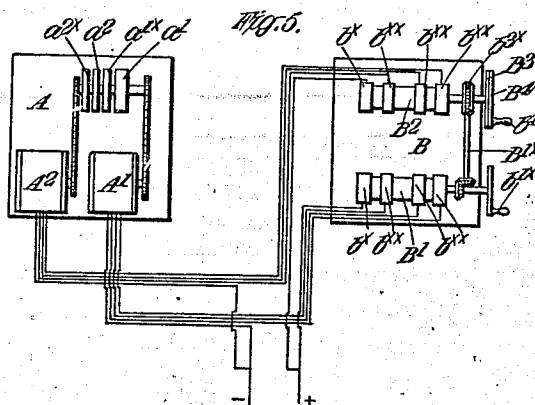
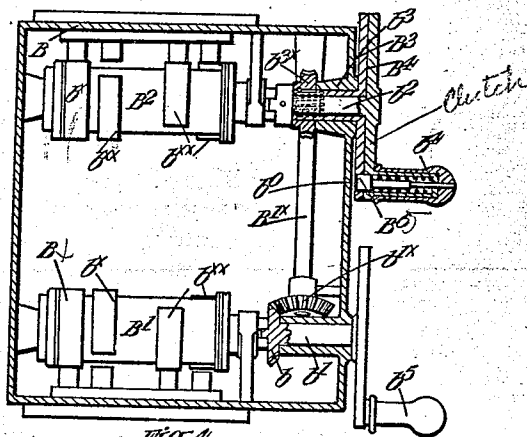
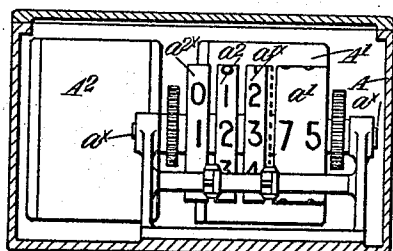
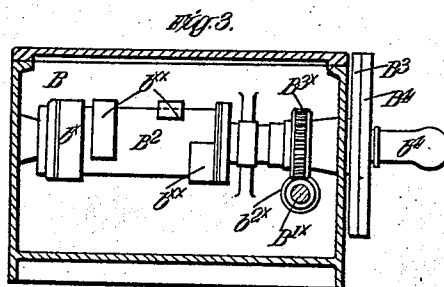
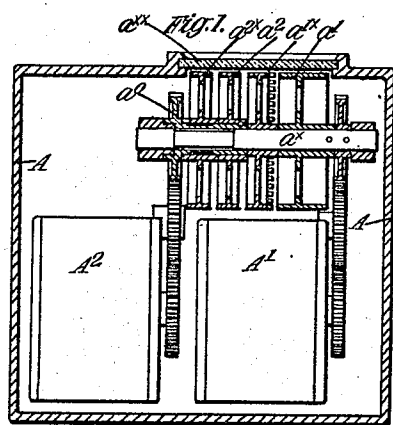


A. T. DAWSON & G. T. BUCKHAM.
ELECTRICAL APPARATUS FOR TRANSMITTING AND RECEIVING SIGNALS.
APPLICATION FILED MAY 4, 1912.

1,037,452.

Patented Sept. 3, 1912.



Witnesses

E. L. Schuermann.
R. G. Galt.

Inventors

A. T. Dawson
G. T. Buckham
Lawrence Davis, Attorney at Law

UNITED STATES PATENT OFFICE.

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

ELECTRICAL APPARATUS FOR TRANSMITTING AND RECEIVING SIGNALS.

1,037,452.

Specification of Letters Patent.

Patented Sept. 3, 1912.

Application filed May 4, 1912. Serial No. 695,044.

To all whom it may concern:

Be it known that we, ARTHUR TREVOR DAWSON, knight, and GEORGE THOMAS BUCKHAM, both subjects of the King of Great Britain, residing at Vickers House, Broadway, Westminster, in the county of London, England, have invented certain new and useful Improvements in or Relating to Electrical Apparatus for Transmitting and Receiving Signals, of which the following is a specification.

This invention relates to electrical apparatus for transmitting and receiving signals, and is more particularly intended for transmitting gun ranges from a fixed position to receiving apparatus arranged contiguous to the guns. In apparatus of this kind it has been proposed to employ at the receiving station two or more electric motors of the "step by step" type (each of which is controlled by a switch at the transmitting station); the said motors being adapted to operate counting devices to indicate the range to which the sights are to be set.

The chief object of the present invention is to provide improved apparatus which will enable the transmission and reception of signals to be effected at a greater speed and in a more reliable manner than heretofore.

According to this invention the switches at the transmitting station are positively interconnected in such a manner that at all relative positions of the said switches the increments of range can be transmitted to the counting device at the receiving station in the usual sequence or in large increments of range independently of the small ones, at the will of the operator. The switches are positively interconnected in such a manner that the ratio of their movements is the same as the desired ratio of the movements of the motors, means being provided whereby the switch or switches controlling the motor or motors for actuating the counting device or devices of higher value can, whatever may be the relative positions of the said switches, be thrown out of gear and rendered capable of being independently operated. In this manner, by directly actuating the motor appertaining to the counting device or devices of higher value, a large increment can be quickly transmitted at any moment without actuating the counting devices of lower values, step by

step, from the first range indication to the increased range indication. Furthermore, by the provision of more than one motor, each will have less work to perform in actuating the drums.

In order that the 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:—

Figures 1 and 2 are sectional views showing one form of the apparatus at the receiving station and Figs. 3 and 4 are similar views of one form of the apparatus at the transmitting station. Fig. 5 is a diagrammatic view showing the electrical connections between the transmitting and receiving apparatus.

A represents the casing of the receiving apparatus and B that of the transmitting apparatus. In the constructional form of the receiving apparatus shown in Figs. 1 and 2, there are two motors A¹, A² appertaining to the counting devices (which are in the form of drums) of lower and higher values respectively. The motor A¹ is connected by suitable gearing with a shaft a^x on which the tens drum a¹ is rigidly mounted. The hundreds drum a² is loosely mounted on said shaft and is driven by the tens drum a¹ through carry on mechanism. The drum a¹ which we have designated the "tens" drum is preferably graduated in increments of twenty-five yards. The motor A² is connected by appropriate gearing with a sleeve a^o loosely mounted on the shaft a^x. To this sleeve the thousands drum a² is rigidly connected, the tens of thousands drum a³ being loosely mounted on the said sleeve and being driven by the drum a² through suitable "carry on" mechanism. The readings of the counting drums are viewed through the glazed openings a^x (Fig. 1) in the casing A.

In the constructional form of the transmitting apparatus illustrated by Figs. 3 and 4 there are two switches B¹, B² each having in the example shown one contact ring b^x and three segmental contact strips b¹. The contact rings and strips work in conjunction with contacts, those appertaining to the rings b being connected to the source of supply and the others being connected to the motors A¹, A² at the receiving station as shown in Fig. 5, so that the switch B¹ con-

trols the motor A' and the switch B² the motor A². These switches as aforesaid are connected in such manner that the ratio of movement between them corresponds to the desired ratio of movement between the impulses given to the two motors in actuating the drums. Thus, as in the example shown the tens drum a' is graduated in increments of twenty-five yards, the motor A' appertaining thereto will require to receive forty impulses to one impulse of the motor A² and consequently the gearing between the switches requires to be in the ratio of forty to one. This gearing comprises a bevel wheel b mounted on the spindle b' of the tens and hundreds switch B' which bevel wheel gears with a similar wheel b'x on a spindle B'x carrying a worm b^{2x} that gears with a worm wheel b^{3x} connected to the thousands and tens of thousands switch B², through the intervention of a clutch device. This clutch device comprises in the example shown a disk B³ having a sleeve b³ which is rotatably mounted on the spindle b² of the switch B² and on the inner end of which the aforesaid worm wheel b^{3x} is rigidly mounted. The said spindle b² is provided at its outer end with a disk B⁴ which bears against the outer surface of the disk B³ connected to the worm wheel. The disk B⁴ is furnished with a handle b⁴ and with a spring plunger B⁵ which normally engages as shown with a hole b^o in the disk B³. The said plunger, which is arranged in the handle b⁴, serves when in its engaging position with the hole b^o to transmit the movement of the disk b³, connected to the worm wheel b^{3x}, to the switch B² (this worm wheel being driven through the aforesaid gearing, from a handle b⁵ with which the tens and hundreds switch B is provided). When however the spring plunger B⁵ is moved out of operative engagement between the two disks by moving the handle b⁴ away from its disks B⁴, the latter can be actuated by its handle to angularly displace the switch B² independently of the tens and hundreds switch B' and without necessitating the disconnection of the aforesaid bevel and worm gearing. In this manner the motor A² can be caused to actuate the thousands drum a² in accordance with the amount of displacement given to the switch so that increments of thousands of yards range can be quickly transmitted independently of the range that is transmitted by the switch B. The hole b^o in the disk B³ insures that the reengagement of the spring plunger B⁵ therewith shall take place only after the handle b⁵ of the tens and hundreds switch B' has been actuated to cause the disk B³ to be angularly displaced to an extent corresponding to the displacement of the handle b⁴ of the thousands and tens of thousands switch B² in transmitting the large increment of range.

The transmitting station is provided with counting drums which may be either electrically driven by motors A', A² or mechanically from a part moving with the actuating handles b⁵, b⁴ of the switches B, B².

We wish it to be understood that we do not desire to limit the invention to the herein described arrangement of counting drums, nor to the number of motors employed and the number of drums that each motor drives. For example instead of the drum of lowest value constituting the tens drum and being graduated in steps of twenty-five as in the example herein described, it may be graduated in units, and the drum of highest value in thousands or in tens of thousands. In the former case (*i. e.* where the drum of highest value is graduated in thousands) there would be four drums, and when two motors are employed, each would drive two drums; in the latter case (*i. e.* where the drum of highest value is graduated in tens of thousands) there would be five drums, and one motor would drive the units, tens and hundreds drums and the other would drive the thousands and tens of thousands drums.

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

1. In signal transmitting and receiving apparatus, the combination with a plurality of switches at the transmitting station and a plurality of motors at the receiving station, of means for electrically connecting each of the said switches to its corresponding motor, means for positively interconnecting said switches, and means for enabling any one of the switches to be operated independently of the other or others at any relative position in the setting of said switches.

2. In signal transmitting and receiving apparatus, the combination with a plurality of switches at the transmitting station and a plurality of motors at the receiving station, of means for electrically connecting each of the said switches to its corresponding motor, means for positively interconnecting said switches, and means for temporarily disconnecting said switches when desired.

3. In range transmitting and receiving apparatus, the combination with a plurality of switches at the transmitting station and a plurality of motors at the receiving station, of means for electrically connecting each of the said switches to its corresponding motor, means for positively interconnecting said switches and means for enabling any one of the switches to be operated independently of the other or others at any relative positions in the setting of said switches.

4. In range transmitting and receiving apparatus, the combination with a plurality of switches at the transmitting station and

a plurality of motors at the receiving station, of means for electrically connecting each of the said switches to its corresponding motor, means for positively interconnecting said switches, and means for temporarily disconnecting said switches when desired.

5. In range transmitting and receiving apparatus the combination with a plurality of switches at the transmitting station, a plurality of step by step motors at the receiving station and a counting device operated by said step by step motors, of means for electrically connecting each of said switches to its corresponding step by step motor, worm gearing for interconnecting said switches, and means for temporarily disconnecting one of said switches at will.

6. In range transmitting and receiving apparatus, the combination with a plurality of switches for transmitting increments of ranges having different values, a plurality of step by step motors at the receiving station and a counting device operated by said step by step motors, of means for electrically connecting each of said switches to its corresponding step by step motor, worm gearing for interconnecting said switches, and means for temporarily disconnecting the switch or switches transmitting ranges of higher value from the other or others transmitting ranges of lower value.

7. In range transmitting and receiving apparatus, the combination with two switches at the transmitting station for transmitting increments of ranges having different values, two step by step motors at the receiving station, and a counting device operated by said step by step motors, of means for electrically connecting each of said switches to its corresponding step by step motor, a handle on each of said switches, a member arranged contiguous to the switch of higher value, gearing for connect-

ing said member to the switch of lower value, and means for detachably connecting said member to the handle of the switch of higher value.

8. In range transmitting and receiving apparatus, the combination with two switches at the transmitting station for transmitting increments of ranges having different values, two step by step motors at the receiving station, and a counting device operated by said step by step motors, of means for electrically connecting each of said switches to its corresponding step by step motor, a handle on each of said switches, a disk arranged contiguous to the switch of higher value, gearing for connecting said disk to the switch of lower value, and a plunger for detachably connecting said disk to the handle of the switch of higher value.

9. In range transmitting and receiving apparatus, the combination with two switches at the transmitting station for transmitting increments of ranges having different values, two step by step motors at the receiving station and a counting device operated by said motors, of means for electrically connecting each of said switches to its corresponding step by step motor, a spindle of each of said switches, a handle on each spindle, a shaft, means for connecting said shaft to the spindle of the switch of lower value, a worm on said shaft, a disk disposed contiguous to the switch of higher value, a worm wheel on said disk gearing with said worm, and a spring plunger on the handle of the switch of higher value for detachably connecting said handle to the disk.

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

ARTHUR TREVOR DAWSON.
GEORGE THOMAS BUCKHAM.

Witnesses:

HENRY KING,
JNO. R. CASWELL.

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