

PATENT SPECIFICATION

(11) 1 361 592

1 361 592
(21) Application No. 27359/73 (22) Filed 8 June 1973
(44) Complete Specification published 31 July 1974
(51) International Classification G01C 17/02; B23P 17/00
(52) Index at acceptance
G1F 1D
B3A 17 82
(72) Inventor FRANCIS LEACH



(54) COMPASS.

(71) We, FRANCIS BARKER AND SON LIMITED, a British Company of Fircroft Way, Edenbridge, Kent, 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 magnetic compasses.

Magnetic compasses are known in which a magnetic assembly and associated compass dial are provided behind a glass window inside an inner case. An outer case encloses the inner and is provided with a hinged lid having a sighting line. A prism sighting unit is also mounted on the outer case to allow simultaneous viewing of the sighting line and a scale on the compass dial.

In such compasses it is of importance that the sighting line and the prism sighting unit are in alignment with each other and with the center of the compass dial which is pivoted in the center of the inner case. In particular, as regards the sighting line, there must be correct alignment with the lid closed or in any elevated position and this requires a high degree of accuracy in the hinge. It has been the practice, because of the accuracy required, to form the hinge and a mounting block for the sighting unit integral with the compass outer case. This has had the disadvantage however that damage to any part of the unit comprising the hinge, lid, outer case or mounting block has required replacement of the complete unit.

It is an object of the present invention to obviate or mitigate these disadvantages.

The present invention is a magnetic compass having an inner case in which is pivotally mounted a magnetic assembly and associated compass dial, an outer case enclosing said inner case, a lid on said outer case and incorporating a sighting line, and a hinge removably mounted between said outer case and said lid, the arrangement

being such that the pivot of the dial and the sighting line are at all times coplanar.

Preferably a prism sighting unit is mounted in a slide member secured to said outer case, the line of sight of the sighting unit being in a common plane with the sighting line, and the slide member permitting movement of the sighting unit within the common plane and perpendicular to said line of sight.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawing in which:

Fig. 1 is an exploded perspective view of part of a magnetic compass according to the present invention;

Fig. 2 is a plan view of a compass lid; and

Fig. 3 is a plan view of a compass case.

Referring now to Fig. 1, the outer case of a magnetic compass comprises a body 10 and the compass is provided with a lid 11 with an associated hinge assembly 12 and a prism sighting unit 13 with associated mounting block. The body 10, comprising a circular base and an upstanding peripheral wall, contains an inner case and a magnetic assembly and compass dial behind a glass window but these components are not illustrated for clarity as they are conventional; it should however be understood that the compass dial is pivotally mounted coaxially with the base of the body 10.

The lid 11 is provided with a glass window 15 on which is provided a sighting line, and is mounted on the body 10 by means of the hinge assembly 12. The hinge assembly 12 comprises a first hinge member 16 secured by screws 17 to the peripheral wall of the body 10, a second hinge member 19 secured by screws 20 to the lid 11 and a hinge pin 21 interconnecting the members 16 and 19. As seen in Fig. 2, the axes of the screws 20 converge on the axis of the lid 11, and as seen in Fig. 3 the axes of the screws 17 are coplanar with the axis of the body 10.

The prism sighting unit 13, which is in

[Price 25p]

Price 75p

itself conventional, is hinged to a pair of rods 25 which slide in grooves 26 in a mounting block 28. The mounting block 28 is again secured to the peripheral wall of the body 10 by screws 30, the axes of which as seen in Fig. 3 converge on the axis of the body 10.

The advantages of this form of construction over the prior art lie in the fact that the mounting block 28 and the hinge assembly for the lid are separate from the body and the lid thus permitting any damaged component to be replaced without having to scrap components that are not in themselves damaged or defective. Of course the manufacturing techniques must be very accurate to ensure that the completed compass is of the required degree of precision, and this involves the extensive use of highly accurate jigs.

An additional advantage that accrues from the use of a construction according to the present invention is that it permits the use of lighter (and mechanically weaker) alloy materials for the body 10. A major disadvantage of a conventional precision compass made of brass is its weight, yet it has not been possible to use a lighter alloy material heretofore because it is necessary to retain brass for the hinges and mounting blocks for reason of mechanical strength and to enable manufacture of these components and yet in the integrated system brass cannot be brazed to the lighter alloy materials.

The hinge assembly 12 associated with the lid 11 is manufactured as follows:—

(a) A ring of suitable width is cut from a tube having the same outside and inside diameters as the hinge member 19.

(b) The ring is jig-drilled to accommodate four pairs of fixing screws 20.

(c) Two such rings are located and clamped together and are machined at four points on the periphery, central to and along the join of the two rings, each point being 90° apart, to provide mounts for the tubular parts of the hinge members 19. This process provides for eight hinge members 19.

(d) For each hinge member, a tube to provide the tubular joints, previously machined from drawn rod to obtain the required outside diameter and drilled through the centre to accommodate the pin 21, is held in position on one of the prepared mounts and brazed to the ring.

(e) The eight hinge members are then formed from the rings by cutting through the rings at points outside and equidistant from the two holes of each pair of holes drilled for the screws 20.

(f) The tube on a hinge member 19 is machined through the centre to provide clearance for the case portion of the hinge, the clearance machined being the exact

width of the case portion of the hinge and in absolute alignment with the centre line of the member 19.

g) The lid 11 is jig-drilled and threaded to accommodate fixing screws 20, the jig being so designed that the drilled holes are equidistant from the center line of the compass to match the holes for the screws 20. The hinge member 16 is manufactured as follows:—

a) The necessary width is cut from an extrusion which in section is basically the required shape of the member 16.

b) The member 16 is jig-drilled to accommodate fixing screws 17, the jig being so designed that the drilled holes are on the centre line of the hinge member 16.

c) The member 16 is then jig-drilled to accommodate pin 21.

d) A curvature identical to that of the body 10 is symmetrically machined on the member 16. The amount of metal removed is such that the member 16 matches with the member 19 when all components are assembled, and the hole in the member 16 matches the holes in the member 19 for trueness of the pin 21.

e) The body 10 is jig-drilled and threaded to accommodate fixing screws 17, the jig being so designed that the drilled holes match those in member 16 and are on the centre line of the compass.

The prism unit mounting block 28 is manufactured as follows:—

a) The necessary depth of block is cut from an extrusion which in section is basically of the required shape.

b) The block is jig-drilled to accommodate fixing screws 30, the jig being so designed that the drilled holes will be equidistant from the centre of the block and hence the centre of the block will align with the centre line of the compass when the block is screwed to the case.

c) A flat 35 and a vee 36 (Fig. 3) to accommodate slide pins of the prism unit are together machined on a face of the block so that the centres of the flat and the vee are equidistant from the centre of the block and the centre line of the compass when the block is fitted by screws 30 to the body 10.

d) The body 10 is jig-drilled to accommodate fixing screws 30, the jig being so designed that the drilled holes are equidistant from the centre line of the compass and on the same two points in line with the centre of the compass as those of the holes drilled in the said prism unit mounting block.

To further ensure accuracy of alignment of the said hinge assembly and the said prism unit locating block with the centre line of the compass, the said components are fitted to the lid and outer case in an assembly jig.

**WHAT WE CLAIM IS:—**

5 1. A magnetic compass having an inner case in which is pivotally mounted a magnetic assembly and associated compass dial, an outer case enclosing said inner case, a lid on said outer case and incorporating a sighting line, and a hinge removably mounted between said outer case and said lid, the arrangement being such that the pivot of the dial and the sighting line are at all times coplanar.

10 2. A compass as claimed in claim 1, in which a prism sighting unit is mounted in a slide member secured to said outer case, the line of sight of the sighting unit being in a common plane with the sighting line, and

the slide member permitting movement of the sighting unit within the common plane and perpendicular to said line of sight.

3. A magnetic compass substantially as hereinbefore described with reference to and as shown in the accompanying drawing. 20

4. A method of making a magnetic compass as claimed in claim 1, substantially as hereinbefore described with reference to the accompanying drawing. 25

For the Applicants,
GRAHAM WATT & CO.,
Chartered Patent Agents,
3/4 South Square, Grays Inn,
London, W.C.1.