

DESCRIPTION

The invention concerns a binocular telescope with a hinged bridge connecting both the tubes and a central drive for the common adjustment of focussing members borne within the tubes.

Such a binocular telescope with internal focussing is known from the DE-GM 1 694 491. Apart from the common adjustment of both the focussing members, an individual adjustment of a focussing member in one of the tubes is also possible in this telescope for the equalisation of differences in sight between the eyes of a user, a so-called dioptré adjustment. For this purpose, the central drive for the common adjustment of both the focussing members is disengagable from the focussing member of the one tube so that only this focussing member is adjusted. In detail, a rotary knob is borne in this known telescope in the rotary joint of both the tubes by an axle which acts on the one focussing member and is surrounded by a hollow axle and a hollow rotary knob which stands under spring effect, which hollow members act on the other focussing member.

Both the rotary knobs are connected together by a friction coupling which can be disengaged through depression of the outer rotary knob against the spring effect. A mutually independent adjustment of the focussing members of both tubes, which can thereby be undertaken in any desired sequence, is not possible with this telescope.

A binocular telescope, which apart from an equipment for the adjustment of a variable enlargement also displays a central drive of two co-axial adjusting knobs for the focussing and the dioptré adjustment, is known from the DE-OS 29 52 04. Both the adjusting knobs are connected by way of a locking pin and are turned at the same time for focussing. For the dioptré adjustment, the focus-adjusting knob must be held fast and the dioptré-adjusting knob must be turned. The adjusting knobs beyond that act on objective lens frames in both tubes while displacing the objectives along the optical axis so that this known telescope displays no internal focussing.

The invention is therefore based on the task of creating a binocular telescope of the initially named kind, both focussing members of which are in the case of unchanged spacing between the eyepieces and objectives

movable together as well as also each independently of the other, i.e. individually and in any desired sequence, with low friction and almost free of play in the tubes, whilst unintentional adjustments of only one focussing member are excluded.

This problem is solved according to the invention by the features of the characterising part of the claim 1.

In this manner, the user is put in a position of focussing each of both the tubes individually in correspondence with the visual acuity of his eyes, for which it is immaterial which tube is started with. Subsequently, a pressure on the adjusting ring near to the eye suffices to connect this with the other adjusting ring and then to undertake a common range adjustment.

A user-friendly adjustment of the binocular telescope with only one hand is assured at the same time through this arrangement.

According to a preferred embodiment of the invention, it can be provided that individual segmental arcuate members are insertable into an annular groove of an entraining ring connected rotationally secured with the first adjusting ring and on the one hand engage by a shaped-on spigot into a radial bore of the entraining ring and on the other hand are couplable to the second adjusting ring by means of an axially extending toothing on an output surface. Thereby, a shape-locking coupling between both the adjusting rings is achieved.

Details of the invention are evident from the following description of an example of embodiment illustrated schematically in the drawing. All parts not necessary for an understanding of the invention have been omitted or not designated for the sake of clarity. There show:

Figure 1 a partially sectioned front view of the binocular telescope according to the invention with both the adjusting rings in the coupled state and

Figure 2 a view of a segmental arcuate member.

In the case of the telescope shown sectioned in Figure 1, a left-hand tube 10 is connected by means of a hinged bridge 11 with a right-hand tube 10', which is alike in build-up. Mounted in the hinged bridge 11 between the tubes 10 and 10' is a central axle 12, on which a first adjusting ring 13 and a second upper adjusting ring 14 are arranged co-axially, which

together form the central drive of the binocular telescope. In Figure 1, both the adjusting rings 13 and 14 are shown in the coupled state. The first adjusting ring 13 is for this purpose connected rotationally secure by means of a lock ring 15 with an entraining ring 16, which in the upper portion displays an annular groove 17, into which individual segmental arcuate members 18 are insertable (Figure 2). In detail, a shaped-on spigot 19 of the segmental arcuate member 18 in that case engages into a radial bore 20 of the entraining ring 16 and an axially directed toothing 21 on the outward surface of the segmental arcuate member 18 produces the shape-locking connection with a corresponding internal toothing 22 of the upper second adjusting ring 14. A rotary movement of the first adjusting ring 13 is on the one hand transmitted by means of the lock ring 15, the entraining ring 16, an entraining washer 23 and a worm 24 to a transmission rod 25, a mounting 38 and a focussing member 27, which is connected therewith and guided and displaceable free of play in the left-hand tube 10. On the other hand, the rotary movement of the first adjusting ring 13 is by reason of the shape-locking coupling with the second adjusting ring 14 transmitted by way of a detent bushing 28 arranged on the central axle 12 also to a worm 29, which engages into a corresponding transmission rod 30, which is connected with a mounting 38.

A guide rod 31 is in turn borne in the latter. A focussing member 32 for the right-hand tube 10' of the binocular telescope is also guided and displaceable free of play in this.

It is to be recognised that a rotary movement of the second adjusting ring 14 is transmitted in like manner not only to the focussing member 32 of the right-hand tube 10, but also to the focussing member 27 of the left-hand tube 10, since the adjusting rings 13 and 14 are each shape-lockingly connected with the other by way of the toothings 21 and 22. Both the focussing members 27 and 32 are displaced in the coupled state of both the tubes 10 and 10', for which it is immaterial which of the two adjusting rings 13 and 14 is termed.

By drawing the second adjusting ring 14 out, the shape-locking coupling with the first adjusting ring 13 is separated, for which the axially extending toothing 21 on the outward surface of the segmental arcuate member 18 slides out of the inward toothing 22 of the second

adjusting ring 14. Each segmental arcuate member 18 is mounted under radial bias in the annular groove 17 of the entraining ring 16 so that, on the drawing-out of the adjusting ring 14, it is pressed into an enlargement 33 underneath the inward toothing 22 of this adjusting ring. For securing the uncoupled state of both the adjusting rings 13 and 14, the central axle is provided with two grooves 34 and 34', into which balls 36, which are arranged in a recess 37 in the detent bushings 28, are urged by means of a spring 35. In this manner, the second adjusting ring 14 is movable into two detent settings, whilst the first adjusting ring 13 is axially fixed.

In the uncoupled state, a rotary movement of the first adjusting ring 13 is evidently transmitted only to the worm 24 and thereby to the focussing member 27 for the left-hand tube 10 of the binocular telescope. Just so, a displacement of only the focussing member 32 in the right-hand tube 10' takes place on the rotation of the second adjusting ring 14 so that an individual diopetre adjustment is superfluous, since each tube 10 and 10' is initially focussed individually for each eye. By depression of the second adjusting ring 14, the coupling is then produced with the first adjusting ring 13, whereby both focussing members 27 and 32 are displaced together when one of both the adjusting rings 13 and 14 is actuated.

The guide rods 26 and 31 for the focussing members 27 and 32 are borne fast with the housing and guided in mountings 38 and 38'. The latter on the one hand are connected with the transmission rods 25 and 30, whilst on the other hand they engage into the focussing members 27 and 32.

The guide rods 26 and 31 are surrounded by equalising springs 39 and 39', which engage at the mountings 38 and 38' and largely eliminate the play in the transmission members, i.e. from the adjusting rings 13 and 14 to the focussing members 27 and 37. The equalising springs 39 and 39' act in opposite sense in order that the adjusting forces for a left-hand rotation of the coupled adjusting rings 13 and 14 are equal to those for a right-hand rotation.

Between the worms 24 and 29, a bearing washer 41 carrying bearing walls 40 is arranged on the detent bushing 28. The bearing walls 40 are engaged over by a bearing ring 42, which is inserted into the lower end of the worm 24. The rotary bearing formed in this manner is low in friction and has the effect that, in the disengaged state, only the worm associated with the respective setting ring rotates without entraining the other.

The focussing of the binocular telescope takes place, as already explained, through individual adjustment of both the focussing members 27 and 32 within both the tubes 10 and 10' by means of the disengaged adjusting rings 13 and 14. In order that the adjusted state also remains maintained during the range adjustment in the coupled state of the adjusting rings 13 and 14 and can be read off and in a given case reproduced by the user, a diopetre plate 43 with index, opposite which lies a viewing window 44 mounted in the second adjusting ring 14, is inserted into the surface of the entraining ring 16 of the first adjusting ring 13. On the rotation of one of both the adjusting rings 13 and 14, the diopetre plate 43 and the viewing window 44 in this way move simultaneously and in like sense above the central axle 12.

It is self-evident that variants of the described embodiment of the binocular telescope are possible. Thus, it is feasible in place of the shape-locking coupling between both the adjusting rings to provide a force-locking coupling in the shape of an elastic ring. The rotary bearing between both the worms can also be constructed differently.

REFERENCE SYMBOLS

10, 10'	Tubes
11	Hinge bridge
12	Central axle
13	First adjusting ring
14	Second adjusting ring
15	Lock ring
16	Entraining ring
17	Annular groove
18	Segmental arcuate member
19	Spigot
20	Bore
21	Toothing
22	Inward toothing
23	Entraining washer
24	Worm
25	Transmission rod
26	Guide rod
27	Focussing member
28	Detent bushing
29	Worm
30	Transmission rod
31	Guide rod
32	Focussing member
33	Enlargement
34, 34'	Grooves
35	Spring
36	Bore
37	Recess
38, 38'	Mounting
39, 39'	Equalising spring
40	Bearing bore
41	Bearing washer
42	Bearing ring
43	Diopetre plate
44	Viewing window



CLAIMS

1. Binocular telescope with a central drive lying between both tubes for the common adjustment of focussing members, wherein a first adjusting ring and a second adjusting ring connected therewith are co-axially arranged on a central axle as central drive, characterised thereby, that both adjusting rings (13, 14) are couplable shape-lockingly in such a manner that the first adjusting ring (13) is axially fixed and the second adjusting ring (14) axially movable, wherein each adjusting ring (14, 15) in the uncoupled state is freely rotatable independently of the other and associated with a respective focussing member (27, 32) displaceable within the tubes (10, 10') for the internal focussing of the individual tubes (10, 10') while the spacing between the eyepieces and objectives remains unchanged.

2. Binocular telescope according to claim 1, characterised thereby, that individual segmental arcuate members (18) are insertable into and mountable under bias in an annular groove (17) of an entraining ring (16) connected rotationally secured with the first adjusting ring (13) and the one hand engage by a shaped-on spigot (19) into a radial bore (20) of the entraining ring (16) and on the other hand are couplable shape-lockingly to the second adjusting ring (14) by means of an axially extending toothing (21) on their outward surface.

3. Binocular telescope according to claim 1, characterised thereby, that each adjusting ring (14, 15) is connected with a respective worm (24, 29), which is co-axially arranged on the central axle (12) and transmits the rotational movement of the uncoupled adjusting ring (13 or 14) by means of a transmission rod (25 or 30) and mounting (38 or 38') for each tube (10 or 10') to the focussing member (27 or 32).

4. Binocular telescope according to claim 3, characterised thereby, that the guide rods (26, 31) are borne fast with the housing and guided in mountings (38, 38'), which on the one hand are connected with the transmission rods (25, 30) and on the other hand engage into the focussing members (27, 32).



5. Binocular telescope according to claim 4, characterised thereby, that equalising springs (39, 39'), which surround the guide rods (26, 31) and act in opposite sense, engage at the mountings (38, 38') for the achievement of equal displacing forces.

6. Binocular telescope according to claim 3, characterised thereby, that a low-friction bearing (40, 41, 42) of a bearing washer (41), a bearing ring (42) and bearing balls (40) is provided between the worms (24, 29).

7. Binocular telescope according to one or more of the preceding claims, characterised thereby, that a diopetre plate (43), which can be read off through a viewing window (44) mounted in the second adjusting ring (14), is arranged on the entraining ring (16) of the first adjusting ring (13).