(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 324 053 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88108814.0**

(51) Int. Cl.4: **B43L 9/22**

(22) Date of filing: **01.06.88**

The title of the invention has been amended (Guidelines for Examination in the EPO, A-III, 7.3).

(30) Priority: **13.01.88 IT 420188 U**

(43) Date of publication of application: **19.07.89 Bulletin 89/29**

(84) Designated Contracting States: **DE ES FR GB IT**

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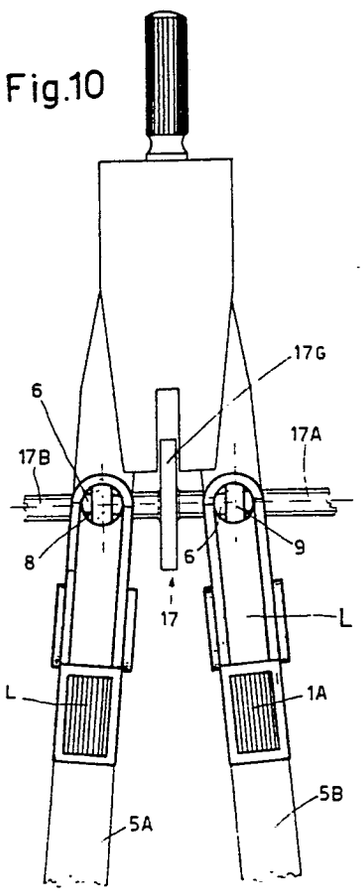
(54) Leg releasing lever for a bow compass.

(57) This lever of the first class with accessories for releasing and allowing quick movement of each leg (5A, 5B) of a bow compass has an intermediate bearing fulcrum (3) which is kept in contact with the surface of the leg (5A, 5B) by the thrust of a reaction spring (11) and is assisted in this by the cooperation of two transversely-retaining side plates (4A, 4B) engaged against their respective leg (5A, 5B) and comprising auxiliary inward fixing projections (4C, 4D) at their rear end.

Said reaction spring (11) directly acts on a bush (12) carrying a half lead nut (16), so reducing the amount by which the operating end (1) of the lever (L) projects beyond the plane of the leg (5A, 5B) on which it is mounted.

The bush (12) performs a fixing function by its insertion though a hole (6) provided at the reaction end (2) of the lever (L) followed by its rotation through 90° to cause undercut elements of the head (9) provided on the bush (12) to engage with said reaction end (2) of the lever.

Fig.10



EP 0 324 053 A2

LEVER WITH ACCESSORIES FOR RELEASING AND ALLOWING QUICK MOVEMENT OF THE LEGS OF A BOW COMPASS

This invention concerns the field of drawing compasses and particularly bow and like compasses. To allow precise adjustment of the degree of opening of compasses and to prevent them opening further during use it is known to use a transverse screw engaged with their legs. This method distinguishes the bow compass class. The incorporation of a screw does not however allow the legs to be moved outwards or inwards with speed, this problem being overcome by using one of two possible expedients, namely making the screw thread of elongated pitch (to the point where motion is reversible), or using a disengageable lead nut.

This latter method has found widespread use, especially in larger bow compasses of normal compass size. This modern type of compass is formed from two normal legs which mutually engage at their toothed ends. In a position close to this mutual engagement region the legs each comprise a half lead nut the thread of which is of different hand from that of the half lead nut provided in the other leg.

Said half lead nuts are kept engaged with a transverse screw having its ends provided with a left hand thread and right hand thread respectively. In this manner, on rotating said screw by means of its operating wheel, the two legs move inwards or outwards.

These half lead nuts are made to engage with their own portions of the screw by means of springs, and are disengaged from them by operating a plastics lever of the first class which compresses the springs.

This lever is thus used for releasing each of the two compass legs so that they can be moved quickly, however the lever mechanisms currently used in the construction of bow compasses suffer from certain drawbacks, which will now be described in order to allow better understanding of the advantages of the mechanism according to the present invention.

Currently either the double half lead nut system or single half lead nut system is used.

The double half lead nut system comprises two half lead nuts in each leg, of which a first half lead nut is provided diametrically in a self-positioning cylindrical bush and the second half lead nut is provided in another opposite bush of identical function but housed and guided within the bush of the first half lead nut. This method, the purpose of which is to allow the adjustment screw to engage with a large (double) lead nut area, has certain drawbacks. In addition to the typical drawbacks of the normally used levers, which will be described hereinafter, the opposing half lead nut method has the drawback of inevitable play between the two coaxial bushes which have the half lead nut portions at their ends.

When this play between the two bushes is added to that between the outer bush and the hole in the metal leg into which it is inserted, a certain mobility arises in the connection between the two compass legs, the compass therefore being inaccurate.

In addition to this basic drawback and the intrinsic problems arising when mounting levers, these problems being of the kind described hereinafter, said double half lead nut method has the disadvantage of greater complexity, resulting in possible accidental jamming during the release operation and in particular increased cost.

In the normally used single half lead nut system, in each leg there is a cylindrical bush with an elongated diametrical hole which is threaded at one end to engage against the transverse screw which joins the two compass legs together. This bush is urged against the screw by a fork on the end of a lever of the first class, its other end being preloaded by a spring.

As this preload acts outwards, the lever pivot must be in the form of a transverse pin which connects the lever to the leg.

To attain this the leg must be provided with a cavity able to house a central guide lug through which the lever is connected to the leg by said pin.

This method has considerable production drawbacks, each leg having to undergo the following operations:

- longitudinal milling of the leg to receive the central lug through which the lever is pivoted;
- transverse drilling of the leg to form the seat for the pivot pin;
- transverse drilling of the leg perpendicular to the previous drilling to form a support and retention seat for the spring;
- providing a pivot pin.

These drawbacks are augmented by certain problems in assembly, which is done by the following procedure. The lever has to be mounted with the half lead nut on one side and the spring on the other side. While holding the assembly together, these parts are inserted into their respective seats. At this point the assembly is preloaded to a precise extent such that the hole in the lever and the hole in the leg are aligned, at which the transverse pin is inserted.

This method of assembly highlights a disad-

vantage of the said method, ie its high cost due to the requirement for extreme machining precision in correctly positioning the holes, and the complex assembly itself.

In conventional levers, the springs are mounted below the handling end so that the lever arm necessary to provide considerable engagement force between the lead nut and screw for a small lever operating force must be large and therefore means that the lever must project considerably beyond the plane containing the leg. This considerable projection is also influenced by the fact that as the diameter of the spring coil must be contained within the width of the lever (or of the legs), this diameter must be small and the spring must therefore have a large number of turns to compensate the consequent rigidity.

A further drawback arises during insertion of the screw. In this respect, as the bush comprising the half lead nut is inserted into a hole intercepted in a transverse position by two slots necessary to allow the screw and leg to undergo relative angular movement, the bush is liable to turn inwards and rest on the flats of said slots. This then prevents it sliding axially in its cylindrical seat, this being necessary to locate the lead screw hole in the correct position, so that the assembly of the screw often requires the additional use of tools able to straighten the bush.

An object of the present invention is to provide a lever for releasing and allowing quick movement of the legs of a bow compass which is free of the aforesaid typical defects of conventional levers.

This and further objects which will be apparaent on reading the following detailed description are attained by a lever of the first class, preferably of plastics construction, with accessories for releasing and allowing quick movement of each leg of a bow compass, characterised by a bearing fulcrum which is kept in contact with the leg surface by the thrust of a reaction spring and is assisted in this by the cooperation of two transversely-retaining side plates engaged against their respective leg and comprising auxiliary inward fixing projections at their rear end. Said reaction spring acts directly on a bush carrying a half lead nut, so reducing the amount by which the operating end of the lever projects beyond the plane of the leg on which it is mounted. The lug provided with the half lead nut performs a fixing function by its insertion though a hole provided at the reaction end of the lever followed by its rotation through 90° to cause undercut elements of the bush head to engage with said reaction end of the lever. Advantageously, this method enables a lever to be used in which the action and reaction arms are practically equal thus reducing the overall lever bulk.

The invention is illustrated by way of non-limiting example on the accompanying drawings, in which:

Figures 1, 2 and 3 are conventional orthogonal views of a lever;

Figure 4 is a section through the lever on the line A-A;

Figures 5, 6, 7, 8 are conventional orthogonal views of a bush comprising a half lead nut;

Figure 9 shows a spring for preloading a half lead nut against a usual transverse adjustment screw;

Figures 10 and 11 represent a bow compass showing, in an assembled state to illustrate their operation, the levers and their accessories for releasing and allowing quick movement of the legs.

With reference to the aforesaid figures, each lever L is provided with an operating end 1, a reaction end 2 and a fulcrum 3. This configuration shows clearly that the lever is of the first class. At the sides of the fulcrum 3 there are two plates 4A and 4B provided at their ends with a retention tooth 4C and 4D which hook behind the preferably quadrangular cross-section 5S of the compass legs 5A and 5B.

The outer surface of the operating end 1 is provided with anti-slip projections 1A.

The reaction end 2 is provided with a rectangular hole 6 within a circular seat 7 having a flat base 8.

The rectangular hole is provided to allow a head 9 of conjugate rectangular profile to pass through.

The head 9 comprises undercuts 10 which bear against the flat base 8 at the reaction end of the lever. This bearing action is obtained by inserting the head through the hole 9 in the direction of the arrow F and then rotating it through 90° as indicated by the arrow G.

This is done during assembly for each of the two legs 5A and 5B of the compass after inserting the bush shown in Figures 5, 6, 7, 8 into a spring 11.

By this means, said spring 11 is preloaded between its support edge 13 on the bush 12 and the flat surface 14 of the respective leg 5A, 5B. The leg is provided with a hole 15 through which the bush 12 penetrates so that its head 9 can engage the reaction end 2 of the lever L.

The bush is provided with a half lead nut 16 for engagement with a usual transverse screw with a central wheel 17G. This screw has a right hand thread 17A on one end and a left hand thread 17B on the other end. For this reason the two bushes 8 are given conventional markings to enable them to be distinguished during assembly and thus correctly associated with the right hand thread 17A or left hand thread 17B of the transverse screw 17.

After the lever L and its accessories 11, 12 have been mounted on the leg 5A, 5B, the thrust of the spring 11 causes the reaction end 2 to rest securely against the upper flat surface 18, so that the system is independent of the presence of the screw 17.

When assembly is complete, the insertion of the ends of this screw into their respective slot 19 is facilitated by operating the lever L. When the lever L is released, the half lead nut 16 bears against its respective screw portion 17A, 17B, and the end 2 bears against the upper flat surface 18. On operating the end 1 of the lever the relative half lead nuts are disengaged from the screw, to allow fast inward or outward movement of the legs.

Claims

1. A lever (L) of the first class, preferably of plastics construction, with accessories (11,12) for releasing and allowing quick movement of each leg (5A, 5B) of a bow compass, characterised by a bearing fulcrum (3) which is kept in contact with the flat surface (18) of the leg by the thrust of a reaction spring (11) and is assisted in this by the cooperation of two transversely-retaining side plates (4A, 4B) engaged against their respective leg (5A, 5B) and comprising auxiliary inward fixing projections (4C, 4D) at their rear end.

2. A lever as claimed in claim 1, characterised by a reaction spring (11) directly acting on a bush (12) carrying a half lead nut (16), so reducing the amount by which the operating end (1) of the lever (L) projects beyond the plane (18) of the respective leg (5A, 5B) on which it is mounted.

3. A lever as claimed in claim 2, characterised in that the bush (12) provided with the half lead nut (16) performs a fixing function by its insertion (F) though a hole (6) provided at the reaction end (2) of the lever (L) followed by its rotation (G) through 90° to cause undercut elements (10) of a head (9) provided on the bush (12) to engage with said reaction end of the lever.

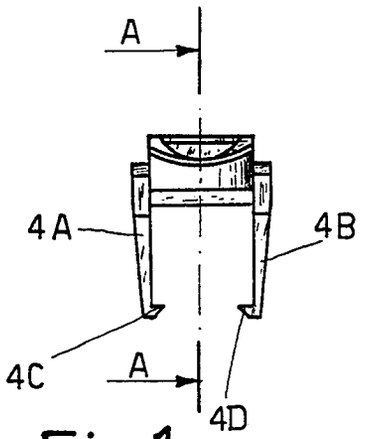


Fig.1

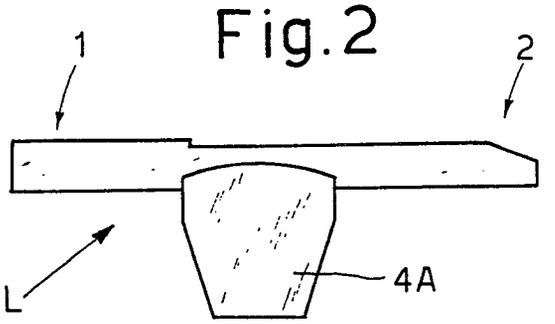


Fig.2

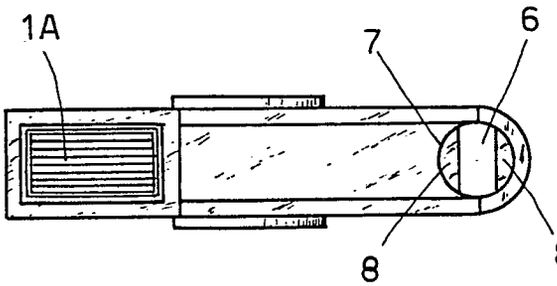


Fig.3

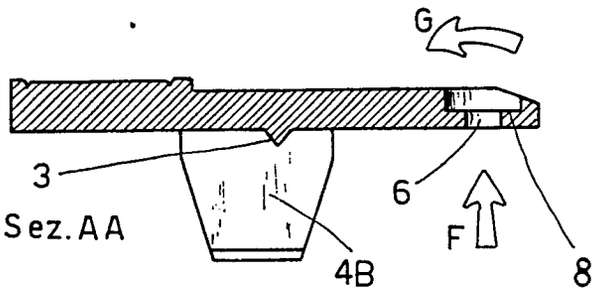


Fig.4

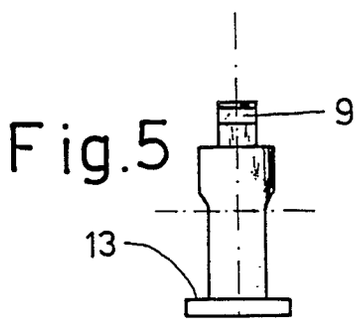


Fig.5

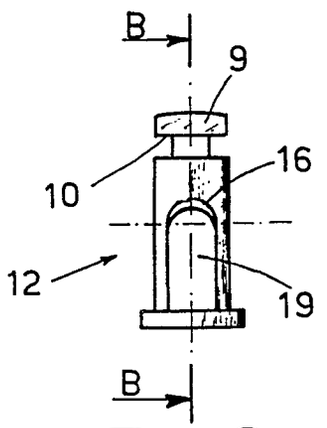


Fig.6

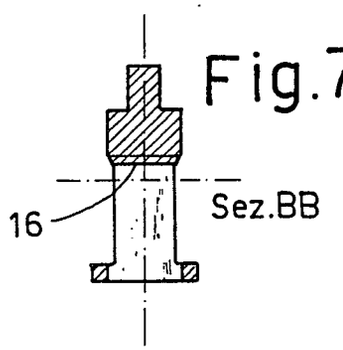


Fig.7

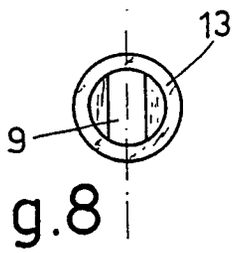


Fig.8

Fig.9

Fig.10

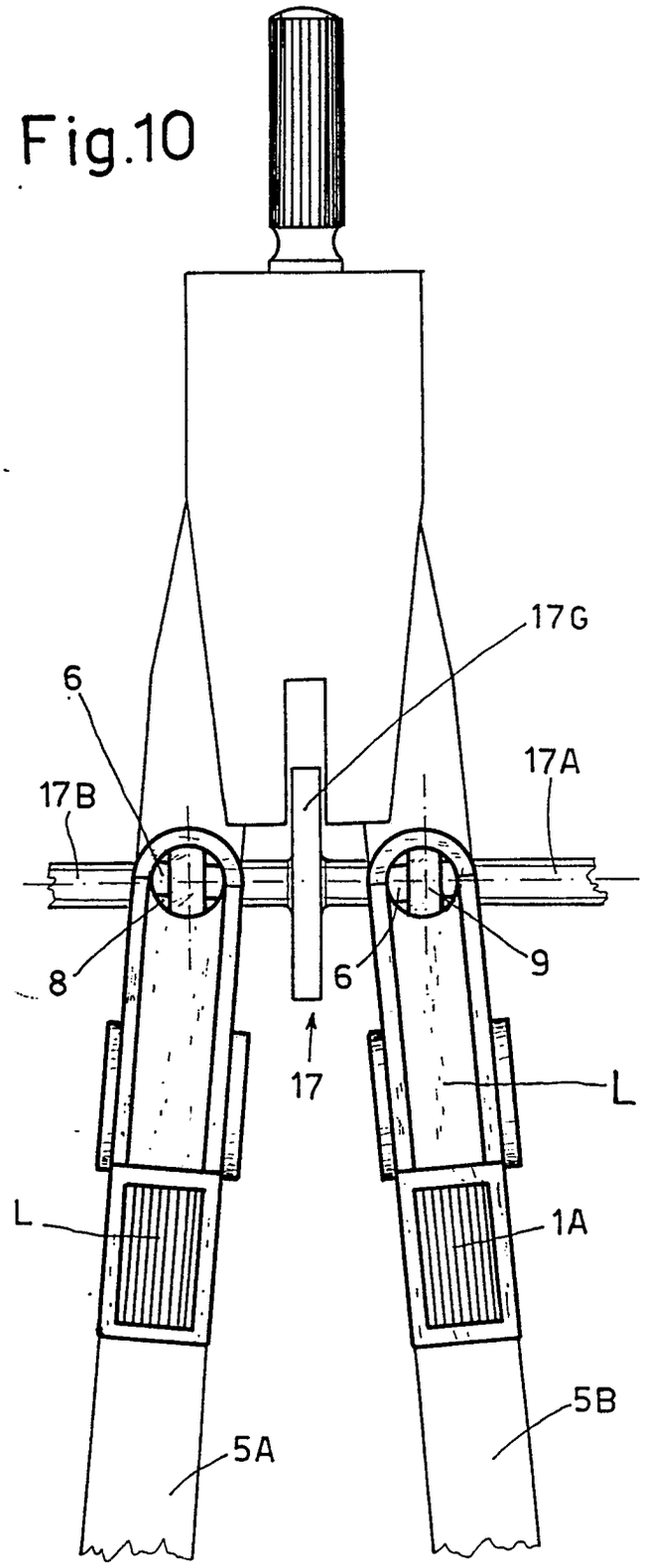


Fig.11