

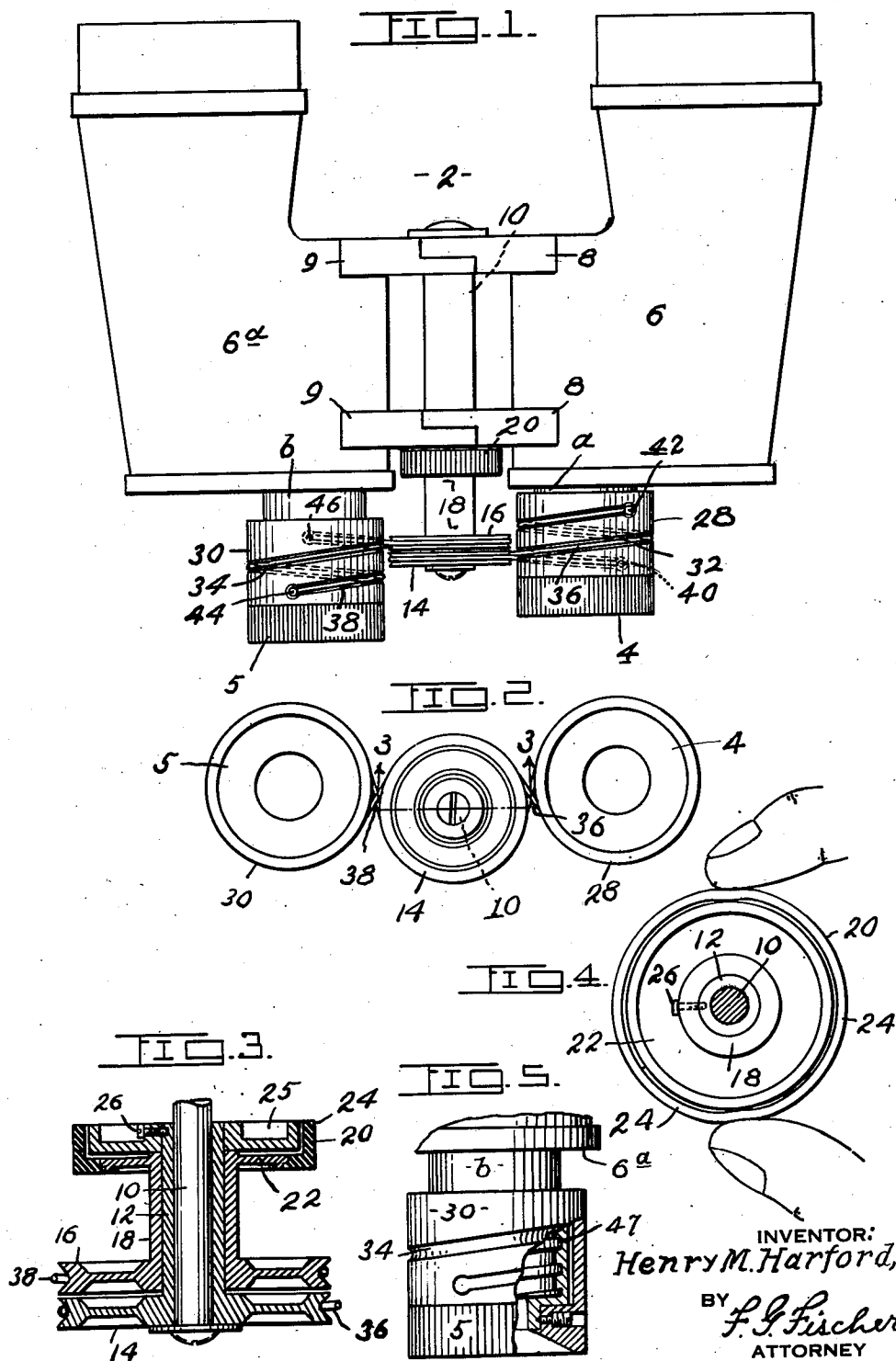
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FOCUSING ADJUSTMENT FOR BINOCULARS

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FOCUSING ADJUSTMENT FOR BINOCULARS

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My invention relates to adjusting mechanisms for optical instruments such as binoculars, field glasses, and the like, and one object of the invention is the provision of a simple, inexpensive and accurate mechanism whereby the eyepieces of optical instruments may be individually and simultaneously focused.

Another object is to provide focusing mechanism of this character which is centrally located between the eyepieces where it may be conveniently manipulated by the user.

A further object is to provide an adjusting mechanism arranged exteriorly of the eyepieces where it is readily accessible for adjustment and repairs and requires no openings through which dust, moisture or other foreign matter may enter the interior of the eyepieces.

Another object is to provide an adjusting mechanism which will not interfere with interpupillary distance adjustment for hinged binoculars.

Other objects will hereinafter appear, and in order that the invention may be fully understood reference will now be had to the accompanying drawing, in which:

Fig. 1 is a plan view of a binocular instrument with my adjusting mechanism incorporated therein.

Fig. 2 is an enlarged detail front elevation of the adjusting mechanism applied to the tubular eyepieces of the binoculars.

Fig. 3 is a detail central section of the central adjusting means taken on line 3—3 of Fig. 2.

Fig. 4 is a detail rear elevation of thumb-wheel grasped between the thumb and forefinger.

Fig. 5 is a detail of one of the eyepieces.

Referring in detail to the different parts of the device, 2 designates a pair of binoculars which may be of conventional form provided with independently adjustable eyepieces 4 and 5, slidably and rotatably mounted upon tubular guides *a* and *b* projecting from the front ends of the binocular barrels 6 and 6*a*, respectively. The barrels 6 and 6*a* may be swung toward and from one another to vary the interpupillary distance between the eyepieces 4 and 5 and for that purpose are provided with the customary hinge members 8 and 9 operably connected to a pintle 10. In the present instance the pintle 10 is longer than conventional pintles in order to position my adjusting mechanism outwardly between the eyepieces 4 and 5, as shown by Fig. 1, where it may be conveniently operated by the user.

Referring now more particularly to the eyepiece adjusting mechanism forming the important feature of the invention, 12 designates a

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sleeve freely mounted upon the forward portion of the pintle 10 and provided at its forward end with a fixedly mounted sheave 14 arranged in front of a companion sheave 16 fixed upon the forward end of a sleeve 18 freely mounted upon the sleeve 12. The rear end of the sleeve 18 is provided with a thumb-wheel 20 comprising a hub 22, fixed to the sleeve 18, and a flexible clutch member 24 fixed to the hub 22 and adapted to be compressed by the thumb and forefinger, as shown by Fig. 4, into frictional engagement with a companion clutch member 25, fixed upon the sleeve 12 by any suitable means such, for example, as a screw 26. The flexible clutch member 24, which may consist of rubber or other suitable material, extends circumferentially around the clutch member 25, but normally is spaced slightly therefrom so that the thumb-wheel 20 may be independently operated when desired to adjust only the eyepiece to which it is geared.

The eyepieces 4 and 5 include diopter rings 28 and 30, of a special type, which are longer than the conventional type, are preferably of uniform diameter throughout their length and have circumferential spiral grooves 32 and 34 in which a pair of cables 36 and 38 operate to rotate and advance or retract the eyepieces 4 and 5, respectively. The convolutions of the cable 36 run around the grooved periphery of the sheave 14 and the ends of the cable are secured to the diopter ring 28 by any suitable means, such as elements 40 and 42, respectively. The convolutions of cable 38 run around the grooved periphery of the sheave 16 and the cable is secured at its ends to the diopter ring 30 by elements 44 and 46, respectively. The pitch of the spiral grooves 32 and 34 correspond to the pitch of the conventional intermeshing threads 47 of each eyepiece and associated guide tube to insure free movement of the eyepieces when operated by the adjusting mechanism above described.

The spiral grooves 32 and 34 are not essential but are desirable to insure smooth operation of the cables 36 and 38 in passing to and from the spiral grooves of the sheaves 14 and 16, respectively. The cables 36 and 38 may consist of wire or other suitable flexible material and are preferably crossed, as shown by Fig. 2, to obtain maximum traction on the respective sheaves and diopter rings.

By arranging the axes of the sheaves 14 and 16 concentrically with respect to the axis of the pintle 10, it is apparent that the distance between the axes of the pintle 10 and the eyepieces

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4 and 5 will remain constant so that there will be neither tightening nor slackening of the cables 36 and 38 when the barrels 6 and 6a are swung towards or away from each other to vary the interpupillary distance between the eyepieces.

The sheaves 14 and 16, the thumb-wheel 20, and the cables 32 and 34, provide a simple, inexpensive transmission mechanism for operating the eyepieces 28 and 30, respectively, and being arranged exteriorly of the eyepieces are readily accessible for adjustments or repairs.

From the foregoing it will be understood that by the use of my central adjusting mechanism that the two eyepieces 4 and 5 may be simultaneously rotated and thus moved forward or backward for focal adjustment of the lenses therein by frictionally engaging the flexible clutch member 24 with the clutch member 25 and turning the central thumb-wheel 20 to the right or left, or the eyepieces 4 and 5 can be independently adjusted to compensate for unequal vision of the user by separately turning each eyepiece to the right or left with the fingers.

While I have shown and described a preferred form of the invention, I reserve the rights to such changes and modifications thereof as properly fall within the scope of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:

1. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a helical peripheral groove formed in the exterior surface thereof having a pitch substantially equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried by said binoculars for rotation about an axis parallel to said barrels and disposed directly intermediate said eyepieces, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, said sheaves being manually rotatable.

2. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together for relative pivotal movement on a pintle parallel to the axes of said barrels and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a peripheral helical groove formed in the exterior surface thereof having a pitch substantially equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried for independent rotation on said pintle, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, said sheaves being disposed in close juxtaposition whereby they may be manually gripped and turned either independently or simultaneously.

3. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a helical peripheral groove formed in the exterior surface thereof having a pitch substantially

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equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried by said binoculars for independent rotation about an axis parallel to said barrels and disposed directly intermediate said eyepieces, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, said sheaves being disposed in close juxtaposition whereby they may be manually gripped and turned either independently or simultaneously.

4. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together for relative pivotal movement on a pintle parallel to the axes of said barrels and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a peripheral helical groove formed in the exterior surface thereof having a pitch substantially equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried for independent rotation on said pintle, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, said sheaves being disposed in close juxtaposition whereby they may be manually gripped and turned either independently or simultaneously.

5. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a helical peripheral groove formed in the exterior surface thereof having a pitch substantially equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried by said binoculars for rotation about an axis parallel to said barrels and disposed directly intermediate said eyepieces, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, a clutch member fixed to and rotatable with one of said sheaves, and a resilient clutch member fixed to and rotatable with the other of said sheaves, said clutch members being disposed in juxtaposition whereby said resilient clutch member may be moved into frictional contact with the other of said clutch members.

6. The combination with a pair of binoculars including a pair of substantially parallel barrels connected together for relative pivotal movement on a pintle parallel to the axes of said barrels and an eyepiece threaded on each of said barrels for movement parallel to the axis of said barrel, each of said eyepieces having a peripheral helical groove formed in the exterior surface thereof having a pitch substantially equal to that of the threads joining said eyepiece to the associated barrel, a pair of sheaves carried for rotation on said pintle, a flexible cable disposed about each of said sheaves, the end portions of said cable entering the helical groove of one of said eyepieces and being respectively wound in opposite directions in said groove, the ends of said cable being secured to said eyepiece, a rigid circular

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clutch member mounted for axial rotation on said pintle and rigidly fixed to one of said sheaves a second clutch member carried for axial rotation on said pintle and rigidly fixed to the other of said sheaves, said second clutch member having a resiliently deformable circular flange overlapping the outer edge of said rigid clutch member in normally spaced apart relation therefrom.

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