

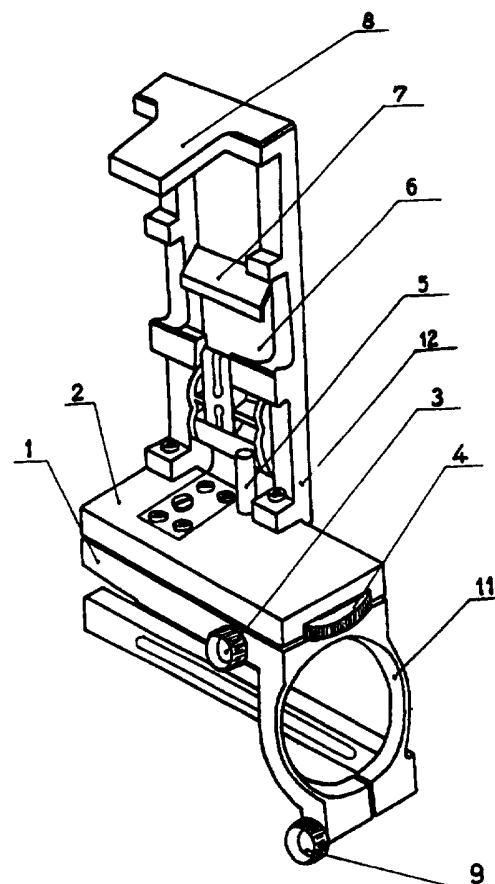


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(54) Title: METHOD AND DEVICE FOR FIXING GEODESIC INSTRUMENTS**(57) Abstract**

This invention relates to a method for fixing geodesic instruments at a telescope of an optical geodesic instrument and to a device for fixing instruments by that method. The method enables to achieve the parallelism between optical axes of both geodesic instruments being connected one to another. The device according to the invention has the base (1) provided with an expandable annular telescope clamp (11). Above the horizontal base (1) there is located the control plate (2), rotationally movable in relation to the vertical and horizontal axes having the knob (4) controlling the vertical position. In the side wall of the base (1) there is located the screw with the control knob (3) for fixing the horizontal position of the control plate (2). On the control plate (2) there is vertically mounted the frame holder (12) comprizing the latch plate (6) with the catch (7), as well as the stop plate (8). The holder (12) is adapted to fasten another optical instrument, e.g. an electro-optical stadia.



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METHOD AND DEVICE FOR FIXING GEODESIC INSTRUMENTS

The invention relates to a method for fixing geodesic devices at a telescope of an optical geodesic instrument, as well as an additional device for fixing by that method. A device according to the invention may be used e.g. for fastening an electrooptical stadia at a telescope of a levelling instrument. In such a case it is fastened to a telescope of a levelling instrument by means of a clamping ring fixed at an outer ring of an objective.

From the Polish patent specification No 56473 a fixture is known for a suspension theodolite. A plate of said fixture has a trough-like furrow having a radius not less than that of the circular housing being used. Moreover, said plate has a cone hole having a convergence corresponding to that of a cone mandrel, resulting in a surface contact with the cone shape of said mandrel along a generatrix of the cone shape of said plate, said mandrel being rotational in relation to the plate. The mandrel has at its another end a truncated cone extending into the plate into which there is screwed a double arm with a chain fastened to that arm. One of the chain links is to be put onto a catch at another end of that arm.

From the Polish patent specification No 85745 a device is known for fixing a phototheodolite in the horizontal position. In a vertical arm of that device there

is mounted a sleeve in which the phototheodolite is fixed by means of a coupling screw in a position rotated by 90 degrees in relation to its normal position. The inclination of the camera axis is controlled by rotating the axis of the phototheodolite around its horizontal axis. Two tube levels, one perpendicular to another, are mounted on the horizontal arm of the body, said levels being designed for setting vertically the main axis of the body.

There is also known from the Polish patent specification No 106343 a housing for a kit of indicators for a measurement equipment. Said housing has an oblique recess and an upper pin, as well as a deep recess in its base, and a lower pin. Said base is provided with a latch and an opening, said upper and lower pins extending through said opening, and being then flattened, most advantageously, to shape a convex head.

An apparatus for controlling the inclination of a phototheodolite axis is also known from the Polish patent specification No 85744. Said apparatus has a body in which there is mounted a movable levelling head with an indicator, and on the threaded mandrel mounted in the body on its axis there is located a nut contacting with said movable levelling head. A scale is fastened to the body for reading values of the inclination angle of the camera axis in relation to the indicator.

The essence of this invention is a method for fixing geodesic devices at a telescope of an optical geodesic

instrument, as well as an additional device for fixing by said method. A method for fixing geodesic devices is characterised by that an additional device, being a link between various geodesic instruments, is fixed at a telescope of a geodesic instrument, especially a levelling instrument, a theodolite or an electronic tachymeter. Said device is fixed by means of its clamping ring connected to the horizontal base. Said device is provided with a control plate rotationally movable in relation to two axes, as well as with a holder fastened to it. Another optical device, advantageously an electrooptical stadia, is to be fixed and fastened in the holder of the device. Then, by means of control elements of the device, provided with knobs, the rotationally movable control plate of the device is set together with an optical instrument fastened to it in such a way as to obtain the parallelism of optical axes of both geodesic instruments connected one to another.

According to the invention a device for fixing geodesic devices by this method is characterised by that it has a horizontal base provided at one side with an expandable annular clamp of the telescope, having a horizontal axis and clamped with a clamping screw. Above said base there is located a horizontal control plate, rotationally movable in relation to the horizontal and vertical axes, advantageously of a cuboid shape. Said control plate may be turned aside vertically by means of a vertical control screw with a knob, located between the base and the control plate. Said screw is advantageously posi-

tioned above the clamp of the telescope. The control plate is also rotationally movable horizontally, what is carried out by means of a control screw with a knob, fastened in the base. A known frame holder with a catch operable to fasten another geodesic instrument, advantageously an electrooptical stadia, fixed by means of a known fixing pin, is vertically fastened to one of the longer vertical walls of the control plate at its end opposite to the clamp of the telescope.

Advantageous technical results of the method for fixing geodesic devices according to this invention, as well as of the device for fixing by this method rely on providing possibilities to obtain the parallelism of a measuring beam of an electrooptical stadia and a target axis of a telescope in a levelling instrument thanks to the precise regulation enabling the deviation of an instrument separately in a horizontal plane and in a vertical one by means of a horizontal position control screw and a vertical position control screw.

The device for fixing geodesic instruments according to the invention is illustrated in its embodiment shown in the enclosed drawing where it is presented in parallel projection.

Above the horizontal base 1 there is located the control plate 2, rotationally movable in relation to the vertical and horizontal axes, having a fixing pin 5 and a face cut-out for the screw, and the knob 4 controlling the vertical deviation of the control plate 2. In the

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side wall of the horizontal base 1 there is located the screw with the control knob 3 for fixing the deviation of the horizontal control plate 2. On the control plate 2 there is mounted, perpendicularly to it, the frame holder 12 comprising the swinging and rotationally mounted latch plate 6 with the catch 7, as well as the stop plate 8. The latch plate is E-like shaped, and in the middle of its height it is hinged with the frame holder 12. The frame holder 12 is fastened to one of the longer vertical walls of the control plate 2 at its end opposite to the telescope clamp 11. The horizontal base 1 has at its one side the expandable annular telescope clamp 11, having the horizontal axis and clamped with the clamping screw 9, adapted for fastening the device at a telescope of an optical geodesic instrument, e.g. an levelling instrument.

According to the invention the device for fixing geodesic devices is slid by means of the annular clamp 11 over a telescope of a geodesic instrument, e.g. a levelling instrument, and is clamped on it by means of the clamping screw 9. An electrooptical stadia is fastened at the upper part of the holder 12 of that device by means of the latch plate 6.

Afterwards, the axis of that electrooptical stadia is set in parallel to the axis of the geodesic instrument by means of the screw with the knob 3 controlling the horizontal position and with the screw with the knob con-

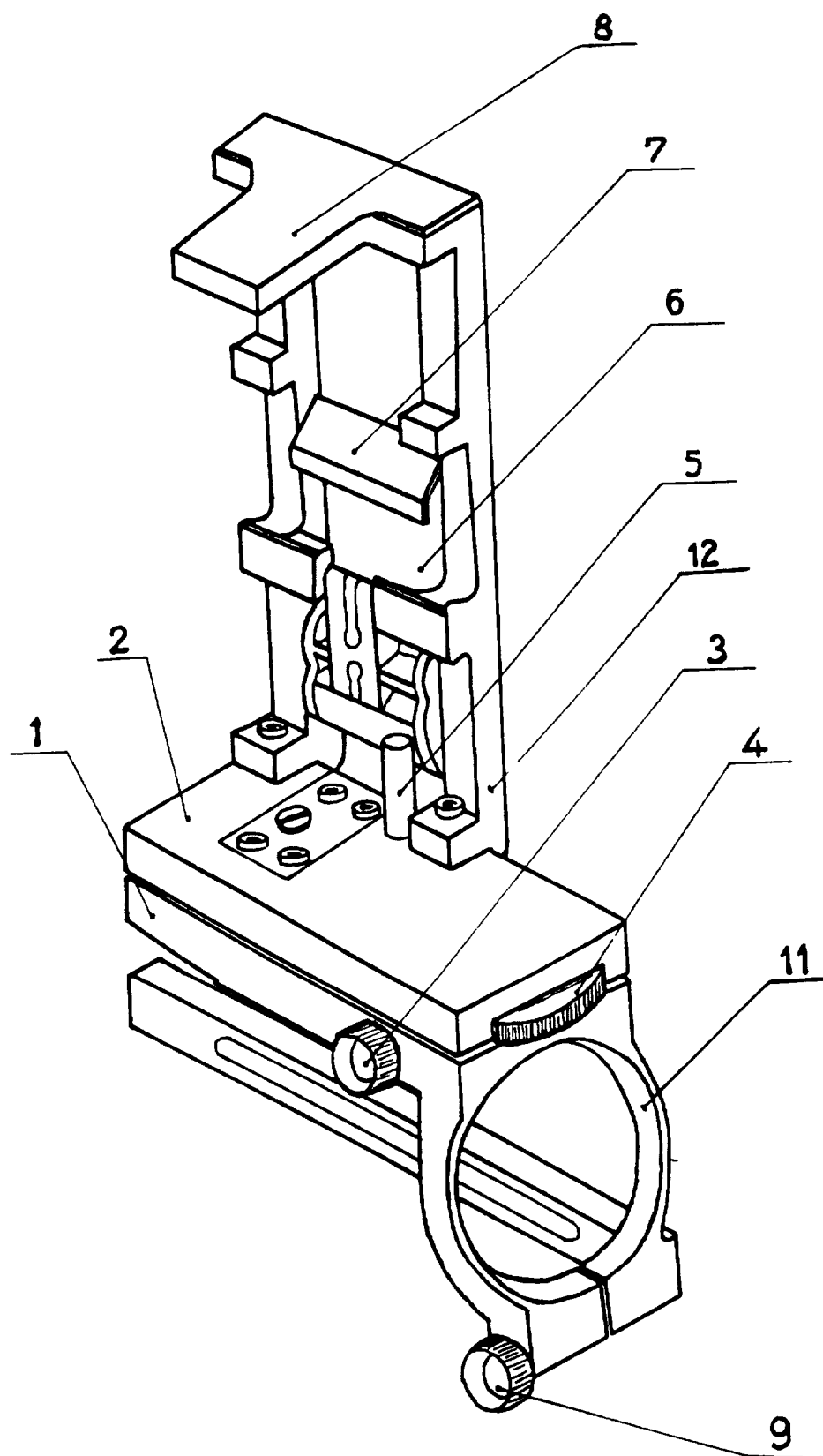
trolling the vertical position, what enables to carry out very precise geodesic measurements.

Claims

1. A method for fixing geodesic devices characterised in that an additional device, being a link, is fixed by means of its annular clamp (11) at a telescope of a geodesic device, especially a levelling instrument, said additional device being provided with a control plate (2) rotationally movable in relation to two axes, as well as a holder (12) fastened to it, and another optical instrument, especially an electrooptical stadia, is fixed and fastened to the device, and afterwards the optical instrument fastened in the holder (12) by means of the rotationally movable control plate (2) is set by means of the controls of the device, having the knobs (3) and (4), in such a way as to obtain the parallelism of the optical axes of both geodesic instruments connected one to another.

2. A device for fixing geodesic devices according to the claim 1 characterised in that it has a horizontal base (1) provided at its one side with an expandable annular clamp (11) for a telescope, having a horizontal axis, and being clamped with a clamping screw (9), and that above the base (1) there is located the horizontal control plate (2), advantageously of a cuboid shape, rotationally movable in relation both to the horizontal and vertical axes, said plate being swung in vertical direction by means of the vertical control screw with the knob (4), located between the base (1) and the control plate (2), and advantageously located above the telescope clamp (11), the control plate (2) also being rotationally movable in the horizontal direction by means of the control screw with the knob (3) fastened in the base (1), wherein at one of the longer vertical walls of the control plate (2), at its end opposite to the telescope clamp (11), there is fastened vertically the known frame holder (12) with a catch (7) adapted for fastening another geodesic instrument, advantageously an electrooptical stadia, fixed by means of the known fixing pin (5) located on the control plate.

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INTERNATIONAL SEARCH REPORT

International Application No

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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 G01C1/02 G01C15/00 G02B23/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 G01C G02B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 873 823 A (NORTHROP RICHARD M ET AL) 25 March 1975 see column 3, line 3 - column 4, line 19; figures 1,2	1,2
A	GB 2 215 478 A (CLYDE SURVEYS LIMITED) 20 September 1989 see page 3, line 1 - line 16; figure 1	1,2
A	US 5 418 609 A (DUNNE JEREMY G) 23 May 1995 see abstract	1,2
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Further documents are listed in the continuation of box C.



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Information on patent family members

International Application No

PCT/PL 97/00002

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