A. T. DAWSON & G. T. BUCKHAM.

ELECTRICAL TRANSMITTING APPARATUS FOR CONTROLLING THE SIGHTING OF GUNS.

APPLICATION FILED NOV. 20, 1908.

922,098. Patented May 18, 1909.

Fig. 2.

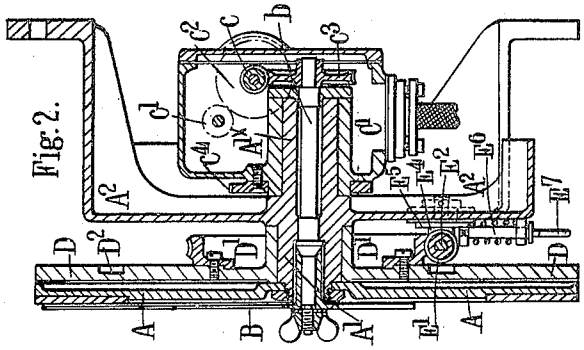
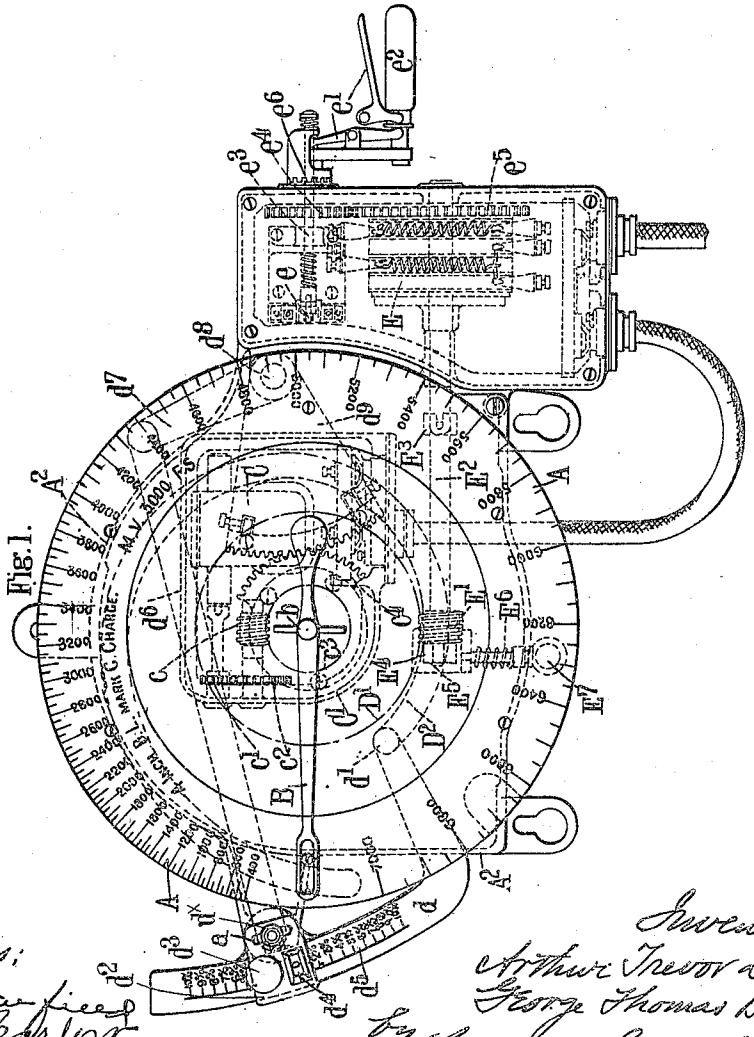


Fig. 1.



Witnesses:
L. V. B. Peirce
L. H. Robertson

Inventors;
Arthur Trevor Dawson,
George Thomas Buckham,
by Pennie Goldsborough,
Attorneys

UNITED STATES PATENT OFFICE.

ARTHUR TREVOR DAWSON AND GEORGE THOMAS BUCKHAM, OF WESTMINSTER, LONDON, ENGLAND, ASSIGNORS TO VICKERS SONS & MAXIM LIMITED, OF WESTMINSTER, ENGLAND.

ELECTRICAL TRANSMITTING APPARATUS FOR CONTROLLING THE SIGHTING OF GUNS.

No. 922,098. Specification of Letters Patent. Patented May 18, 1909.

Application filed November 20, 1908. Serial No. 463,731.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON and GEORGE THOMAS BUCKHAM, both subjects of the King of Great Britain, residing at 32 Victoria street, Westminster, in the county of London, England, have invented certain new and useful Improvements in Electrical Transmitting Apparatus for Controlling the Sighting of Guns, of which the following is a specification.

This invention relates to electrical transmitting apparatus for controlling the position of an electrically actuated pointer with respect to the range dial of the sighting apparatus and it has for its chief object to combine with the transmitting apparatus what is known in connection with sighting apparatus as a "calibrating" device for the purpose of enabling corrections to be made in the setting of the electrically actuated pointer to compensate more particularly for errors of the day affecting the range. This calibrating device is mechanically controlled by the transmitter switch that electrically controls the movement of the said pointer, whereby variable relative movement between the pointer and the range dial is caused to take place in addition to the movement transmitted electrically through the said switch to the pointer.

According to this invention the transmitting apparatus comprises a cam disk situated at the back of the range dial and rotatably mounted concentrically therewith, the said cam disk being adapted to be rotated through suitable gearing from the spindle of the transmitter switch. On the back of the said cam disk is a cam or spiral groove with which engages a roller carried at one end of an arm or lever which swings in a bearing carried on the casing of the instrument, and which is provided with a sliding block. This sliding block may be adjusted on the lever in any desired position at either side of the bearing, according to whether the movement imparted to the pointer by the calibrating device requires to be increased or diminished. The sliding block is provided with an index mark to be used in conjunction with suitable graduations on the lever.

The motor together with its gear for the electrically actuated pointer may be carried in an oscillatory box or casing movable on a bearing formed centrally behind the cam disk bearing. The sliding block on the lever is connected to the oscillatory box by a link so as to impart motion to the said box or casing in an analogous manner to that set forth in the specification of our prior application Serial No. 398717. In order to amplify the motion given to the oscillatory box and pointer, the said link is connected to a lever geared to the oscillatory box.

In order that our said invention may be clearly understood and readily carried into effect we will describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a front elevation of the transmitting apparatus with the calibrating device combined therewith. Fig. 2 is a vertical central section of the same.

A is the range dial, B the pointer, and C the motor for electrically actuating the pointer.

D is the cam disk situated at the back of the range dial A and rotatably mounted on a boss A' concentric with the range dial and forming part of the casing or framing A^2 thereof. Fixed to or forming part of the cam disk D is a worm wheel D' which gears with a worm E' on the spindle E^2 of the transmitter switch E, means being provided for throwing the cam disk out of gear so that the latter can be returned to the original position without moving the transmitter switch E. This may be effected by forming the spindle E^2 with a universal joint E^3 and by supporting the worm end of the spindle in a bearing E^4 pivotally mounted in a sliding block E^5 which is carried by the casing A^2. Connected to the sliding block is a spring controlled bolt E^6 capable of being retracted by the handle E^7 for disengaging the worm E' from the worm wheel D', any suitable means being provided for retaining the bolt in its retracted position.

Formed in the back of the disk D is a cam groove D^2 with which engages a roller d' carried on the end of the short or bent arm of the lever d. This lever d is pivotally mounted on a bearing a carried in a bracket on the casing or framing A^2 of the apparatus. The said lever is provided with a sliding block d^2 having a clamping screw d^3 by means of which it may be secured to the lever in any

desired position on either side of the axis of the bearing a, according to whether the variation in the movement of the pointer B requires to be increased or diminished. The sliding block d^3 is provided with an index mark d^4 to be used in conjunction with suitable graduations d^5 on the lever. The motor C has its armature connected with a worm c by means of toothed gearing c' c^2, the said worm engaging with a worm wheel c^3 attached to the spindle b of the pointer B. The said motor C together with its gearing is carried in an oscillatory box C′ movable on a rearward extension $A'^{\times}$ of the boss A′. The sliding block d^2 is connected by a link d^6 to a lever d^7 which is pivotally mounted at d^8 to the framing A^2 of the apparatus and imparts motion to the oscillatory box by a toothed segment c^4 fixed upon the said oscillatory box.

The said transmitter switch E is of the drum type, the spindle E^2 of this switch being connected with the cam disk D through worm gearing as above explained. The electric current is supplied to the transmitter switch through a quick break switch e adapted to be worked by a system of levers e' which are carried by the switch actuating handle e^2 and which come into operation on grasping the said handle as is well understood in connection with switches of this kind. The spindle e^3 carrying this handle is connected by toothed wheels e^4 e^5 with the spindle E^2 of the transmitter switch and thereby imparts motion thereto when the handle is turned. Any other convenient form of transmitter switch may be used.

To prevent the transmitter switch E from being moved when current is not passing, a locking arrangement is provided and in the example shown is in the form of a clutch e^6 operated by the aforesaid system of levers and so arranged that the quick break switch e makes contact before the clutch is free.

In using the apparatus say for correcting the range to compensate for errors of the day, the sliding block d^2 is first moved to the requisite extent on the lever d to one side or other of the axis of the bearing a, according as the correction is to be greater or less than the normal. The transmitter switch handle e^2 is then turned to cause the pointer B to indicate the desired range, this movement of the pointer being effected through the intervention of the toothed gearing e^4, e^5, the rotary switch E and the motor C. Simultaneously with this movement, motion is imparted to the cam disk D through the worm E′ and the worm wheel D′ from the spindle E^2 that carries the rotary switch E. The movement of the pointer relatively to the range dial is increased or diminished by the calibrating lever d and the cam groove D^2 in the said disk D imparting motion to the oscillatory box C′; it being understood that the extent of the movement transmitted through the calibrating lever d is regulated by the position to which the block d^2 is set on the said lever d. A greater or less number of turns will require to be given to the switch handle e^2 to bring the pointer to the desired range, according as the relative movement of the pointer and range dial is increased or diminished; thus the pointers of all the sighting apparatus that are in electrical connection with the transmitting apparatus will move through a greater or less angle as the case may be. This correction will preferably be additional to that which is made by adjusting the calibrating device at each of the sighting apparatus to compensate for changes in muzzle velocity and temperature. The hinge pin $d^{\times}$ by means of which the connecting link d^6 for actuating the oscillatory box C′ is attached to the sliding block d^2 may be slidably connected with the block, as shown in Fig. 1. By changing the position of this pin $d^{\times}$ in relation to the sliding block, the angular movement of the oscillatory box C′, may be further adjusted to allow for other errors in ranging, such as, for instance, the difference in range due to the use of different kinds of shot. This separate slide may be provided on the sliding block of either the calibrating device appertaining to the transmitting apparatus or to the sighting apparatus or to both of them.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, and means whereby the actuation of the switch causes a variable relative movement to take place between the pointer and the range dial in addition to the movement said switch transmits to the pointer.

2. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, a cam disk, means for actuating said cam disk from the switch and means for transmitting variable movement from the said cam disk to the electrically actuated pointer.

3. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, a cam disk, means for actuating said cam disk from the switch, a bell crank lever arranged in conjunction with the said cam disk, a sliding block on one arm of the bell crank lever and means attached to the sliding block for imparting additional

movement to the aforesaid electrically actuated pointer.

4. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, a cam disk, means for actuating said cam disk from the switch, a bell crank lever arranged in conjunction with the said cam disk, a sliding block on one arm of the bell crank lever, an electric motor under the control of said switch for actuating said pointer, a casing for said motor rotatably mounted co-axially with the pointer, and lever mechanism connected with said sliding block for imparting rotary movement to the motor casing.

5. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, a disk, means for actuating said disk from the switch, a spiral groove in said disk, a bell crank lever, a roller on one arm of said lever engaging with the spiral groove, a sliding block on the other arm of the bell crank lever, a link attached to said sliding block, a lever connecting the link to a toothed segment, and a further toothed segment gearing therewith and attached to the motor casing.

6. In electrical transmitting apparatus for controlling the sighting of guns, the combination of a rotary transmitter switch, an electrically actuated pointer under the control of said switch, a range dial over which the said pointer moves, a cam disk, a worm wheel mounted thereon, a worm meshing therewith, a shaft on which the said worm is mounted and to which the transmitter switch is attached, and means for transmitting variable movement from the said cam disk to the electrically actuated pointer.

In testimony whereof we affix our signatures in presence of two witnesses.

ARTHUR TREVOR DAWSON.
GEORGE THOMAS BUCKHAM.

Witnesses:
HENRY KING,
F. MAGEE.