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DIRECTOR SIGHT

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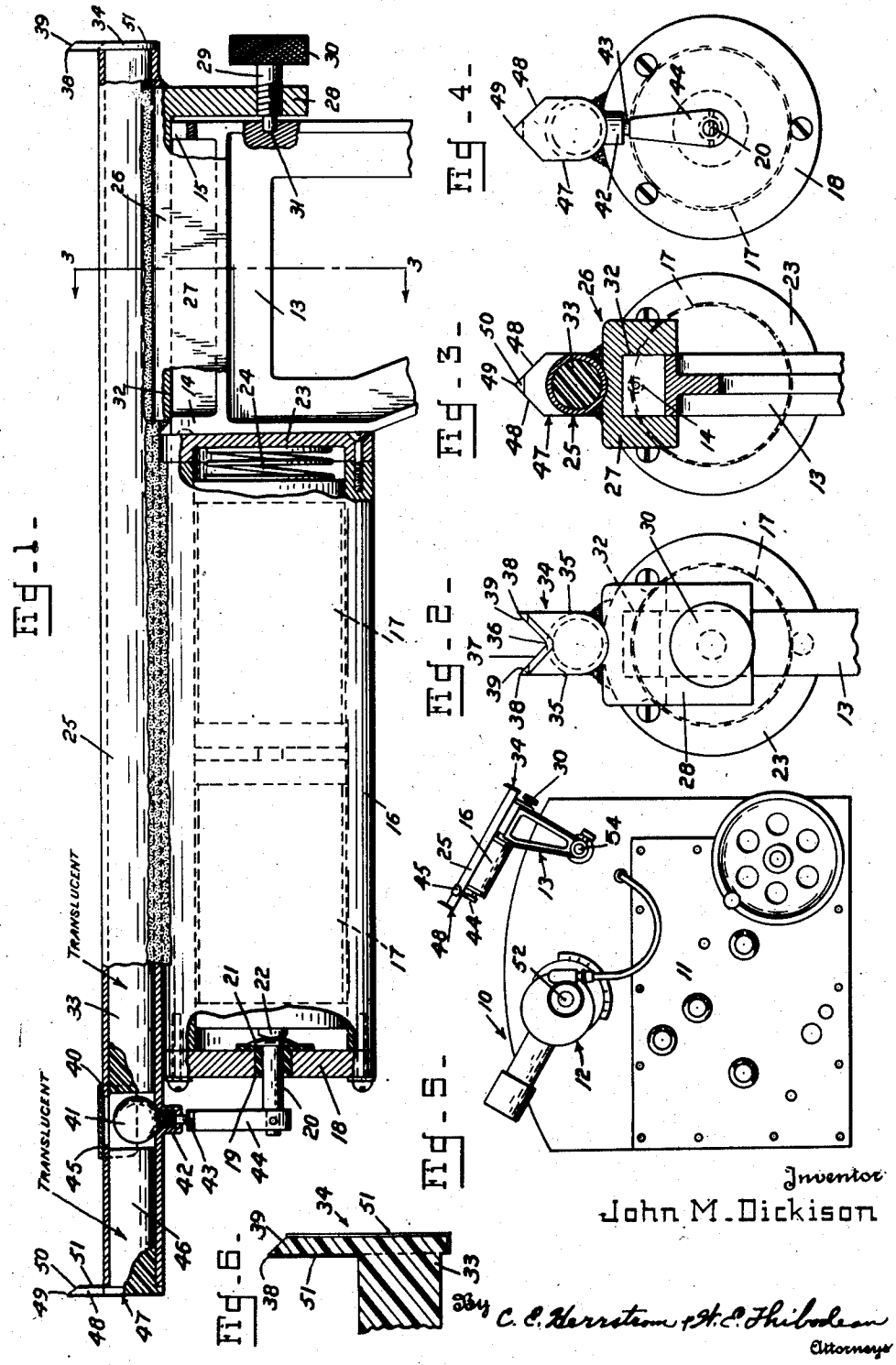

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DIRECTOR SIGHT

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

The invention relates to sights for use in dim light and at night, and while variously adaptable, it has—in the specific embodiment here shown—been specially useful and valuable in use on directors and similar computing devices for use in training anti-aircraft guns and the like on rapidly moving targets. Its dominant purpose is to enable a rapid movement of a director sight to bear upon the target in dim light and especially at night.

In these directors, owing to the fact that the pointing of the guns is usually dependent on initial control by the director to effect training of the weapon upon a particular target, especially when a choice between a number of targets is involved, any delay in the training of the sights of the director suspends sighting activity of a battery to that extent, and after the preliminary data is transmitted some further delay will usually occur at each gun due to the catch-up movements necessary to bring the target into the sights and effect rectification of adjustments of the sights to actual alinement of the target and cross wires, or other exact adjustment of the target in the sights. Such delays, representing a few seconds, are most serious, and on the average constitute a large proportion of the total time available in the encounter.

Use of the invention has demonstrated that current 40 mm. anti-aircraft gun units were "on target" in from three to six seconds in advance of other units similarly controlled, but without my sight, and using conventional sight devices. Considering the fact that many encounters extend over only fifteen seconds or less, this accomplishment is a substantial improvement to say the least.

It is also an aim of the invention to enable the production of a pseudo luminous or illuminated sight with a minimum of complexity of structure and expense, in manufacture as well as one liable in a minimum degree to derangement in the uses contemplated or in transportation under field conditions.

A most important purpose is to present a sight which may be set in place on a director without disturbance of other adjuncts and which may be understood and applied to use with high effectiveness by army personnel or ordinary training in tracking, and for the sighting functions requiring no special skill or knowledge.

A further important purpose is to present a

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sight of novel construction and optional function.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention, as will be apparent or understood from the following description and accompanying drawings, wherein:

Figure 1 is a side elevation of the device full size;

Figure 2 is a rear elevation thereof;

Figure 3 is a section taken on the line 3—3 of Fig. 1;

Figure 4 is a front elevation thereof;

Figure 5 is a side elevation of a director equipped with my invention;

Figure 6 is an enlarged fragmentary longitudinal section at the rear sight.

Referring more particularly to the drawings, there is illustrated conventionally a director 10 comprising a case 11, at each side of which are mounted elbow telescopes 12 of usual construction in directors (one only being shown) rotatable on a transverse horizontal axis for elevational movement and moving with the case 11 in azimuth as heretofore. At one side, close beside the case, a single open sight 13 familiar in these directors, having front bead and rear notch elements 14 and 15, is fixed on a revoluble shaft or spindle which is also geared as heretofore to the elevation gearing of the telescopes so that the open sight will rotate on the case synchronously with the telescopes. The open sight need not be used after my sight is installed and is referred to because it facilitates and is utilized in the installation of my sight as a simple attachable device applicable on directors already in use, without structural modification of prior apparatus, and being removable in case it is preferred to use the ordinary open sight in daylight, although it is an object to adapt my sight to both day and night use.

My sight includes a cylindrical battery case 16, of sufficient length to accommodate one or more conventional dry cells 17. It is closed at its forward end by a head plate 18 centrally bushed with insulation 19 and having inserted slidably through the bushing a revoluble headed contact pin 20, the round head 21 of which is arranged so as to engage the center contact electrode 22 of the cell 17 when the latter is pressed slidingly forward in the battery case.

At the rear the battery case is closed by an interiorly recessed cap 23 removably secured to the case and having a helical spring 24 to press the cells 17 forwardly toward the pin 20.

Fixed over the battery case on a parallel axis,

there is a rectilinear metal light tube 25 which may be much smaller in diameter than the battery case, and it projects beyond the latter at both ends. At the rear end there is a mounting bracket 26, which is substantially L-shaped, the long arm 27 being of channel form welded to the lower side of the tube 25 with its extremity short of the cap 23 and its short arm 28 projected downward adjacent the rear extremity of the tube 25. Engaged through the end of the arm 28 from the rear there is a screw 29 having a knurled head 30 and a tenoned forwardly extended end 31.

The tube 25 may be welded or otherwise secured to the battery case or otherwise attached as found expedient. In the present instance the space between the rear face of the cap 23 and the bracket arm 28 is sufficient to receive the upper part of the open sight 13 therein with the rear element 15 of the sight next to the arm 28 and the forward element 14 of the sight next to the cap 23. By setting the channel arm 27 of the bracket 26 over the open sight 13 with the screw 30 at the rear and the tube 25 alined with the sight, then tightening the screw, the sight 13 is clamped between the arm 28 and cap 23, and my sight held in place coordinated and synchronously movable with the telescopes through the elevation gearing provided within the director, as well understood. To facilitate alinement of my sight, a channel 32 may be formed in the arm 27 of the bracket 26 to partly receive and fit the sides of the open sight, and a socket may be formed in the rear side of the open sight to receive the tenon of the screw 29.

Fitted in the tube 25 there is a solid cylinder 33 of a transparent material of high refraction index suitable for transmitting light effectively longitudinally therethrough, which may be of glass or preferably one of the plastics (as, methylmethacrylate) now well known and suitable for the use. This cylinder extends within the tube 25 from the rear end of the tube to a point at, or slightly in advance of, the head 18 of the battery case. At the rear of the tube and set at the end of the cylinder a rear sight extension 34 is provided of the same material as the cylinder; in the shape of a thin planiform plate extended upward from the tube, and capable of receiving and diverting toward its edges and especially upward, light transmitted longitudinally through the cylinder. This extension may be formed integrally with the cylinder 33 or as a separate plate cut to the desired shape and set against and united with the cylinder by a cement of the same index of refraction. This plate may extend before and against the end edges of the tube and has rectilinear parallel vertical lateral edges 35 extending to the same distance above the tube 25, sufficient to permit the formation of a notch 36 in the top edge of the plate the sides of which notch form an angle of ninety degrees with each other, although this angle is arbitrary and may be more or less than stated. The edges 37 at the notch are bevelled toward the rear in the present instance, so that each edge is a planiform surface at an angle of forty-five degrees to the major plane of the plate. The edges of the notch intersect the vertical edges so as to form sharp points 38 at the upper extremities of the plate. These points may also be additionally bevelled at their rear sides in a common plane which is inclined upward and forward, producing light emitting facets 39.

All external surfaces of the plate 34 are covered with opaque coating material 51 except the bevelled edge surfaces 37 and the bevelled facets 39. This permits light from the cylinder 33 to enter the plate 34, but prevents escape of the light except at the bevelled edges 37 and facets 39.

An opening 40 is formed in the upper side of the tube 25 immediately adjacent and forwardly of the forward end of the cylinder 33 and an electric screw base lamp 41 is set in a socket 42 fixed in the lower side of the tube under the opening 40. The socket is a threaded tube of such length and position that when the lamp is screwed thereinto, the central contact 43 of the lamp base is exposed a distance below the tube 25. The contact pin 20 has its shank extended forwardly from the head 18 of the battery case below the lamp and is tenoned to receive thereon a radial contact brush arm or lever 44 pinned on the tenon of pin 20. The extremity of the arm is rounded toward each side and flattened medially, and is of such radius as to wipe against the contact 43 when swung into alinement therewith, its flat end then serving to retain it in circuit closing position against the contact 43, yieldable to manual pressure to disengage it from the contact 43.

The opening 40 is large enough to enable manual emplacement or replacement of lamps in the socket 42 and may be closed by a C spring clip 45 embracing the tube frictionally and being slidable longitudinally on the tube from a position covering the opening 40 when necessary.

The tube 25 extends a distance forwardly beyond the lamp and has set therein a solid short cylinder 46 of material similar to that in the cylinder 33 and having at its forward end a plate or sight extension 47 similar to the one 33 in thickness and height, but instead of a notch, its upper part having its lateral edges 48 inclined inwardly to intersect in the medial longitudinal vertical plane of the sight forming a single point 49. The point is bevelled toward the rear or inner side of the plate, producing a facet 50 constituting the front sight proper. This point is at the same distance above the tube 25 as the points 38 so that a line of sight may be determined by an observer when the point 49 is seen midway between the points 38 at the same level. All external surfaces of the part 47, except the facet 50, are covered with opaque material 51 so that when the lamp 41 is energized, illumination appears only at the facet 50.

If desired, the bracket 26 may be extended in a form corresponding to that of the open sight 13 and conventionally mounted on the shaft 54 heretofore used for the open sight, the latter being done away with.

In the operation and use of this invention, when the sight is mounted on the director as described, the line of sight therein will always be parallel to the axes of the telescopes and movement of the elevation tracking crank will elevate the telescopes and my sight commonly. The telescopes and my sight are fixed azimuthally with the director and swing therewith.

My sight may be used in daylight in the same manner as the open sight. But in dim light or at night, the lamp will be connected in circuit with the cells 17 by swinging the switch arm 44 into engagement with the contact 43. The rear cell being firmly contacted by the spring 24, the circuit is completed through the case 11 and tube 25 to the socket 42, and the head of pin 20 being engaged with the central contact of the forward cell (the two cells being insulated from the case

and the center contact of the rear one bearing on the front cell case), the circuit to the lamp may be made or broken with the switch arm 44.

When the lamp is lit, a large part of the light enters the adjacent polished planiform end faces of the cylinders 33 and 46 and will be retained therein by internal reflection, and will reach and enter the plates 34 and 47 where it will be in substantial part deflected laterally in all directions. A sufficient quantity of this light will be transmitted to the points 38 and 49 to illuminate the material in or at these points and the facets will aid in deflecting such light toward the rear of the sight and the eye of the observer. By the use of reflection and/or other materials or means in conjunction with the plates 34 and 47, the transmission or communication of light to the points may be enhanced. When viewed from the rear the bevel edges 37 and the facets 39 will appear as a glowing V-shaped element with bright tips at the extremities, the brilliance of which will depend on the power of the lamp and effectiveness of light transmission and reflection within the cylinders and sight pieces.

As before indicated, in sighting, the initial operator endeavors to keep the point of the front sight on a line between the points of the rear sight and midway of the latter points and to bring the instrument into position with the target on the line thus established.

The observer being behind the director and noting the target slews the director and operates the elevating tracker until the target is brought on or very near the line of sight of my invention (across point 49 and between points 38), after which the target then being included in the fields of the two telescopes, the crewmen operating the azimuth and elevation tracker devices take over and effect the further movements necessary to keep the target in view in the telescopes and to bring it into definite relation to elements of the telescope sights required for developing data to be transmitted by the director.

While I have disclosed the invention with particularity in the best form known to me, it will nevertheless be understood that changes in structure, and arrangement, and substitution of materials and equivalents, mechanical or otherwise, may be made without departing from the spirit of the invention set forth in the appended claims.

I claim:

1. In a sight line device, an opaque tube, first and second sections of light transmitting material fitting said tube, said sections having their adjacent ends spaced apart within said tube, a notched plate of light-transmitting material integral with the outer end of one said section, a pointed plate of light-transmitting material integral with the outer end of the other said section, the inner surface of each said plate lying flush against a respective end surface of said tube, and light-emitting means in said tube between confronting ends of said sections.

2. In a sight line device, an opaque tube, first and second sections of light-transmitting material smoothly fitting said tube and having their ends within said tube spaced apart to form a chamber within said tube, a first plate of light-transmitting material integral with the outer end of one said section, a second plate of light-transmitting material integral with the outer end of the other said section, each said plate lying flush against a respective end of said tube, said first plate having a pointed end and said second plate having a notched end, said ends coacting to determine a sight line substantially parallel with said tube and light-emitting means in said chamber.

3. A sight line device comprising a first tube, first and second sections of light-transmitting material smoothly fitting said tube, said sections having their confronting ends spaced apart to form a chamber within said tube, a second tube of larger diameter than said first tube and adapted to contain a dry cell, said tubes being rigidly connected in side-by-side parallel relation, the ends of said second tube being spaced inwardly of the ends of said first tube, an electric light bulb in said chamber, means forming an electrical connection between a battery terminal at one end of said second tube and said bulb, clamp means for mounting said device on a support, said clamp means including the other end of said second tube and sight means comprising plates of light-transmitting material integral with the outer ends of said sections, respectively, said plates being shaped to determine a line of sight substantially parallel with said tubes.

4. A sight line device as in claim 3, one said plate tapering to a point remote from said first tube, the other said plate being notched to form two spaced points equally remote from said first tube, both said plates being coated with an opaque coating except for said points, whereby there are formed three illuminated points when said bulb is energized.

5. A sight line device as in claim 3, said clamp means comprising an arm secured to and extending radially from said first tube in spaced relation with the adjacent end of said second tube, and clamp means carried by said arm to clamp a supporting object between said arm and said second tube end.

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