A. STEINLE.

HINGED DOUBLE TELESCOPE.

APPLICATION FILED DEC. 19, 1910.

1,022,340. Patented Apr. 2, 1912.

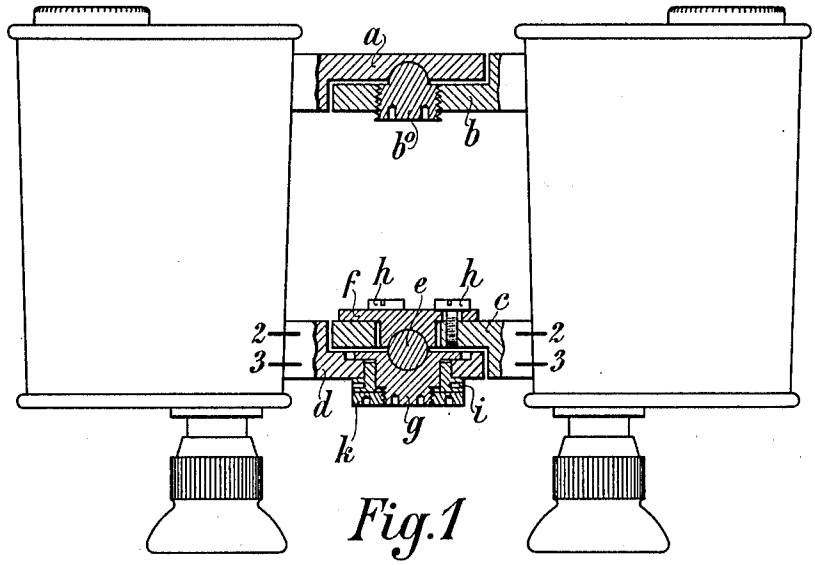

Fig. 1

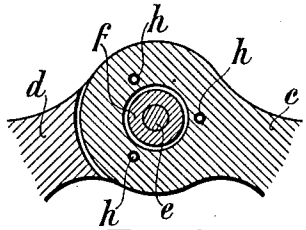

Fig. 2

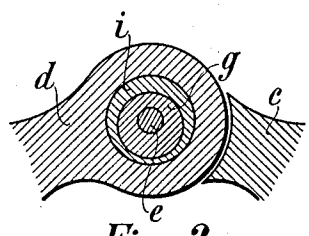

Fig. 3

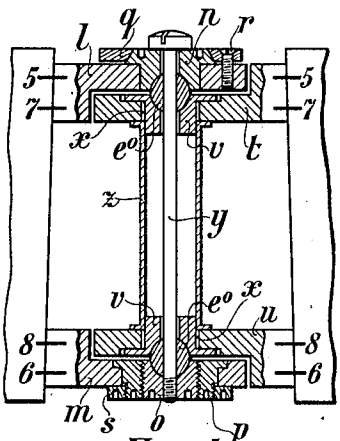

Fig. 4

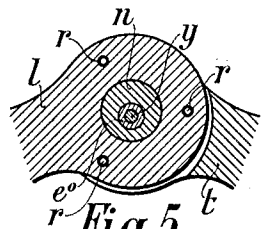

Fig. 5

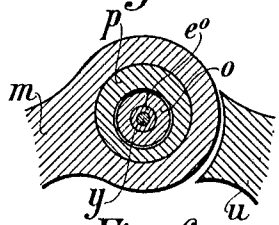

Fig. 6

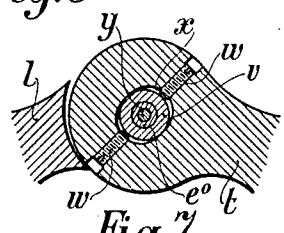

Fig. 7

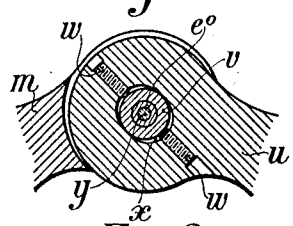

Fig. 8

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HINGED DOUBLE TELESCOPE.

1,022,340. Specification of Letters Patent. Patented Apr. 2, 1912.

Application filed December 19, 1910. Serial No. 598,172.

To all whom it may concern:

Be it known that I, ADOLF STEINLE, a citizen of the German Empire, residing at Carl-Zeiss strasse, Jena, in the Grand Duchy of Saxe-Weimar, Germany, have invented a new and useful Hinged Double Telescope, of which the following is a specification.

The invention relates to hinged double telescopes, in which hinge parts are adjustably fitted in the hinge arms in such a manner that the geometrical axis of the hinge in each single telescope can be set parallel to the optical axis of the same. Such telescopes are known in one form only, *e. g.* from the Patent 962929. In the said patent a hinged double telescope is represented and described, of the hinge arms of which the two outer ones, which belong to the one single telescope, carry in common a cylindrical journal and the two inner ones, which belong to the other single telescope, carry in common the cylindrical bearing sleeve corresponding to the journal. The position of the journal and that of the bearing sleeve relative to their respective single telescopes are made capable of being regulated by each of these two hinge parts being adjustable, relatively to the two hinge arms carrying it, in any direction on spherical surfaces having a common center of curvature. In order that the two hinge parts, when set anyhow relatively to their single telescopes, may correctly engage each other in the double telescope, their common centers of curvature lie in one and the same point of the hinge axis and the facing surfaces of the hinge, in each of which an inner and an outer hinge arm abut upon each other, are likewise spherical surfaces with a common center of curvature, which again lies in that point of the hinge axis.

According to the present invention the same object is attained by other means which as a whole are more simple than those just described. In the first place each of the two arms of a single telescope is fitted with a spherical hinge surface (bearing or journal). The front pair of hinge surfaces has a center of curvature different from that of the hinder pair. In such an arrangement, the hinge surfaces represent at the same time the facing surfaces of the hinge and the position of the hinge axis is determined by the front and the hinder center of curvature.

In order to be able to set the hinge axis parallel to the optical axis of a single telescope, either one of the two hinge surfaces of the single telescope should be located on a hinge part adjustable relatively to its hinge arm in every direction transversely to the hinge axis, or both hinge surfaces should be located on hinge parts which in this case need only be made adjustable along a suitable fixed path.

An increase of the number of single parts and, nevertheless, a reduction of the cost of production arises, when both surfaces of a pair of hinge surfaces are formed as bearing surfaces, and within such a pair a ball is placed as a loose journal. The well-known arrangement of a distancing tube between the inner hinge arms is here likewise to be preferred. At the same time the distance apart of the outer arms may be secured by connecting them, through central openings in the hinge parts, by means of a clamping bolt.

In the annexed drawing: Figure 1 is a plan view, partly in section, of a hinged double telescope constructed according to the invention. Fig. 2 is a section on line 2—2 in Fig. 1. Fig. 3 is a section on line 3—3 in Fig. 1. Fig. 4 is a plan view, partly in section, of another hinged double telescope constructed according to the invention, the two telescope bodies being broken away. Fig. 5 is a section on line 5—5 in Fig. 4. Fig. 6 is a section on line 6—6 in Fig. 4. Fig. 7 is a section on line 7—7 in Fig. 4. Fig. 8 is a section on line 8—8 in Fig. 4.

In the first example, Figs. 1 to 3, in each single telescope one hinge surface, in both the hinder one, is located on a hinge part adjustable in all directions. In the second example, Figs. 4 to 8, the front and the hinder hinge surface of each single telescope are each located on a hinge part adjustable along a fixed path. In each of both examples the adjusting device is constructed in two different forms.

In the first example the outer arm *a* of the front pair of arms itself carries the hinge surface, being directly fitted with the spherical bearing surface. The hinge part *b*° of the inner arm *b* carries a spherical journal surface and is inserted in the arm *b* by means of a screw thread. The hinder pair of arms *c d* embraces a ball *e*, its hinge parts *f* and *g* being for this reason both provided with bearing surfaces. The adjustability of *f* in all directions is guaranteed by

spaces, which after the clamping screws *h h h* have been loosened allow this part to be displaced in any direction. A double eccentric device serves for adjusting *g* in all directions. On the one hand the bearing surface lies eccentrically in the hinge part *g*, on the other hand an eccentric ring *i* is arranged between the hinge part and the arm *d*. A nut *k* serves to fix both *g* and *i* relatively to the arm *d*.

In the second example, each of the front and the hinder pair of arms embraces a ball *e*°. The arms *l* and *m* of the left single telescope carry hinge parts *n* and *o*, eccentrically rotatable for adjustment in a fixed path. Of these the part *n* is directly seated in *l* eccentrically to its hinge surface, the part *o*, on the other hand, is inserted by means of a screw thread in an intermediate eccentric ring *p*. A ring *q* with screws *r r r* serves the purpose of fixing *n* relatively to *l*. For fixing *p* relatively to *m*, a nut *s* is provided. The arms *t* and *u* of the right single telescope are equipped with similar hinge parts *v v*. These parts are adjustable by means of the screws *w w*, *w w* along a fixed path represented by straight guides *x x* in directions at right angles to each other. The balls *e*° and all of the four hinge parts have central openings, for the reception of a clamping bolt *y* screwed with its threaded end into the hinge part *o* and abutting with its head upon the hinge part *n*, so that the distance between the outer arms *l* and *m* cannot increase. Between the inner arms *t* and *u* a distancing tube *z* is arranged.

I claim:

1. In a double telescope a hinge connecting the single telescopes and comprising two pairs of hinge arms, a front and a hinder one, each single telescope carrying two of the hinge arms, a front and a hinder one, each hinge arm being fitted with a spherical hinge surface and the front and the hinder pair of hinge surfaces each having its own center of curvature, a separate hinge part on at least one hinge arm of each single telescope, each hinge part presenting one of the hinge surfaces, and means for adjusting each hinge part on its hinge arm transversely to the hinge axis.

2. In a double telescope a hinge connecting the single telescopes and comprising two pairs of hinge arms, a front and a hinder one, each single telescope carrying two of the hinge arms, a front and a hinder one, each hinge arm being fitted with a spherical bearing surface and the front and the hinder pair of bearing surfaces each having its own center of curvature and inclosing a ball as a loose journal, a separate hinge part on at least one hinge arm of each single telescope, each hinge part presenting one of the hinge surfaces, and means for adjusting each hinge part on its hinge arm transversely to the hinge axis.

3. In a double telescope a hinge connecting the single telescopes and comprising two pairs of hinge arms, a front and a hinder one, each single telescope carrying two of the hinge arms, a front and a hinder one, each hinge arm being fitted with a spherical bearing surface and the front and the hinder pair of bearing surfaces each having its own center of curvature and inclosing a ball as a loose journal, a separate hinge part on at least one hinge arm of each single telescope, each hinge part presenting one of the hinge surfaces, and means for adjusting each hinge part on its hinge arm in a fixed path transversely to the hinge axis.

4. In a double telescope a hinge connecting the single telescopes and comprising two pairs of hinge arms, a front and a hinder one, each single telescope carrying two of the hinge arms, a front and a hinder one, the hinge arms of the one single telescope being outer ones and those of the other single telescope being inner ones, each hinge arm being fitted with a spherical bearing surface, the front and the hinder pair of bearing surfaces each having a special center of curvature and inclosing a ball as a loose journal, the hinge parts and balls having central openings, a clamping bolt connecting the outer arms, and a distancing tube being placed between the inner arms, a separate hinge part on at least one hinge arm of each single telescope, each hinge part presenting one of the hinge surfaces, and means for adjusting each hinge part on its hinge arm in a fixed path transversely to the hinge axis.

ADOLF STEINLE.

Witnesses:
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RICHARD HAHN.