No. 842,564. PATENTED JAN. 29, 1907.

J. KURIG.

SIGHTING DEVICE FOR PORTABLE GUNS.

APPLICATION FILED APR. 25, 1905.

3 SHEETS—SHEET 1.

Fig. 2.

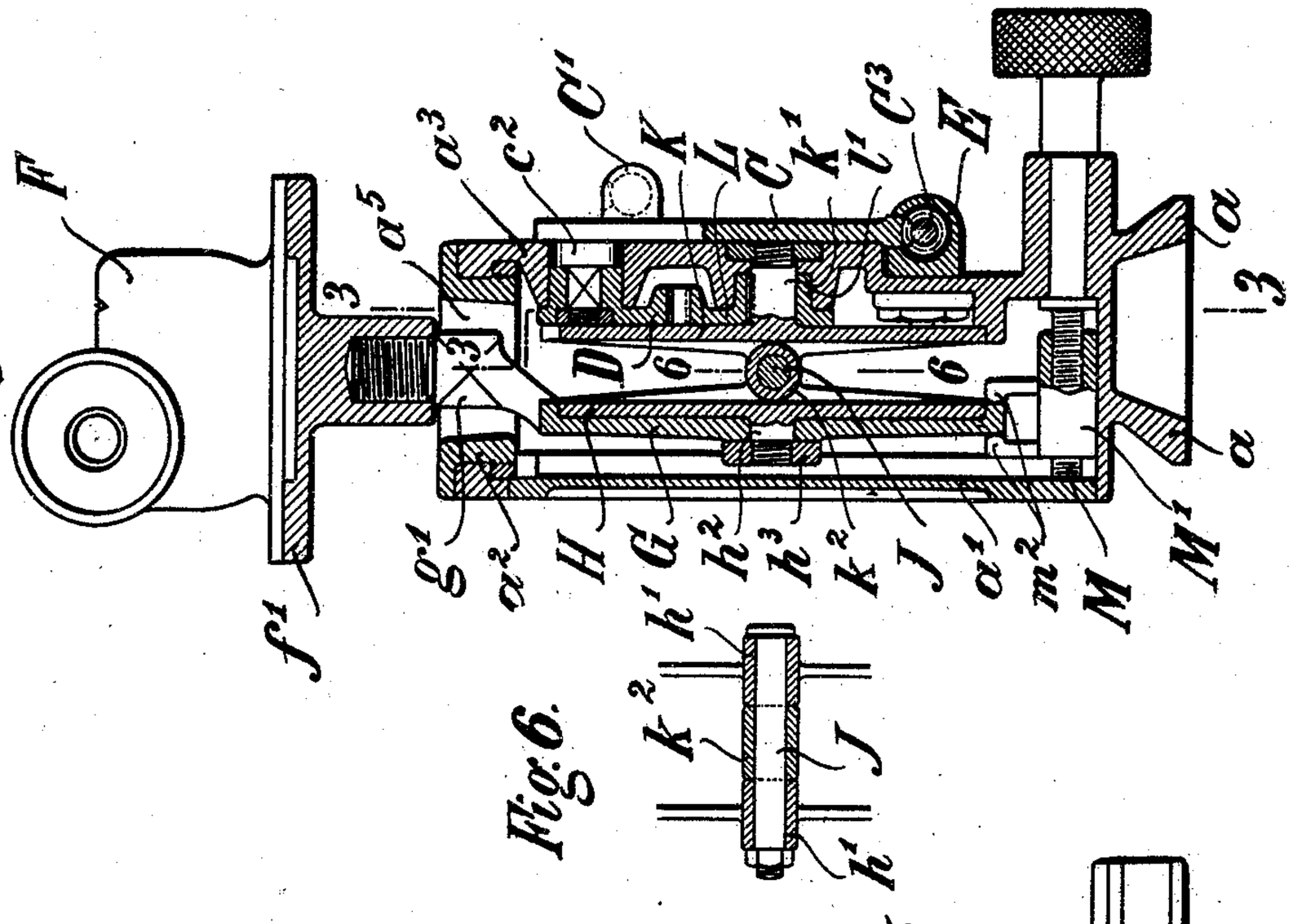
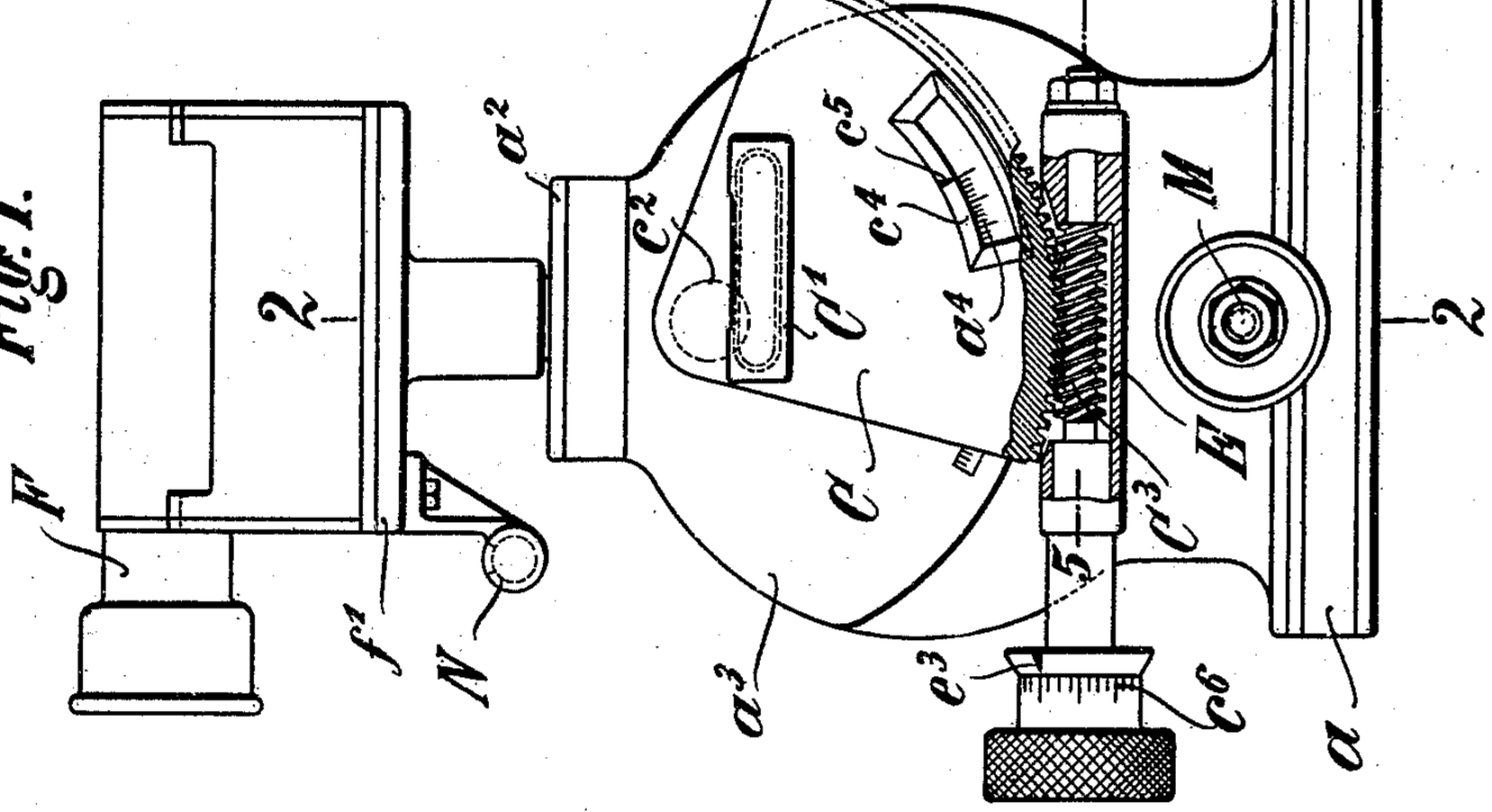


Fig. 6.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 4.

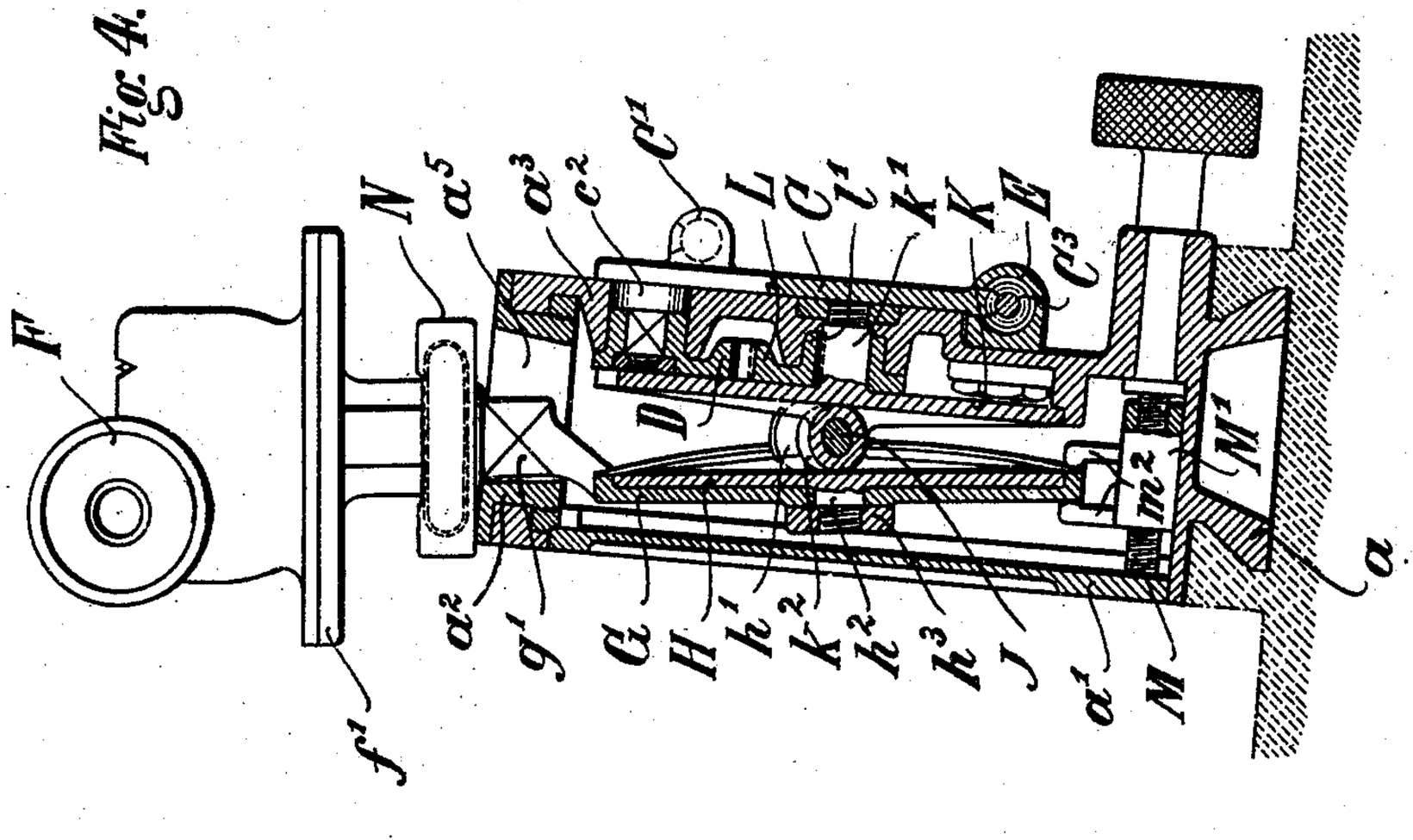


Fig. 3.

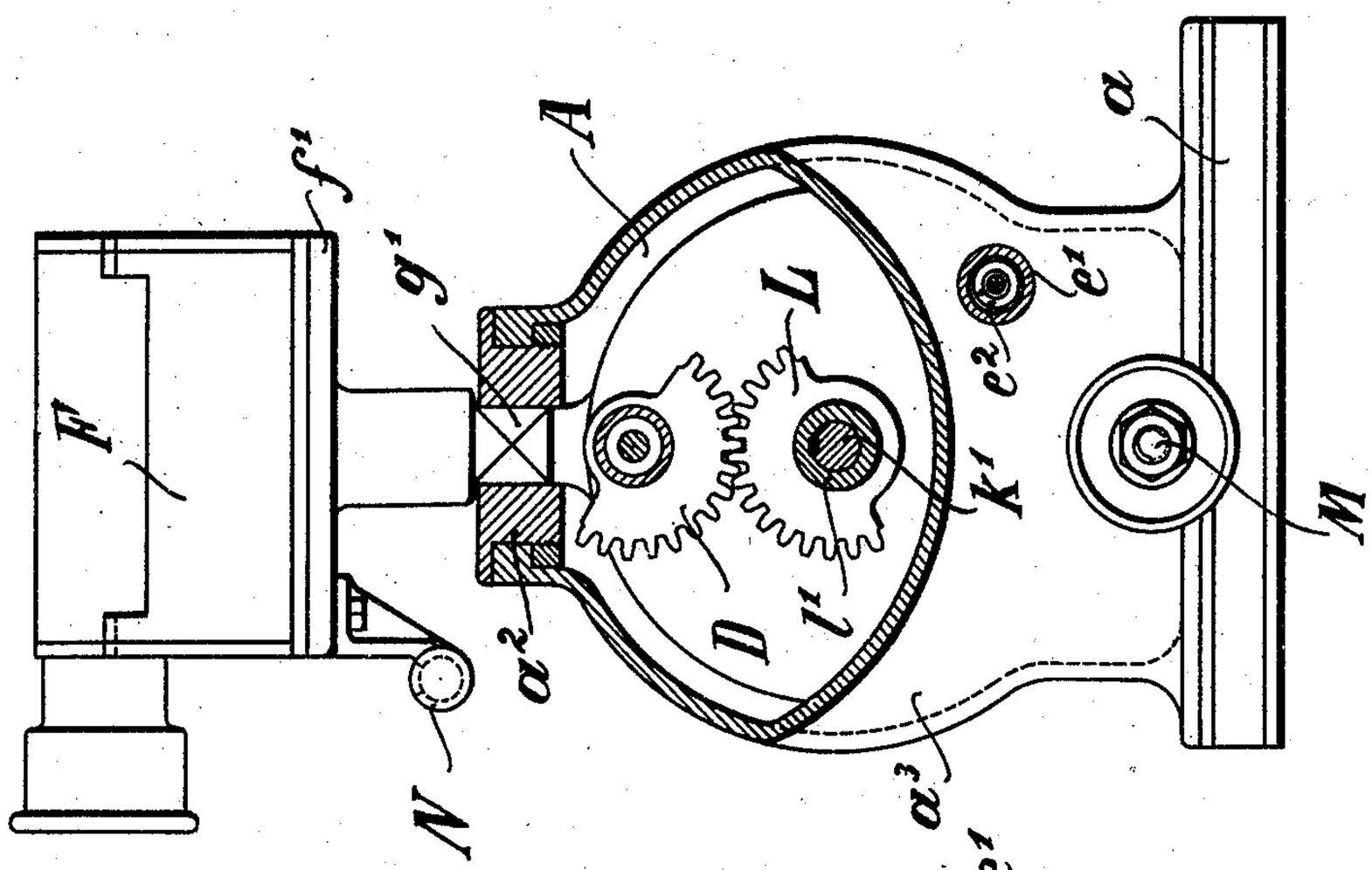
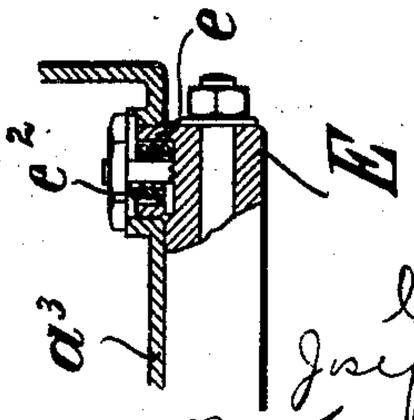


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 8.

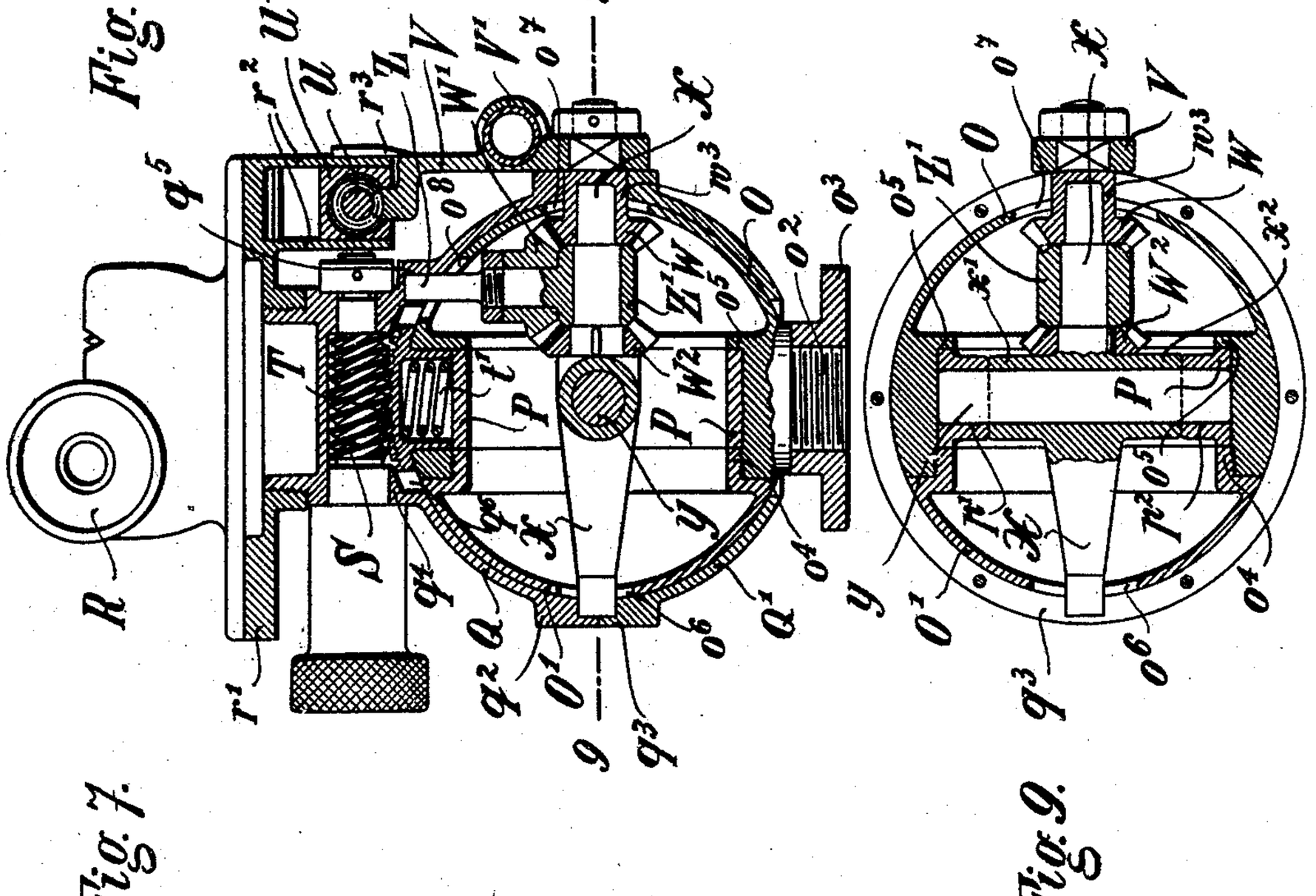
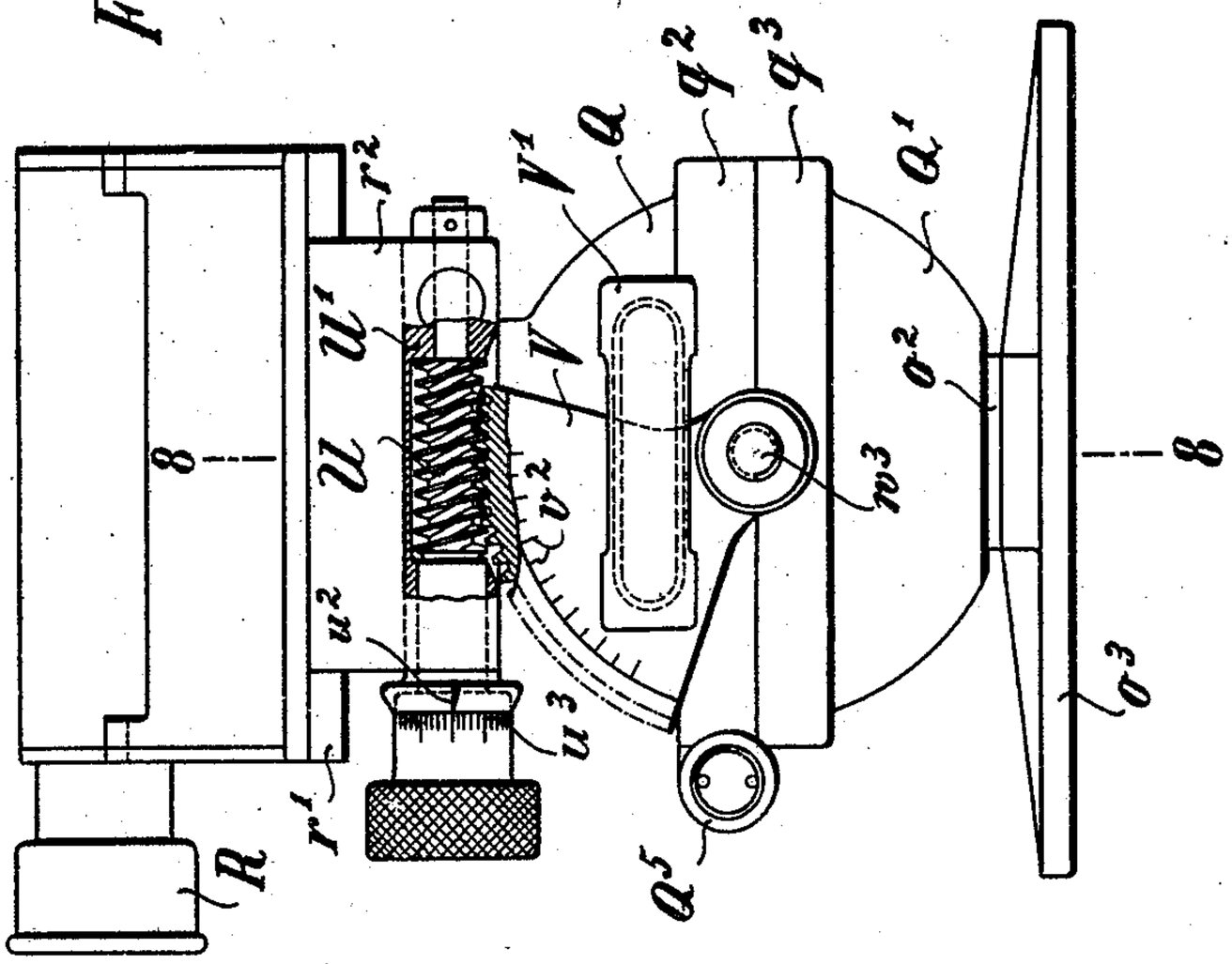


Fig. 9.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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SIGHTING DEVICE FOR PORTABLE GUNS.

No. 842,564. Specification of Letters Patent. Patented Jan. 29, 1907.

Application filed April 25, 1905. Serial No. 257,322.

To all whom it may concern:

Be it known that I, JOSEF KURIG, a subject of the Emperor of Germany, and a resident of 16 Holzstrasse, Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Sighting Devices for Portable Guns, of which the following is a specification.

The present invention relates to sighting devices for portable guns having means for eliminating the effect of an uneven position of the wheels. In order to eliminate the influence of the inclined position of the wheels in portable guns which are aimed by means of a sighting attachment carried by the barrel or by the cradle, it has hitherto been customary to arrange the attaching-sleeve or guide-box to swing about an axis that is parallel to the axis of the bore of the gun-barrel. When the influence of the inclined position of the wheels is to be eliminated in such guns, the necessary elevation must first be imparted to the gun-barrel. The sighting attachment is then swung around the aforesaid axis into the vertical position from the position that is inclined relative to the horizontal plane. Finally, the sighting-line is directed at the target by means of the horizontal training mechanism and, if necessary, by means of the elevating mechanism. If the sighting-line passes through the target, the gun is directed at the target with elimination of the influence of the inclined position of the wheels.

The object of the present invention is to make it possible to eliminate the influence of the inclined position of the wheels, also in guns which do not have such a sighting attachment and in which, therefore, elimination of the influence of the inclined position of the wheels cannot be accomplished in the above-described manner. In high-elevation guns, for instance, it is not practicable to use an ordinary sighting attachment in view of the generally required great elevations, for which reason such guns are preferably directed by means of a level-quadrant.

In the accompanying drawings are shown two embodiments of the invention, Figure 1 being a side view, partly in section, of one embodiment of the invention; Fig. 2, a section on line 2 2, Fig. 1, seen from the left, the sight-telescope being shown in front view; Fig. 3, a view corresponding to Fig. 1, partly in section, on line 3 3, Fig. 2, and seen from the right; Fig. 4, a view corresponding to Fig. 2 with some of the parts in other positions; Fig. 5, a section on line 5 5, Fig. 1, seen from above, and Fig. 6 a section on line 6 6, Fig. 2, seen from the right, and Fig. 7 being a side view, partly in section, of another embodiment of the invention; Fig. 8, a section on line 8 8, Fig. 7, seen from the left, the sight-telescope being shown in front view; and Fig. 9 a section on line 9 9, Fig. 8, seen from above.

Reference will first be had to the embodiment shown in Figs. 1 to 6. The approximately disk-shaped casing of the sight device is provided with a dovetailed base a, which when the sight device is in use engages a dovetailed groove in the breech of the gun-barrel. The casing is closed at one side by a removable countersunk cover a', Figs. 2 and 4, and has an opening at the top in which a guide-piece a^2 is rotatably but non-slidably arranged. In the casing-wall a^3 opposite the cover a' a level-quadrant C C′, Figs. 1, 2, and 4, is journaled by means of a trunnion c^2. A worm C^3, which is rotatably but non-slidably arranged in a housing E, engages with a toothed part of the quadrant C C′. The housing E is rotatably connected to the casing of the sight device by means of a trunnion e', Figs. 3 and 5, which is journaled in the casing-walls a^3. A spring e^2, Figs. 3 and 5, having one of its ends engaging the housing E and the other end engaging the casing-wall a^3, tends to swing the housing E upwardly, thereby retaining the worm C^3 in engagement with the teeth of the quadrant C. The described arrangement of the worm-housing E makes it possible to bring the worm C^3 out of engagement with the teeth of the quadrant C by pressing the hand-wheel of the worm, whereupon the operator may swing the quadrant C rapidly by hand on the trunnion c^2. The rough adjustment of the quadrant C is indicated by means of a scale a^4, Fig. 1, on the wall a^3, which is visible through a window c^4, Fig. 1, in the quadrant C, and by means of a mark c^5 on the window c^4. The fine adjustment of the quadrant C may be indicated by means of a mark e^3, Fig. 1, on the worm-housing E and a scale c^6, arranged on a drum of the hand-wheel of the worm C^3.

The trunnion c^2 of the quadrant C is rigidly connected with a toothed segment D, Figs. 2

to 4, which is located within the casing of the sight device and meshes with a toothed segment L. The latter is rotatably arranged in the wall a^3 by means of a centrally-perforated trunnion l'. The segments D and L have the same radius and same number of teeth. A disk K, Figs. 2 and 4, is provided with a trunnion k', which projects into the perforation of the trunnion l' and which is non-rotatably connected with the segment L and held from horizontal movement in the wall a^3. The disk K lies against the segments D and L, and on the side opposite the trunnion k' it is provided with an eye k^2. (See also Fig. 6.) The eye k^2 receives a bolt J, which passes through two eyes h' of a disk H, Figs. 2 and 4, which eyes abut against the eye k^2. The disk H is rotatably connected with a dish-shaped disk G by means of a central trunnion h^2. A nut h^3, screwed into the trunnion h^2, prevents the disk G from moving out of engagement with the disk H. The trunnions k' h^2 are coaxially arranged relatively to each other and their axes are in plane with the axis of the bolt J. The disk G, which in the following will be referred to as the "telescope-carrier," is by means of a boss g', Figs. 2 to 4, connected with the plate f', carrying a telescope F. A part of the boss g' is square and is guided in a cut a^5, Figs. 2 and 4, in the guide-piece a^2 in such a manner that the telescope-carrier G is incapable of partaking of a turning movement of the disk H around the axis of the trunnion h^2.

The relative arrangement of the above-mentioned parts is such that when the sight device is placed for use on the breech of the gun-barrel the axes of the trunnions k' h^2 are parallel to the axis of the horizontal trunnions of the gun, and the axis of the bolt J extends parallel to the axis of the bore of the gun-barrel when the marks c^5 e^3 register with the zero-point of the corresponding scales. If in this position of the quadrant C the axis of the bore of the gun-barrel is horizontal, the level C′ registers.

In the casing of the sight device and close above the base a, a screw-spindle M, having right-hand threads, is rotatably arranged and held from longitudinal movement. The spindle M engages with a nut M′, which lies with a plane surface against the lower wall of the casing of the sight device, so that when the spindle M is turned the nut M′ moves longitudinally. The nut M′ is provided with a pair of catches m^2, having curved faces engaging the lower edge of the telescope-carrier G. Thus by turning the spindle M the telescope-carrier may be swung on the bolt J, and thereby be brought in a vertical position during the inclined position of the wheels. A level N, Figs. 1, 3, and 4, which is secured on the plate f', shows whether the telescope-carrier assumes a vertical position.

Let it be assumed that in the gun to be aimed the wheels occupy an inclined position, causing the axis of the horizontal trunnions of the gun to incline to the right relative to the horizontal plane looking from the breech of the gun-barrel. In order to direct the gun, the sight device is shoved into the breech of the gun-barrel, which is in the loading position. In the present instance it is for the sake of simplicity assumed that the barrel is horizontal in the loading position. The level-quadrant C C′ is thereupon adjusted to the elevation corresponding to the distance of the target. For this purpose the quadrant C is by means of the worm C^3 swung around the axis of the trunnion c^2 until the marks c^5 and e^3 register with the scale-line corresponding to the distance of the target. If the elevation be high, the worm C^3 is first brought out of engagement with the quadrant C in the aforesaid manner and the quadrant is roughly adjusted, and the fine adjustment of the quadrant is accomplished by means of the worm c^3. When the quadrant C is adjusted, due regard must of course be taken to the position of the target above or below the horizontal plane through the place where the gun is located, (the terrain angle.) This is done by adjusting the quadrant at an angle corresponding to the distance of the target plus or minus the terrain angle. The toothed segment D partakes of the turning of the quadrant C, thereby turning the toothed segment L the same angle in the opposite direction. The trunnion k', the disk K, the bolt J, and the disk H partake of the turning of the segment L, while the telescope-carrier retains its original position. Through the adjustment of the quadrant C the axis of the bolt J has attained relative to the horizontal plane an inclination the direction and amount of which corresponds to the elevation which must be imparted to the gun-barrel. The spindle M is thereupon turned clockwise and the nut M′ slides to the right, Fig. 4, and carries along with it the telescope-carrier through the medium of the catches m^2. The disk H partakes of the movement of the telescope-carrier, which, with the telescope, swings around the axis of the bolt J. During the movement of the telescope-carrier the square part of the boss g' slides in the cut a^5 of the guide-piece a^2, thereby causing a slight turning of the latter. The turning of the spindle M is continued until the level N registers, in which case the telescope-carrier assumes a vertical position, Fig. 4. The sighting-line is thereupon directed at the target by means of the elevating mechanism and the horizontal training mechanism of the gun and finally the elevation corresponding to the distance of the target is imparted to the gun-barrel. The last-mentioned operation is accomplished by lowering the breech of the gun-barrel by means of the elevating mechanism until the level C′

registers. If this is the case, the gun has been directed at the target and the influence of the inclined position of the wheels has been eliminated, as will be understood upon consideration of the following explanation: If the longitudinal axis of the bolt J be regarded as the axis of the bore of a gun-barrel, there is no doubt that such a gun is directed at the target with elimination of the inclined position of the wheels. This must, however, also be the case with the real gun when the necessary elevation has been imparted thereto, for the reason that the axis of the bore of the gun has partaken of the lateral adjustment of the longitudinal axis of the bolt J, and the two axes must therefore extend parallel to one another when they are elevated to the same extent.

The sight device (illustrated in Figs. 7 to 9) comprises an approximately spherical casing O O′, having its two parts screwed together. The part O is connected with a base-plate o^3 by means of a threaded bolt o^2. The casing O O′ is surrounded by a spherical telescope-carrier and serves as guide for the same. The telescope-carrier consists of two parts Q Q′, each provided with a connecting-flange q^2 and q^3. The lower part Q′ is provided with a circular cut, through which the bolt o^2 projects so as to move freely in all directions. The upper part Q of the telescope-carrier is provided with a boss q^4, Fig. 8, into which is screwed a plate r', carrying a telescope R. A level Q^5, Fig. 7, is rigidly connected with the part Q. A worm S, Fig. 8, is rotatably but non-slidably arranged in the boss q^4. The worm S meshes with a toothed sector T, the arrangement and shape of which is shown in Fig. 8. A spring t' serves the purpose of retaining the sector T in engagement with the worm S. The plate r', carrying the telescope R, is provided with a pair of downwardly-projecting flanges r^2, Figs. 7 and 8, to which a housing U′ for a worm U is secured. The worm U is rotatably but non-slidably arranged in the housing U′ and engages with the teeth of a rotatably-arranged level-quadrant V V′, Figs. 7 and 8, which is provided with a scale v^2, Fig. 7, for the rough adjustment. On the outer flange r^2 is secured a hand r^3, Fig. 8, along which passes scale v^2 when the quadrant is adjusted. For the fine adjustment of the quadrant V there is provided a mark u^2, Fig. 7, on the worm-housing U′, and a scale u^3, Fig. 7, on a drum of the hand-wheel of the worm U. The quadrant is rigidly connected with a cone-wheel W, Figs. 8 and 9, which is journaled in the flanges q^2 q^3 of the telescope-carrier Q Q′ through the medium of a trunnion w^3. The trunnion w^3 of the cone-wheel W is provided with a central perforation receiving one end of a shaft X. The other end of the shaft X rests in a bearing in the telescope-carrier Q Q′, which is diametrically opposite the bearing for the trunnion w^3 of the cone-wheel W. The cone-wheel W meshes with a cone-wheel W′, Fig. 8, which is rotatably but non-slidably arranged on a shaft Z. The shaft Z, which rests in a bearing q^5, Fig. 8, in the telescope-carrier Q Q′, is disposed at a right angle to the shaft X and articulated thereto by means of an eye Z′. The cone-wheel W′ meshes with a cone-wheel W^2, Figs. 8 and 9, which is non-rotatably connected with the shaft X and held from sliding movement on the same. The cone-wheels W W′ W^2 are of same diameter and have same number of teeth. The shaft X is provided with a perforation intersecting the axis of the shaft at a right angle and terminating in two eyes x' x^2, Fig. 9. The axis of the said perforation coincides with a plane through the center of the casing O O′ and of the telescope-carrier Q Q′. The perforation of the shaft X and of the eyes x' x^2 register with two eyes p' p^2, Fig. 9, of a ring P, (see also Fig. 8,) which is inserted between the treaded part o^4 of the casing part O′ and an annular flange o^5 on the casing part O. The perforation of the shaft X of the eyes x' x^2 and of the eyes p' p^2 of the ring P serves the purpose of receiving a pivot-bolt Y. The casing O O′ is provided with cuts o^6 o^7 o^8, Figs. 7 and 8, and the boss q^4 is provided with a recess q^6, Fig. 8, in order to permit a swinging movement of the telescope carrier Q Q′ and the parts connected therewith relative to the casing O O′ when the influence of the inclined position of the wheels is eliminated.

The relative arrangement of the several parts of the sight device is such that when the sight device is secured in the position of use, with its base-plate o^3 on the breech of the gun-barrel, the axis of the shaft X is parallel to the axis of the horizontal trunnions of the gun and the axis of the bolt Y extends parallel to the axis of the bore of the gun-barrel when the hand r^3 and the mark u^2 register with the zero-point of the corresponding scales. The level V′ registers when with this position of the several parts of the sight device the axis of the bore of the gun-barrel is horizontal, while the level Q^5 registers when the position of the axle of the wheels of the gun is horizontal or when the influence of the inclined position of the wheels has been eliminated.

The handling and operation of the last-described sight device correspond in the main points to the handling and operation of the first-described embodiment. The adjustment of the level-quadrant V V′ to the elevation corresponding to the distance of the target and to the terrain angle, if any, is accomplished by turning the worm U. The swinging movement of the quadrant V effects a turning of the cone-wheel W in the same direction and through the same angle. Through the medium of the cone-wheel W′

the cone-wheel W turns the cone-wheel W² and the shaft X through the same angle, but in the opposite direction. By reason of the turning of the shaft X the bolt Y swings through the same angle as does the quadrant V and carries the ring P along with it. When the quadrant V has been adjusted to the elevation corresponding to the distance of the target, the bolt Y consequently has an inclination relative to the horizontal plane, which with regard to amount and direction corresponds to the elevation which must be imparted to the gun-barrel. Thereupon the telescope-carrier Q Q′ is swung, by means of the worm S, around the axis of the bolt Y until the level Q⁵ registers. When this has been done, the sighting-line is directed at the target by means of the elevating mechanism and the horizontal training mechanism of the gun, and finally the breech of the gun-barrel is lowered until the level V′ registers. The gun has then been directed at the target with elimination of the influence of the inclined position of the wheels.

Having described my invention, what I claim as new is—

1. A portable gun-sight device having swinging movement for eliminating the influence of the inclined position of the gun-wheels, and having the part on which said swinging movement takes place, mounted to swing independently of the gun-barrel about an axis parallel to the axis of the horizontal trunnions of the gun whereby the influence of the inclined positions of the wheels may be eliminated before the necessary elevation is imparted to the gun.

2. A portable gun-sight device having swinging movement for eliminating the influence of the inclined position of the gun-wheels, and having the support on which said swinging movement takes place, mounted to swing independently of the gun-barrel about an axis parallel to the axis of the horizontal trunnions of the gun whereby the influence of the inclined positions of the wheels may be eliminated before the necessary elevation is imparted to the gun; the sight device being provided with a level device, capable of adjustment in unison with said support.

3. In a portable gun-sight device, the combination of an adjustable level device, a bolt mounted to swing independently of the gun-barrel, about an axis parallel to the axis of the horizontal trunnions of the gun whereby the influence of the inclined positions of the wheels may be eliminated before the necessary elevation is imparted to the gun, means transmitting motion from the level device to the bolt, and a telescope-carrier having swinging movement on said bolt for eliminating the influence of the inclined position of the gun-wheels.

4. In a portable gun-sight device, the combination of an adjustable level device, a bolt mounted to swing independently of the gun-barrel, about an axis parallel to the axis of the horizontal trunnions of the gun whereby the influence of the inclined positions of the wheels may be eliminated before the necessary elevation is imparted to the gun, means transmitting motion from the level device to the bolt, a telescope-carrier, a connection between the bolt and the telescope-carrier permitting relative swinging movement of the carrier and the bolt and means for swinging the carrier and the connection on the bolt for eliminating the influence of the inclined position of the gun-wheels.

5. In a portable gun-sight device, the combination of an adjustable level device for fixing the elevation of the gun-barrel, and a telescope-carrier mounted to remain stationary when the level device is adjusted and capable of being swung into a vertical position independently of the level device.

6. In a portable gun-sight device, a sight-carrier, an axis extending longitudinally of the barrel about which said carrier is adjustable to eliminate the influence of the inclined position of the gun-wheels, an axis parallel to the horizontal gun-trunnions about which the first-mentioned axis is turnable whereby the influence of the inclined positions of the wheels may be eliminated before the necessary elevation is imparted to the gun, means for determining the direction and amount of turning of the first-mentioned axis, a level movable with said axis, and a level on the sight-carrier.

The foregoing specification signed at Düsseldorf this 8th day of April, 1905.

JOSEF KURIG.

In presence of—
PETER LIEBER,
WILLIAM ESSENWEIN.