O. GRAUHEDING.

TELESCOPE SIGHT FOR AIRSHIPS AND FLYING MACHINES.

APPLICATION FILED MAR. 12, 1915.

1,217,169.

Patented Feb. 27, 1917

4 SHEETS—SHEET 1.

Fig. 1.

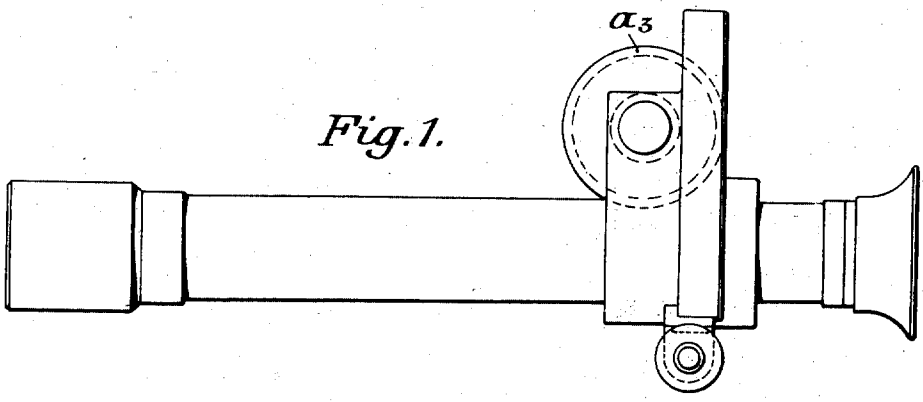
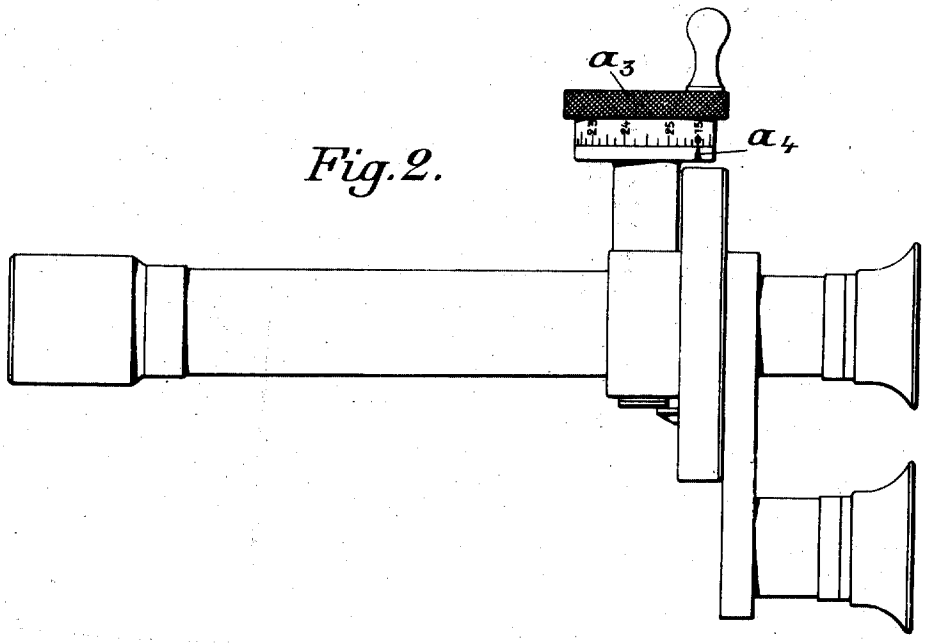


Fig. 2.



WITNESSES

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4 SHEETS—SHEET 2.

Fig. 3.

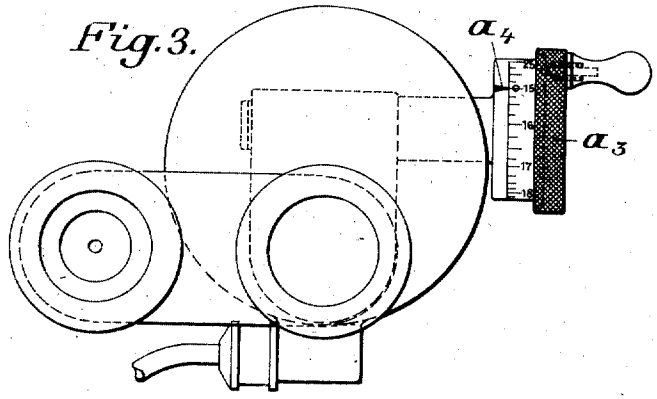
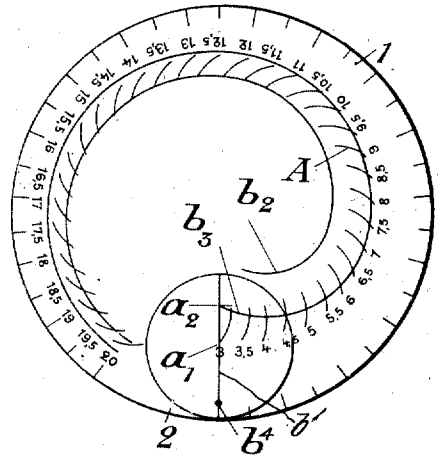


Fig. 4.



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4 SHEETS—SHEET 3.

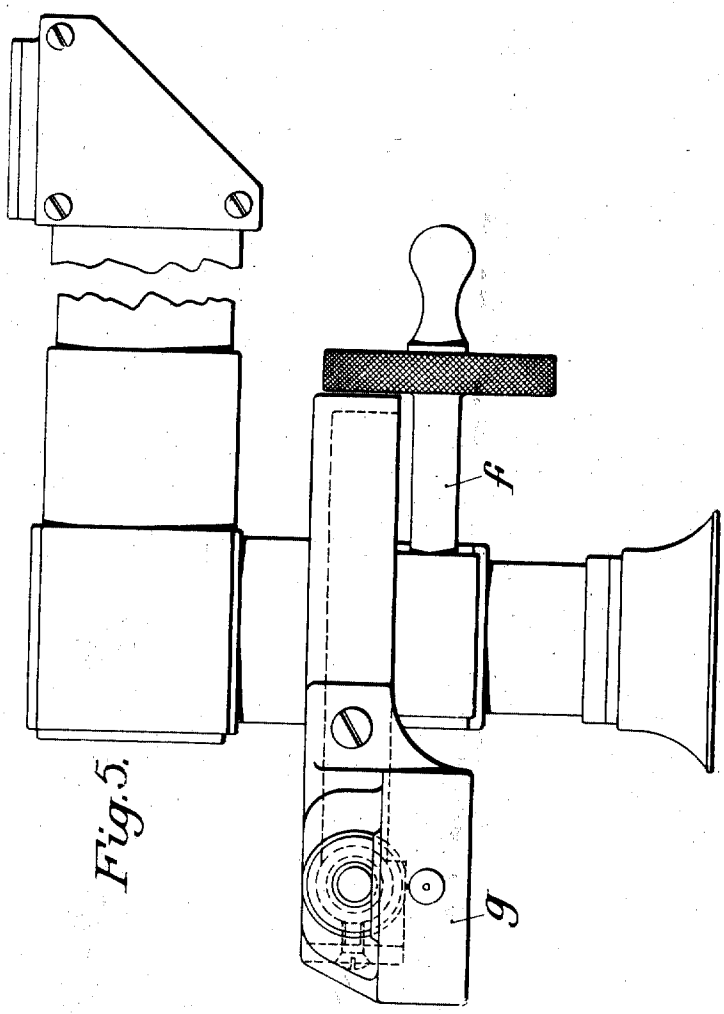


Fig. 5.

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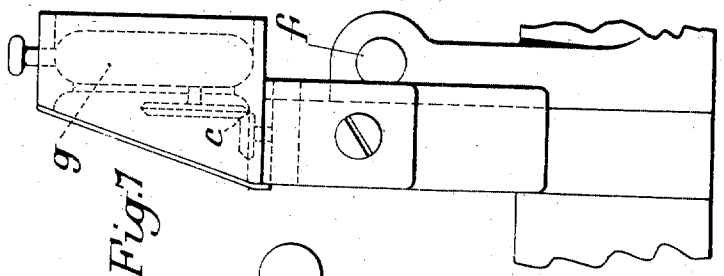


Fig. 7

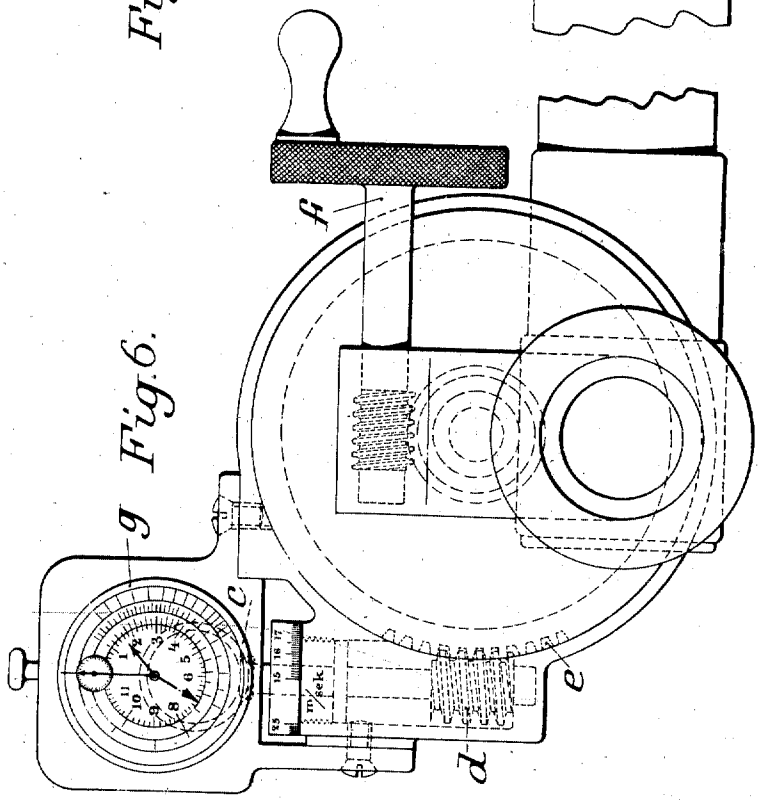


Fig. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

OSKAR GRAUHEDING, OF DUSSELDORF, GERMANY, ASSIGNOR TO RHEINISCHE METALLWAAREN- UND MASCHINENFABRIK, OF DUSSELDORF-DERENDORF, GERMANY, A CORPORATION OF GERMANY.

TELESCOPE-SIGHT FOR AIRSHIPS AND FLYING-MACHINES.

1,217,169. Specification of Letters Patent. Patented Feb. 27, 1917.

Application filed March 12, 1915. Serial No. 14,008.

To all whom it may concern:

Be it known that I, OSKAR GRAUHEDING, engineer, a subject of the German Emperor, residing at 25 Fischerstrasse, Dusseldorf, Germany, have invented certain new and useful Improvements in Telescope-Sights for Airships and Flying-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in telescope sights of the kind described in my U. St. Patent 1004416 and in my U. St. Patent No. 1,127,230. In telescope sights of this kind a movable disk or plate is provided with a fixed marking line with which may be brought to intersection a curve arranged on another disk or plate.

According to my present invention such a telescope sight is improved so as to be adapted for aiming from air ships or flying machines at targets to be thrown at by shells.

In order to hit the target the shells must not be thrown off if the air ship or the flying machine is exactly above the target as in this case the shell having the forward velocity of the flying machine or the air ship would not fall on the target but at a certain distance therefrom depending on the velocity and on the height of the air ship or flying machine.

According to my present invention the disk movable relatively to the fixed marking line is provided with curves corresponding to the different heights and to the different velocities of the air ship or the flying machine so that by adjusting the intersecting point of one of the said curves corresponding to the actual height and velocity of the machine with the fixed marking line into the line of sight the target coinciding with the said intersecting point is hit by the shell thrown off in this moment.

On the accompanying drawings I have represented some embodiments of my invention. Figure 1 is a side elevation and Fig. 2 a plan view of a telescope sight constructed according to my present invention. Fig. 3 is a front view and Fig. 4 shows the disk provided with curves in its relation to the fixed marking line. Figs. 5, 6 and 7 are, respectively, front, top and side views of a modified form of telescope constructed in accordance with my invention.

In the embodiment shown by Figs. 1–4 the disk or plate 1 is rotatable relatively to a fixed disk or plate 2 provided with a line b^1. The disk 1 is provided with a plurality of small curves A each of which corresponds to a certain height of the air ship or flying machine. These curves are marked by numbers indicating the flying heights by hundreds so that for instance the first curve marked with the number 3 is for a flying height of 300 m.

The curves A are so formed that the starting point, that is the point of each nearest the periphery of the disk, with the flying height indicated by the whole curve, corresponds to the smallest occurring flying velocity. For instance the starting point a^1 of the first curve when adjusted into the line b^1 fixes the angle of sight in which the target must be aimed at under a flying height of 300 m. and a velocity of 15 m./sec., in order to be hit by a shell thrown off from an air ship or a flying machine, whereas the end point a^2 of the same curve fixes the angle of sight for the same flying height under the highest occurring velocity say for instance 25 m./sec. The points of the curve between the starting point and the end point fix the angles of sight for intermediate velocities.

Of course it would be possible to mark these intermediate velocities on the curves themselves. I prefer however to provide a scale on the handwheel a^3 by the rotation of which the disk 1 is rotated in a well known manner so as to adjust the correct intersecting point of the correct curve A on to the fixed line b^1 of the disk 2. For adjusting the said correct intersecting point the disk 1 is at first rotated so as to bring the correct curve A into the range of vision of the ocular of the telescope and of the line b^1 whereupon the exact point of intersection is obtained by adjusting the scale of the handwheel a^3 relatively to a fixed mark a^4 the said scale being marked with the different flying velocities.

The curves A must be drawn in such a manner that the end point a^2 of one curve and the starting point a^1 of the next one cannot coincide at the same time with the fixed line of the disk 2. This may be done

by calculating the transmission between the handwheel a^3 and the disk 1 so that a complete revolution of the handwheel a^3 causes the disk 1 to move through an angle at the center, the sides of which pass through the starting points of two neighbored curves A.

In the embodiment of my invention shown by Figs. 1–4 the disk 1 is further provided with two spiral curves b^2 and b^3 for measuring the velocity of the air ship or flying machine. For this purpose the two spiral curves coöperate also with the fixed line b^1 and are so formed that if the disk 1 is rotated for adjusting one of the curves A into the range of vision the intersecting point between the curves b^2, b^3 and the line b^1 are the nearer to a zero point b^4 of the latter the greater the flying height indicated by the adjusted curve A is. The distance between the said zero point of the line and each occurring intersecting point of the latter with the curve b^2 corresponds to a constant distance of flight, say for instance 400 m., and the distance between the zero point and the intersecting point of the curve b^3 corresponds to another constant distance of flight, say for instance 200 m.

In order to measure the velocity the curve A corresponding to the flying height of the machine is brought into the range of the line b^1. Then the target or any other object on the earth is aimed at so as to coincide with the zero point of the line b^1. In continuation of the flight the target or other object aimed at travels from the zero point against the curves b^3 and b^2 and if the moments of its coinciding with the zero point and with one of the curves b^2 or b^3 are marked by a stop watch, the velocity of the machine may be found immediately so that it can be adjusted on the scale of the handwheel a^3 thereby bringing the exact point of the correct curve A into the line b^1.

Instead of using one gear for bringing the correct curve A into the range of vision and for adjusting it exactly I may use separated gears as shown in my above said Letters Patent No. 1,127,230. The disk or plate 1 may also be constructed shiftable across the range of vision instead of being rotatable.

It will be seen from the foregoing description that after having measured the velocity by means of a stop watch a further manipulation is necessary for adjusting the curve A brought into the range of vision exactly according to the measured velocity. In the embodiment shown by Figs. 5, 6 and 7 this additional manipulation is avoided by an arrangement, by which the exact adjustment of the height-curve is effected during the measuring of the velocity automatically by means of the clock work of the stop watch.

By means of a worm gear f the curve A corresponding to the height of the air ship or flying machine is brought into the range of vision of the telescope. For this purpose the telescope may be constructed similar to Figs. 6, 7 and 8 of my said Letters Patent No. 1,127,230. The clock work of the stop watch g is coupled by means of a bevel gear c (Figs. 5 and 7) with the shaft of a worm d engaging the disk 1 provided with the height-curves.

If after the adjustment of the disk 1 by means of the gear f the stop watch is started the said disk 1 is further rotated by means of the gear c, d, e till the watch is stopped. In this moment the height-curve A previously brought into the range of vision of the telescope coincides exactly by its correct point of velocity with the fixed marking line on the disk 2. It will be seen that it is not difficult to choose the relation of transmission between the clock work and the disk 1 so as to obtain the said result.

With the last described embodiment the exact adjustment of the height curve is obtained automatically by measuring the velocity and if the shell be thrown off in the moment of stopping the watch the shell must hit the target aimed at for the purpose of measuring the velocity.

I may construct the gear between the clock work of the stop watch and the disk 1 so that it can be disconnected at any place whereby it will be possible to adjust the disk 1 if desired independently of the stop watch.

Without departing from the scope of my invention I may construct the device not as a telescope but in any other manner using for instance plates of opaque ground glass or mirrors. Further instead of using a rotatable disk having both kinds of curves or two disks arranged within a rotatable frame I may use one disk having only one sort of curves and being removable so that it may be replaced by another disk carrying the other sort of curves.

Having thus described my invention what I claim is:

1. A telescope sight for air ships, flying machines and the like comprising a fixed disk or plate having a line thereon, and a movable disk or plate having a series of curves corresponding to different flying heights and velocities of the machine.

2. A telescope sight for air ships, flying machines and the like comprising a fixed disk or plate having a line thereon, and a movable disk or plate having a series of curves corresponding to different flying heights and velocities of the machine, and a curve, the distance of which from the zero point corresponds in all positions of the movable disk to a constant distance of flight.

3. In a telescope sight for air ships, flying machines and the like the combination of a fixed disk or plate provided with an indicating mark, a movable disk or plate carrying curves corresponding to different flying

heights and velocities of the machine, means for moving the movable disk to bring one of said curves into the range of the marking line and additional means for exactly adjusting such curve relatively to that line.

4. In a telescope sight for air ships, flying machines and the like the combination of a fixed disk or plate provided with a line, a movable disk or plate carrying curves corresponding to different flying heights and velocities of the machine, means for moving the movable disk to bring one of said curves into the range of the marking line, and a stop watch and intermediate gears connecting the clock work of the watch with the movable disk or plate.

5. In a telescope sight for air ships, flying machines and the like the combination of a fixed disk or plate provided with a marking line, a movable disk or plate carrying curves corresponding to different flying heights and velocities of the machine, and a curve, the distance of which from the zero point corresponds in all positions of the movable disk to a constant distance of flight, means for moving the movable disk to bring said curves into the range of the marking line, a stop watch, and intermediate gears connecting the clock work of the watch with the movable disk or plate.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

OSKAR GRAUHEDING.

Witnesses:
J. WIJNEN,
R. DEZEN.