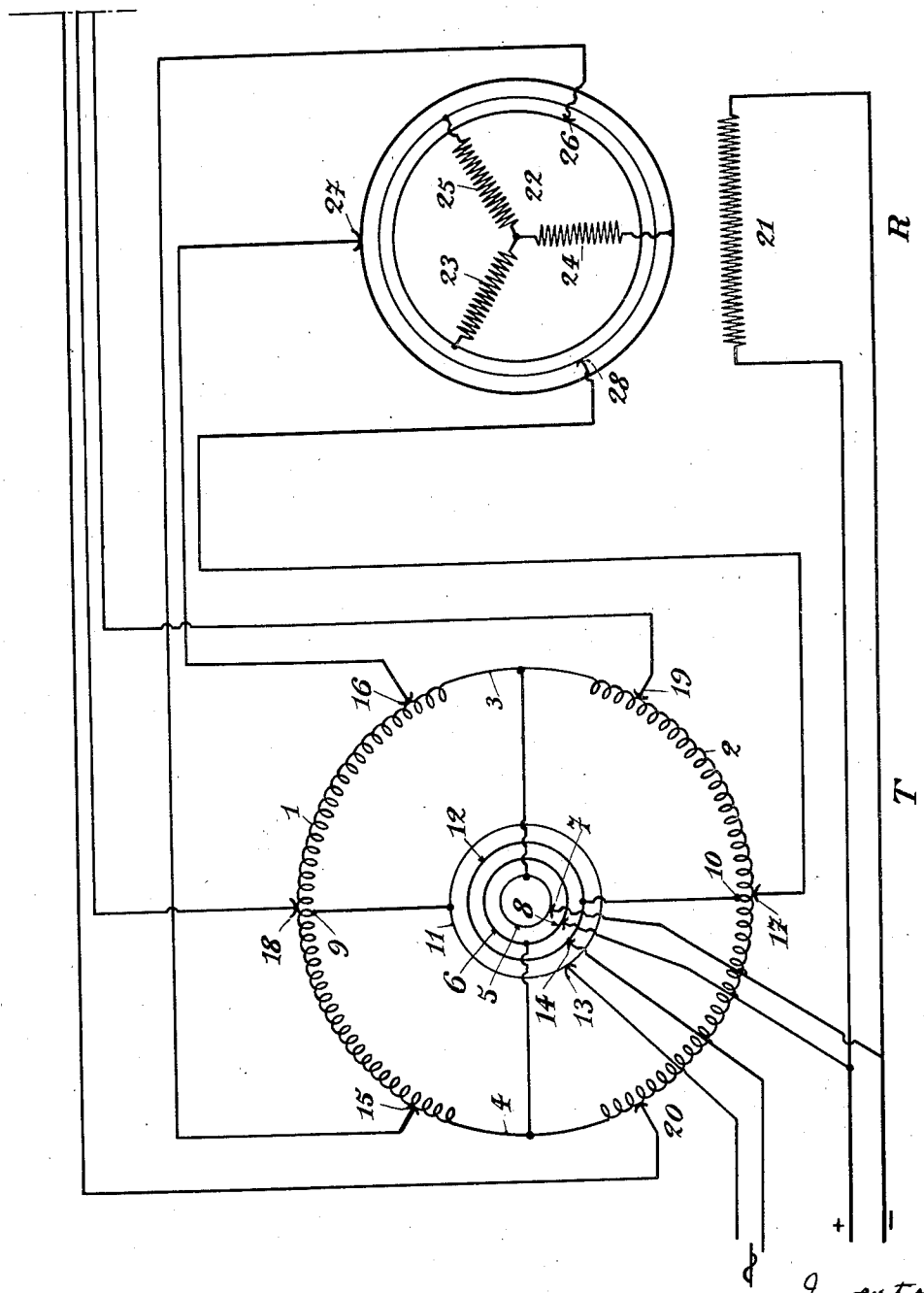
Sept. 11, 1928. 1,684,042

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APPARATUS FOR CONTROLLING THE POSITIONING OF DEVICES FROM A DISTANCE

Filed May 20, 1924



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Patented Sept. 11, 1928. 1,684,042

UNITED STATES PATENT OFFICE.

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APPARATUS FOR CONTROLLING THE POSITIONING OF DEVICES FROM A DISTANCE.

Application filed May 20, 1924, Serial No. 714,755, and in Italy March 4, 1924.

This invention relates to distant control apparatus and more particularly to a system comprising a transmitter and a receiver located at a distance from said transmitter, said receiver and transmitter being so constructed and connected that movements imparted to the transmitter are reproduced at the distant receiver. The present invention is particularly applicable to the fire control of guns mounted on board warships and may be used in combination with the invention set forth in U. S. Patents Nos. 1,507,209, dated September 2, 1924, and 1,492,899, dated May 6, 1924.

The present invention will now be described with reference to the accompanying diagrammatic drawings in which is illustrated by way of example the application of the improvements forming the subject matter of the present invention to the particular case of a transmission of a known type. Although the receivers may be in any desired number, only one transmitter T and one receiver R are shown.

Referring to the drawings, 1 and 2 are two rheostats arranged symmetrically on a circular support and connected together by two conducting arcs 3 and 4. The arcs 3 and 4 are connected to a supply of direct current by means of the rings 5 and 6 on which rub brushes 7 and 8. The middle points 9 and 10 of the rheostats 1 and 2 are connected to a supply of alternating current by means of the rings 11 and 12 upon which rub the brushes 13 and 14. 15, 16 and 17 represent a first set of fixed brushes arranged 120° apart and connected to a first receiving set. 18, 19 and 20 are a second set of brushes interposed between the first mentioned sets of brushes, midway between the latter, and which are adapted to be connected to a second receiver (not shown). 21 is the field winding of a receiver (which can be constituted if desired, by a permanent magnet). 22 is the armature of a receiver composed of three windings 23, 24, 25 spaced 120° apart and connected respectively at one end to a common point, and at their other end to three rings on which rub the brushes 26, 27, 28 that are connected respectively to the brushes 15, 16, 17 of the transmitter. This armature has the peculiarity that it comprises a uniformly distributed smooth winding and has a fixed magnetic core. It will be understood that the specific details of construction of the armature constitutes no part of the present invention and these details are disclosed in the patent to C. E. O'Keenan, No. 641,140, dated January 9, 1900.

It will be readily perceived that on rotating the support on which the rheostats 1 and 2 are mounted, rotation of the armature 22 will be produced by the displacement of the resulting field which is generated thereby.

This rotation is produced by the application of a known principle; but I shall now set forth the functions of the supplementary devices that constitute the invention.

The conducting arcs 3 and 4 have the effect of modifying the curve that represents the potential difference between any two of the fixed brushes as a function of the angle of rotation of the transmitter, and practice has shown that by giving to these arcs a circular measure of about 45°, the object will be achieved of rendering at all points the displacements of a receiver practically proportional to those of the transmitter.

The distribution of the receivers in a plurality of groups has the effect of rendering uniform the distribution of the load on the rheostat. By this means local heatings that might occur in the neighborhood of the conducting arcs are prevented.

The alternating current admitted at 9 and 10 has the result of imparting vibratory motion to the armatures of the receivers. The magnitude and frequency of this current must be so adjusted that the amplitude of the vibrations imparted to the ends of the pointers of the receivers shall be limited to about 1 or 2 mm. This vibratory motion has as a first advantage, that of increasing considerably the sensitiveness of the receivers, because it reduces in a very high degree the coefficient of friction of the brushes 26, 27, 28. This vibratory motion also allows of checking in a continuous manner during the progress of a battle on the one hand the condition of the line, and on the other hand the condition of the receivers, because the said vibratory motion disappears automatically in case of breaking of the net works, or even in case of an accidental jamming of the armature.

The peculiar features of the receiving armatures consisting in a uniformly distribut-

ed smooth winding and a fixed magnetic core affords the following advantages, namely:—the reduction of the inertia torque to a minimum, total suppression of the hysteresis torque and of the torque of purely magnetic origin entailed by the use of notched or slotted armatures.

The hereinabove described improvements are applicable to all transmissions wherein the receivers consist of synchronous motors of n-phases, and wherein the transmitters are constituted by devices that supply n-differences of potential varying as functions of the transmitted order.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A device of the class described comprising, in combination, a synchronous motor of n phases constituting a receiver, a transmitter including a circular potentiometer adapted to supply n potential differences to said receiver, the magnitude of said differences being a function of the order to be transmitted, low resistance paths connected to the potentiometer and including two arcs of approximately 45°, means for supplying alternating current to said potentiometer, and means for supplying direct current to said potentiometer, said means having electrical connection with said arcs, whereby proportionality is produced between the angular movements of the transmitter and those of the receiver.

2. A device of the class described comprising, in combination, a circular potentiometer, low resistance paths connected to said potentiometer and including two arcs of substantially 45°, means for supplying direct current to said potentiometer, said means having electrical connection with said arcs midway of the ends thereof, means for supplying alternating current to said potentiometer, said last-named means having electrical connection with the potentiometer at points situated substantially at right angles to the supply points for the direct current, a receiver, and means operatively connecting said receiver to said potentiometer.

3. A device of the class described comprising, in combination, a transmitter including a potentiometer, means for supplying direct current to said potentiometer and means for supplying alternating current to said potentiometer, a synchronous motor receiver having a fixed magnetic core and having an armature, and a plurality of conductors operatively connecting said receiver to said transmitter.

4. A device of the class described comprising, in combination, a plurality of movably mounted rheostats, conducting means connecting said rheostats, means for supplying direct current to said conducting means, means for supplying alternating current to said rheostats, a receiver, and a plurality of conductors operatively engaging said rheostats and said receiver.

5. A device of the class described comprising, in combination, a transmitter including a pair of rheostats, connecting means for said rheostats, means for supplying direct current to said connecting means, means for supplying alternating current to said rheostats, and a plurality of brushes having sliding engagement with said rheostats, a receiver including a plurality of brushes for supplying current thereto and conductors for connecting the brushes of the transmitter with the brushes of the receiver.

6. A device of the class described comprising, in combination, a receiver having a movable armature and means for imparting limited angular movement and vibratory motion to the armature of said receiver, said means including a pair of rheostats, connecting means for said rheostats, means for supplying direct current to said connecting means, means for supplying alternating current to said rheostats, and means for operatively connecting said rheostats and receiver.

7. In combination, a receiver having an armature, means for transmitting movement to said armature, said means including a pair of rheostats, connecting means for said rheostats and means for supplying direct current to said connecting means, and means supplying alternating current to said rheostats for imparting vibratory motion to said armature.

8. Apparatus for signalling comprising, in combination, a transmitter including a movable member, means including a pair of diametrically disposed brushes engaging said member for supplying alternating current to the member, a plurality of brushes for supplying direct current to the member, a synchronous motor constituting a receiver, and a plurality of electrical conductors for operatively connecting the receiver to said member.

In testimony whereof I have signed this specification.

NICOLAS EMILIEN METHLIN.