to hold the pencil in the hole so that the length of pencil projecting from the hole may be adjusted.

10 Compasses of this type are well known and usually have a clamping ring screw-threadably engaged on said leg which may be advanced at least partly across the hole on relative rotation of the leg and ring to engage and clamp a pencil in the hole. Various sizes of
15 pencil may be accommodated in the hole. The ring is also restrained from being screwed-off the free end of the leg. In order to manufacture compasses of this type certain production costs are incurred to produce the screw-thread engagement of the ring and
20 leg to within certain tolerance ranges.

It is an object of the present invention to produce a drawing instrument in which the clamping arrangement of a writing implement in a hole of the instrument
25 is of relatively simple design and relatively cheap to produce, and which provides for the writing implement to be clamped quickly in the hole.

According to the present invention there is provided a drawing instrument comprising at least one leg having a hole for the reception of a writing implement, and a clamping ring advanceable in a direction across the hole to clamp the writing implement in the hole, said clamping ring being provided with a cam surface mutually co-operable with a cam surface on the leg, the arrangement being such that on rotation of the ring relative to the leg said cam surfaces are capable of co-operating to urge the ring across the hole to clamp the writing implement in the hole by a wedging action of the ring inbetween the cam surface of the leg and the writing implement.

15 Preferably, the clamping ring is of plastics and may be provided with external grip means, preferably in the form of grooves or ribs on its external periphery.

20 Preferably, with the ring in a maximum displacement position across the hole, in which the cam surfaces are in engagement, the ring extends less than halfway across the hole.

25 In one embodiment the clamping ring is movable from a minimum displacement position across the hole, in which the cam surfaces are in engagement, to said

maximum position when said ring has been rotated relative to said leg through 180° .

5 Preferably, the ring is rotationally held in the minimum displacement position so that it can only be rotated from this position in one rotational sense.

10 Preferably, the cam surface on the ring is a two part helical cam surface, the first helical part extending from the bottom of a first step to the top of a second step defining the maximum axial thickness of the ring, and the second helical part extending from the bottom of ^{the} second step to the top of the first step.

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The cam surface on the leg is, preferably, provided with an end stop which restrains the ring from being moved axially off one end of the leg. The external diameter of the ring is conveniently larger than that of the end stop.

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Preferably, the ring is freely axially movable away from the end stop at least part way in a direction across the hole.

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The ring may be retained on the leg so that it experiences resistance to axial motion across the hole,

in a direction away from the end stop, when it reaches a convenient position on the leg, for example, when it has been moved about half way across the hole. This resistance may be provided for by diametrically opposed
5 lugs.

Preferably, the internal diameter of the ring corresponds generally to the diameter of the leg portion on which it is located in use.

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An embodiment of a pair of compasses in accordance with the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

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Figure 1 shows a front view of the pair of compasses;

Figure 2 shows a plan view of a detail of a leg of the compass, and

Figure 3 shows a perspective view of a clamping ring of the compasses.

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Figure 1 shows a pair of compasses 1 generally of a type known per se except for the right leg 1a. Therefore only the relevant part of the compasses will be described.

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The right leg 1a has a generally transversely extending lower portion 1b having a hole 1c for receiving a writing implement such as a pencil and

carrying a clamping ring 2. The clamping ring 2 is shown more clearly in Figure 3 and is provided with a two part helical cam surface 2a. A first part of the cam surface rises from the bottom of step 3 at a shallow angle approximately through 180° and is stepped down at 4 to the second part of the cam surface which again rises at a similar shallow angle through the remaining 180° to the top of step 3.

10 The lower surface of the ring 2, as shown in the Figures, is flat but this need not necessarily be so.

An exactly similar cam surface 5 is provided at the free end of lower portion 1b, and, as shown in Figure 2, 15 the step 3 is in engagement with a step 6 on the cam surface 5 simultaneously as step 4 engages with a similar step on the cam surface 5 (not shown) diametrically opposite.

20 The cam surface 5 is formed on an end stop 7 of said lower portion 1b which prevents ring 2 from being taken off the portion 1b in the direction of arrow A. The external diameter of ring 2 is slightly larger than end stop 7 and provided with grip means 25 in the form of parallel, axially extending grooves so that the clamping ring 2 may be easily gripped and rotated about its axis on leg portion 1b. The

internal diameter of ring 2 conforms substantially to leg portion 1b surrounding the hole 1c.

In this embodiment the ring 2 may be moved axially away from the end stop 7 (in direction reverse to A) to disengage mutually co-operating cam surfaces 2a and 5, but in other embodiments this need not be the case. The ring 2 encounters resistance to axial movement (by lugs L) when it has been moved about half-way across the hole 1c / although this may be overcome so that the ring 2 can be moved over the transverse portion 1b.

While the cam surfaces 2a, 5 are engaged in a minimum displacement position across the hole 1c as shown in Figure 2 the ring 2 may only be rotated relative to the end stop 7 in the direction of arrow B (as shown in Figure 2) since rotation in the opposite sense is prevented by the engagement of steps 3 and 6 and 4 with the step diametrically opposed to step 6.

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The operation of the clamping action of the ring onto a pencil will now be described. With the position of the ring in the minimum displacement position as shown in Figure 2 the ring just extends fractionally across the hole 1c, and in this position a pencil may easily be introduced into the hole. With the pencil projecting through the hole the ring 2 may be gripped

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between finger and thumb and rotated in the direction of arrow B so that cam surface 2a rides up cam surface 5. The ring 2 is simultaneously moved axially away from the end stop and across the hole 1c towards the pencil and the pencil is clamped in the hole by a wedging action provided by the ring inbetween the pencil and cam surface 5. In this way pencils, or other writing implements, of different diameter may be accommodated in the hole.

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The specific form of the cams, including the angle of incline and the possible provision of one or more steps may be altered to suit requirements.

15 In this embodiment the ring is only rotatable through 180° to the maximum displacement position with the cam surfaces in engagement before step 4 on the ring drops into step 6 and the ring moves simultaneously in the direction to a position equivalent to that shown in
20 Figure 2. At the maximum displacement position between the ring and the end stop 7 (i.e. with the cam surfaces still engaged) the ring still does not extend halfway across the hole and so writing implements of diameter less than half the hole diameter could not be
25 accommodated.

The shape of the cam surfaces may be altered to vary the maximum width of writing implement which may be held in the hole by a wedging action of the ring between the pencil and the end stop.

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In this embodiment it is advantageous that pencils of most diameters may be accommodated by rotating the clamping ring in direction of arrow B through about one quarter of a revolution.

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In prior art screw-thread designs the clamping ring usually has to be rotated through a far greater angle (several revolutions) in order to adjustably locate a pencil in a correct position in the hole.

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The clamping ring 2 is of moulded plastics and can be produced quite cheaply. The whole arrangement is more easily and cheaply produced than screw thread designs.

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Also in this embodiment when leg 1a is separate from the remainder of the compasses 1 before assembly, the ring 2 can easily be introduced over the vertical part of the leg 1a and over the angle between the vertical part and into position on the lower portion 1b.

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In alternative embodiment a cam surface on the leg portion 1b could instead be provided on the opposite side of the ring 2 as shown in the Figure, which is co-operable with a cam surface on the opposite side of the ring as shown in the Figures. In this way the writing implement could be held against the opposite side of the hole and a separate stop provided to restrain the ring on the leg portion.

10 In another alternative embodiment grip means may be formed on the flat surface on the ring which engages the writing implement and/or on one or both of the cam surfaces.

15 It is to be understood that the scope of the present invention extends to any drawing instrument having a leg with a hole into which a writing implement may be clamped.

20 In the described embodiment each cam surface part on the clamping ring is at a shallow inclination of 6° .

This cam angle may alter to suit other embodiments or requirements but should be shallow enough to provide a wedging action. Preferably this angle is less than about 10° .



CLAIMS

1. A drawing instrument comprising at least one leg having a hole for the reception of a writing implement, and a clamping ring advanceable in a direction across the hole to clamp the writing implement in the hole,
5 said clamping ring being provided with a cam surface mutually co-operable with a cam surface on said at least one leg, the arrangement being such that on rotation of the ring relative to said leg said cam surfaces are capable of co-operating to urge the ring across the hole
10 to clamp the writing implement in the hole by a wedging action of the ring inbetween the cam surface of said leg and the writing implement.
2. An instrument as claimed in claim 1 in which the
15 clamping ring is of plastics.
3. An instrument as claimed in claim 1 or claim 2 in which the clamping ring is provided with external grip means.
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4. An instrument as claimed in claim 3 in which the external grip means is in the form of grooves or ribs on its external periphery.
- 25 5. An instrument as claimed in any one of the preceding claims in which, with the ring in a maximum displacement position across the hole ^{whilst} the cam surfaces are in



engagement and the ring extends less than halfway across the hole.

5 6. An instrument as claimed in any one of the preceding claims in which the clamping ring is movable from a minimum displacement position across the hole, in which the cam surfaces are in engagement, to a, or the, maximum displacement position when said ring has been rotated relative to said leg through 180^0 .

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7. An instrument as claimed in claim 6 in which the ring is rotationally held in the minimum displacement position so that it can only be rotated from this position in one rotational sense.

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8. An instrument as claimed in any one of the preceding claims in which the cam surface on the ring is a two part helical cam surface, the first helical part extending from the bottom of a first step to the top of a second step defining the maximum axial thickness of the ring, and the second helical part extending from the bottom of the second step to the top of the first step.

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25 9. An instrument as claimed in claim 8 in which each of the first and second helical parts is at an

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inclination of less than 10° , for example, 6° .

10. An instrument as claimed in any one of the preceding claims in which the cam surface on said leg is provided with an end stop which restrains the ring from being moved axially off one end of said leg.

11. An instrument as claimed in claim 10 in which the external diameter of the ring is larger than that of the end stop.

12. An instrument as claimed in claim 10 or claim 11 in which the ring is freely axially movable away from the end stop at least part way in a direction across the hole.

13. An instrument as claimed in claim 12 in which the ring is retained on the leg so that it experiences resistance to axial motion ^{WHEN IT HAS BEEN MOVED PART WAY} across the hole, in a direction away from the end stop, for example, when it has been moved about half way across the hole.

14. An instrument as claimed in claim 13 in which said resistance to axial motion is provided for by diametrically opposed lugs.



15. An instrument as claimed in any one of the preceding claims in which the internal diameter of the ring corresponds generally to the diameter of the leg portion on which it is located in use.

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16. An instrument as claimed in claim 1 in which the clamping ring and said at least one leg are substantially as herein described and illustrated with reference to the accompanying drawings.

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17. An instrument as claimed in claim 1 including lugs substantially as herein described and illustrated with reference to figures 1 and 2 of the accompanying drawings.

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18. A drawing instrument substantially as herein described and illustrated with reference to the accompanying drawings.

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