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 ADJUSTING MEANS FOR MACHINE GUNS OR THE LIKE.  
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1,179,968.

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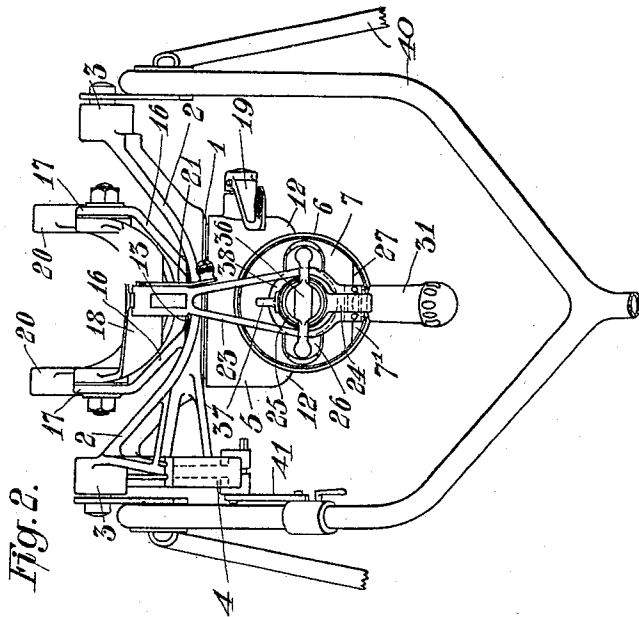


Fig. 2.

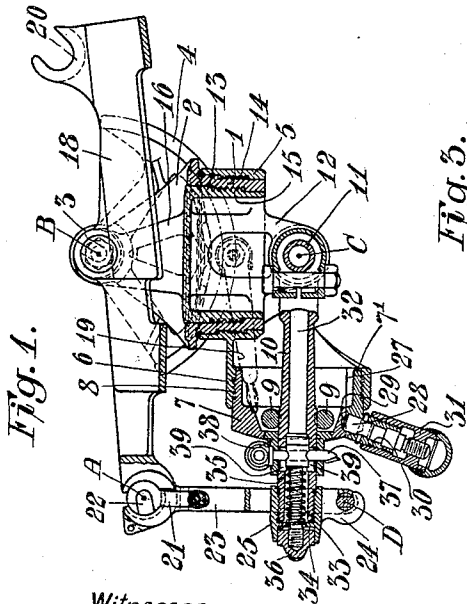


Fig. 1.

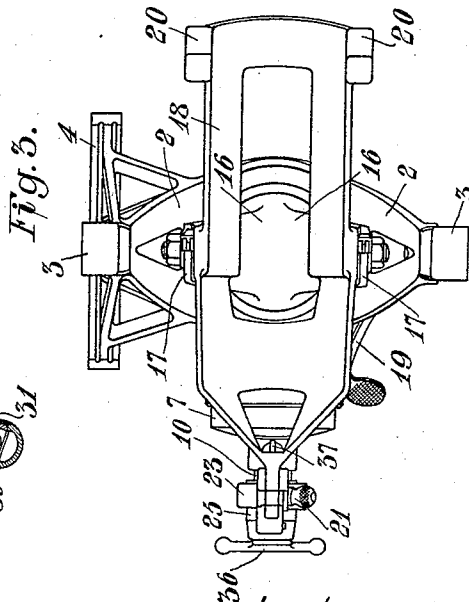


Fig. 3.

Witnesses:

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# UNITED STATES PATENT OFFICE.

DAVID GUSTAV SJÖQUIST, OF STOCKHOLM, SWEDEN, ASSIGNOR TO HELGE AX:SON JOHNSON, OF STOCKHOLM, SWEDEN.

ADJUSTING MEANS FOR MACHINE-GUNS OR THE LIKE.

1,179,968.

Specification of Letters Patent.

Patented Apr. 18, 1916.

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*To all whom it may concern:*

Be it known that I, DAVID GUSTAV SJÖQUIST, a subject of the King of Sweden, residing at Stockholm, in the Kingdom of Sweden, have invented new and useful Improvements in Adjusting Means for Machine-Guns or the like, of which the following is a specification.

This invention relates to adjusting means for machine-guns or the like, and has for its object to facilitate firing at marks which are extended or located obliquely or in any other position, as for instance, at soldiers scattered over a sloping field, *i. e.* between wings situated at different levels or in such manner that the distances between the two wings and the gun are unequal, or in both of said cases. For this purpose the gun-barrel has hitherto been connected with adjusting means so constructed that said means, after being adjusted successively at one point of the mark and then at another point thereof, elevates automatically the gun so that all points of the mark will be hit. The principle of this device previously known is chiefly founded on the arrangement of an adjustable guide, which is inclined in accordance with the oblique mark by being adjusted at different points thereof. When a member connected with the barrel then is moved in the said guide, the barrel will be elevated in the manner described above. Said device as hitherto constructed, is inconvenient in many respects, and on account thereof, has not been used to such an extent, as could be expected from the practical value of the invention. One inconvenience, especially, consists in this that the member movable in the inclined guide is connected directly with the barrel, mounted as usual in the adjusting device for vertical and horizontal elevations. Owing thereto, the arrangement is not only less accurate but also complicated and delicate as well as heavy and expensive to make. Besides, the connecting and disconnecting of the barrel is difficult.

The object of my present invention is to remove these disadvantages by rendering the device simple, stable and accurate in operation as well as easy to operate and able to endure percussions and shocks, being

important qualities for practical use of the same.

Another advantage of not less importance is also gained on account of the easy mounting and dismounting of the barrel.

The invention is chiefly characterized by this, that the member, movable in the inclined guide, forms a part of a mechanical system preferably a parallelogram-guide for transmitting to the barrel the sliding motion of the member movable in the inclined guide.

A suitable embodiment of the invention consists in passing the member sliding in the adjustable guide longitudinally through a member preferably of cylindrical shape and adapted to be secured to the stationary part of the adjusting means by a locking device comprising two members adjustable relatively to each other, one of which forms a support for or, if desired, constitutes the adjustable guide.

The advantages mentioned above may be attained by means of the device shown in the accompanying drawing in which—

Figure 1 is a sectional side view of the device. Fig. 2 is an end view and Fig. 3 is a top view of the same.

The stationary part, or in other words the part of the adjusting device adapted to be secured to the gun-carriage comprises a sleeve or ring 1, provided with arms 2, the outer ends of which form bearings 3 for trunnions, journaled in the carriage. The carriage shown consists of a tripod 40, but any other suitable construction may be used. The whole system shown in the drawing may be swung in the vertical plane about the trunnions in the bearings 3 one of which, as shown in the drawing, is connected with an elevation arc 4 coöperating with a locking device 41 on the tripod, and by means of which the whole system may be locked in the elevated position desired. Outside the ring 1 is mounted another ring 5 integral with a cylindrical member 6 and adapted to be secured to the ring 1 by a locking device 19 of any known type. Inside the cylinder 6 is rotatably mounted another cylindrical or cup-shaped member 7 retained in the cylinder 6 by means of threads or any other suitable means. The ends of two parallel

guide bars 9 are secured inside the member 7 as shown in cross section in Fig. 1, the sides of the guide bars facing each other being planed off. The said guide bars form the guide mentioned above which may be adjusted obliquely according to the oblique position of the mark. The plane sides of the guide bars bear against a laterally movable and swingable tubular member 10, pivoted at the inner end by means of a joint 11 on two lugs 12, integral with a ring 13, movably inserted in the ring 1. The swinging movement of the tubular member 10 along the guides 9 is effected by turning the ring 13 inside the ring 1. The rings 1, 5 and 13 are connected with each other by means of threads 14 and 15 or any other suitable connecting means. From the inner ring 13 arms 16 project upwardly the upper ends of which form bearings 17 supporting a frame or cradle 18, adapted to be swung in a vertical plane and provided at the foremost end with bearings 20 supporting the trunnions of the barrel.

In order to secure the barrel to the cradle the latter, at its rear end, has a swingable bar 21 provided with a slot 22 (Fig. 1) which by swinging the bar 21 can be turned upwardly to permit a stud or the like provided on the barrel to enter the slot 22. When the bar is swung back and the slot is turned into locking position, as shown in Fig. 1, the barrel will be locked to the cradle 18. The operations for securing the barrel to the cradle and for releasing the same may, therefore, be performed very easily since only a simple manipulation of turning the bar 21 is required.

The bar 21 does not only constitute a locking device but serves also as a fulcrum for a connecting member 23, connected with the cradle, the lower end of the member 23 being pivoted on a lug 24, projecting from a sleeve 25, screwed onto the rear end of the tubular member 10. The member 23 may also be journaled directly in the tubular member 10. The aforesaid members viz. the cradle 18, the ring 13 with the arms 12 and 16, the tubular member 10 and the member 23 form together a parallelogram-guide, by means of which the motion is transmitted from the guide 9 to the barrel when the latter is moved in the manner described above. The corners of the parallelogram-guide coincide with the centers of motion A, B, C and D. In order to prevent the recoil of the barrel from disturbing the transmission of motion of the mechanical system A, B, C, D, the barrel should, preferably, be so journaled in the bearings 20 of the cradle, and so connected with the connecting member 23 that the axis of the barrel coincides with a plane through the geometrical axis of the bearings 17.

The mechanism by means of which the

guide is adjusted according to the inclined position of the mark is constructed as follows: The member 7 is, as shown in Fig. 2, provided with an aperture 26 extending transversely thereof and in which the tubular member 10 may be swung outwardly from the center as will be more fully described below. The member 7 is divided in two segments 7 and 7<sup>1</sup> by a slit 27. Inserted in the portion 7<sup>1</sup> is a bolt 28, entering a recess 29 in the portion 7. The bolt 28 is guided in a sleeve 30 projecting from the portion 7<sup>1</sup>, and screwed onto the outer surface of the sleeve 30 is a handle 31 or the like which is also screwed onto the outer end of the bolt 28. By turning the handle 31 the bolt 28 will enter into or move out of the recess 29. In the first case the segments 7 and 7<sup>1</sup> will be moved apart and pressed against the inside of the member 6, and in the latter case the segments 7 and 7<sup>1</sup> will be released from the member 6 so that they can be turned in the same, thus effecting the adjustment of the guide 9. After the adjustment the members 7 and 7<sup>1</sup> are secured by screwing the threaded bolt 28 into the recess 29. Any suitable locking device may, however, be employed.

A spindle 32 inserted in the tubular member 10 may reciprocate therein and may be moved inward by a spiral spring 33, surrounding the outer end of the spindle and bearing with one end against a flange 34 on the inside of the sleeve 25 and with the other end against a boss 35 of the spindle. Screwed onto the outer threaded end of the spindle is a handle 36 which can be turned and moved longitudinally in the sleeve 25. A pin 37 is inserted in an aperture traversing the spindle 32 as well as in apertures traversing a sleeve 38, movable along the member 10, and in oblong apertures 39 in the member 10. By the action of the spring 33 the sleeve 38 enters a corresponding seat of the aperture 26 (Figs. 1 and 2) thus locking the tubular member 10 so that it cannot be swung laterally. In order to permit the tubular member 10 to swing laterally in the guide 9, the sleeve 38 must be released, which is effected by pulling the spindle 32 by means of the handle 36, thereby causing the sleeve 38 to move out of the member 7. In the retracted position the sleeve 38 is maintained by turning the handle 36, the portion of which entering the sleeve 25 together with the inside flange 34 of the sleeve form a bayonet lock that holds the handle in retracted and turned position. Any other locking device may, however, be used for securing the sleeve in its retracted position.

The adjusting device, described above operates as follows. During the first moment of the adjusting operation when the barrel preferably is adjusted at the center

or nearly at the center of the mark, the locking device 19 is released so that the ring 5 and the member 6 as well as the remaining parts connected therewith can be swung laterally around the ring 1. Simultaneously the tubular member 10 is kept secured to the hollow member 7 by means of the sleeve 38. The adjustment of the barrel can, therefore, take place in the horizontal as well as in the vertical direction, on the one hand, by turning the ring 5 around the ring 1 and, on the other hand, by turning the latter ring in the vertical plane around the trunnions journaled in the carriage. The ring 1 is then secured to the carriage and the ring 5 is secured to the ring 1 by means of the locking device 19. Then the second movement of the adjusting operation may be performed by pointing, preferably, at or nearly at one end of the mark. For this purpose the handle 36 is retracted and turned so that the sleeve 38 is released from the segment 7 thus allowing the member 10 to swing, and then the handle 31 is turned so that the bolt 28 is retracted from and releases the segments 7 and 7<sup>1</sup>, which, on account thereof, will be permitted to turn in the locked member 6. Then the adjustment is effected, *i. e.* the barrel is swung in the direction from the center of the mark up to the highest, or down to the lowest wing with the elevation required by the angle between the mark and the firing direction. While the ring 13 supporting the cradle 18 and the barrel respectively are turned in the ring 1 the cradle 18 together with the barrel will also be swung around the trunnions of the cradle on account of the change of elevation, which latter swinging movement together with the first mentioned lateral swinging motion will then be transmitted to the guide 9 by the parallelogram-guide A B C D, causing the guide to adjust itself obliquely according to the inclined position of the mark. The handle 31 is then turned, so that the bolt 28 is pushed into and secures the members 7 and 7<sup>1</sup>, *i. e.* locking the guide in the inclined position. The sleeve 38 is still kept retracted from the segment 7, allowing the tubular member 10 to swing freely. The swinging movement of the tubular member 10, preferably effected by means of the handle 36, along the inclined guide 9 will swing the barrel along the oblique mark, at the same time elevating the barrel automatically to coincide with all points of the mark in different horizontal planes or at different distances of the same.

It is to be understood that the invention is not limited to the constructional form described above, which is intended to serve only as an example of a preferred embodiment thereof but may be performed and modified in different manners without deviating from the scope of the invention.

Having now fully described my invention and in what manner the same may be performed, what I claim and desire to secure by Letters Patent is:—

1. In an adjusting device for machine-guns, the combination of a support, a guide movably connected with the support and adjustable to inclined positions relatively to the horizontal plane, and a parallelogram device for transmitting motion to the gun and having one member movable in the guide, substantially as and for the purpose set forth.

2. In an adjusting device for machine-guns, the combination of a support, a member connected with the support and movable in horizontal directions, a guide movably connected with the member and adjustable to inclined positions relatively to the horizontal plane, and a parallelogram device for transmitting motion to the gun and having one member movable in the guide, substantially as and for the purpose set forth.

3. In an adjusting device for machine-guns, the combination of a support, a member connected with the support and movable in horizontal directions, means for securing the member to the support, a guide movable in the member to inclined positions relatively to the horizontal plane and consisting of two segmental parts, means for forcing apart said segmental parts and thus securing the guide to the said member, and a parallelogram device for transmitting motion to the gun and having one member movable in the guide, substantially as and for the purpose set forth.

4. In an adjusting device for machine-guns, the combination of a support, a member journaled to the support and movable in horizontal directions, means for securing the member to the support, a guide movable in the member to inclined positions relatively to the horizontal plane and consisting of two segmental parts, a bolt threaded into one of said parts and bearing against the other, and a parallelogram device for transmitting motion to the gun and having one member movable in the guide, substantially as and for the purpose set forth.

5. In an adjusting device for machine-guns, the combination of a support, a guide movably connected with the support and adjustable to inclined positions relatively to the horizontal plane, and a parallelogram device for transmitting motion to the gun consisting of a cradle supporting the gun, a member supporting the cradle and journaled in the support, another member pivoted to said member and movable in the guide, and a bar connecting the last-mentioned member and the cradle, substantially as and for the purpose set forth.

6. In an adjusting device for machine-guns, the combination of a support, a guide

movably connected with the support and adjustable to inclined positions relatively to the horizontal plane, a parallelogram device for transmitting motion to the gun consisting of a cradle, a member supporting the cradle and journaled in the support, another member pivoted to said member and movable in the guide, and a bar connecting the last-mentioned member and the cradle, bearings on the cradle for trunnions on the gun, and means on the connecting bar for securing the gun, substantially as and for the purpose set forth.

7. In an adjusting device for machine-guns, the combination of a support, a guide movably connected with the support and adjustable to inclined positions relatively to the horizontal plane, a parallelogram device for transmitting motion to the gun and

having one member movable in the guide, and means for securing the said member in its middle position in the guide, substantially as and for the purpose set forth.

8. In an adjusting device for machine-guns, the combination of a support, a guide movably connected with the support and adjustable to inclined positions relatively to the horizontal plane, a seat in said guide, a parallelogram device for transmitting motion to the gun and having one member movable in the guide, and a spring-actuated sleeve on the said member adapted to enter the seat in the guide, substantially as and for the purpose set forth.

DAVID GUSTAV SJÖQUIST.

Witnesses:

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THURE OSTEILING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."