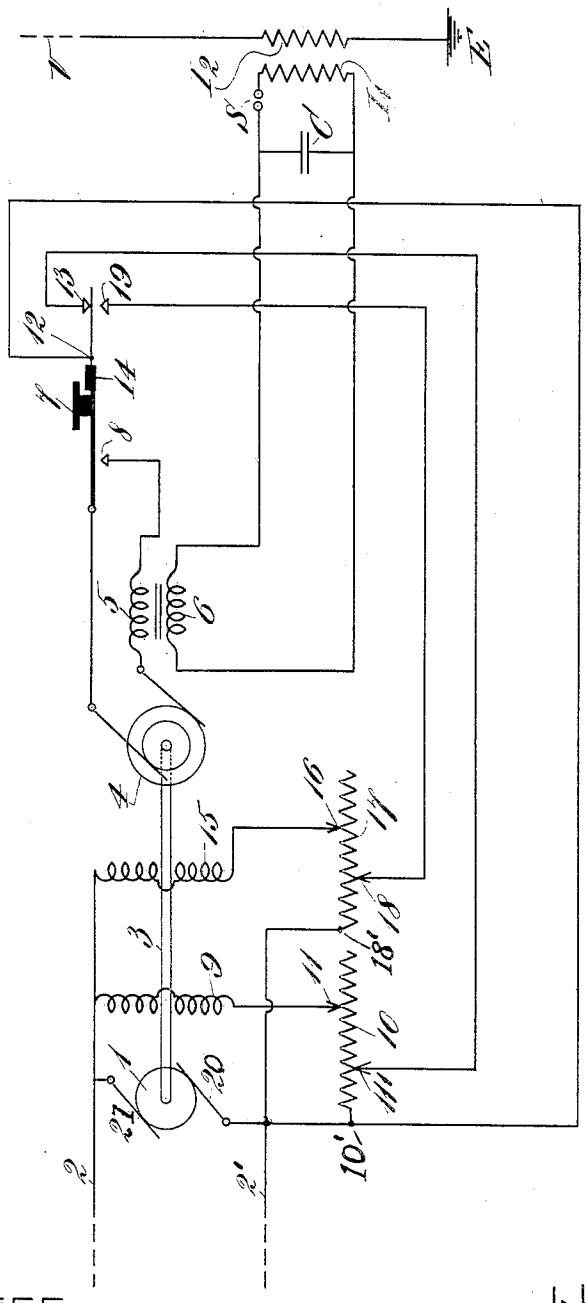
C. R. SAFFELL.

SPACE TELEGRAPHY.

APPLICATION FILED AUG. 12, 1909.

966,475. Patented Aug. 9, 1910.



WITNESSES:

E. B. Tomlinson

Patrick J. Conroy

INVENTOR:

Chester R. Saffell

by Browne & Woodworth

Attys.

UNITED STATES PATENT OFFICE.

CHESTER R. SAFFELL, OF THE UNITED STATES NAVY, ASSIGNOR TO JOHN FIRTH, OF NEW YORK, N. Y.

SPACE TELEGRAPHY.

966,475. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed August 12, 1909. Serial No. 512,536.

To all whom it may concern:

Be it known that I, CHESTER R. SAFFELL, a citizen of the United States, electrician, of the United States Navy, have invented a new and useful Improvement in Space Telegraphy, of which the following is a specification.

My invention relates to space telegraphy and its object is to provide a space telegraph transmitting system in which the speed of rotation of the alternating current generator which energizes the oscillation circuit and the voltage developed by said generator may be maintained constant, irrespective of variations in the load applied to the same by the closure of the transmitting key. In carrying out my invention I employ means controlled by said key for increasing the energization of the field of the generator or means controlled by said key for decreasing the energization of the field of a motor mechanically connected with said generator, or I may employ both of said means.

My invention will be explained in connection with the accompanying drawing which forms a part of this specification and illustrates diagrammatically one arrangement of apparatus and circuits whereby the foregoing objects may be carried into effect.

In the drawing the figure is a diagrammatic view representing a space telegraph transmitting system constructed in accordance with my invention.

In the particular diagram selected for more fully disclosing the principle of my invention, 1 represents a motor having brushes 20, 21 fed by the direct current mains 2 2′ and mechanically connected by the shaft 3 to the alternating current generator 4. This generator is connected in series with the primary 5 of a transformer, the transmitting key 7 and its front contact 8. The secondary 6 of said transformer is connected with the oscillation circuit which contains the condenser C, spark-gap S and primary I_1 of an oscillation transformer. The secondary I_2 of this oscillation transformer is included in the antenna V which is connected to earth at E. It will be understood of course that I do not limit myself to the particular type of oscillation circuit shown or to any particular manner of associating said circuit with the antenna.

9 represents the field coil or coils (hereinafter referred to as the field) of the motor 1 and is adjustably connected by the contact 11 with the resistance 10, said resistance being connected with the brush 20 of the motor. A conductor connects the brush 20 of the motor at the point 12 to a metallic extension on the key 7, said extension being insulated from the rest of the key by the insulation 14. The back contact 13 is connected by the adjustable contact 11′ to the resistance 10.

15 represents the field coil or coils (hereinafter referred to as the field) of the alternating current generator 4 and is connected by the adjustable contact 16 to the resistance 17, one terminal of which is connected to the brush 20 of the motor.

A supplemental front contact 19 of the key is connected by the adjustable contact 18 to the resistance 17.

The operation is as follows: Normally that portion of the resistance 10 which is included between the contact 11′ and the point 10′, is short-circuited by the extension of the key which normally is held against the back contact 13, the current passing from the main 2′ to the point 10′, thence to the point 12, contact 13, adjustable contact 11′, through a portion of the resistance 10 to the contact 11 and thence through the field 9 and back to the source. As soon as the transmitting key is depressed for the purpose of completing the circuit through the primary 5 and thereby energizing the oscillation circuit, this short circuit is broken at 13 and that portion of the resistance included between the adjustable contact 11′ and the point 10′ is included in series with the field 9 thereby decreasing the energization of said field and increasing the torque of the motor, so that the speed of the latter remains constant. Shortly after the extension of the key leaves the contact 13, the circuit through the primary 5 is completed and the oscillation circuit is energized. When the load is applied by the key contact 8 the motor is slowed down again, the positions of the contacts 11, 11′ being so chosen

that the speed of the motor under full-load with the resistance between 10′ and 11′ in circuit is practically the same as the no-load speed with this resistance short-circuited. Thus the speed of the generator is kept constant under conditions of rapidly varying no-load and full-load.

Where a motor-generator consisting of a motor and a generator on a single shaft is not employed, or if desired or rendered necessary by various conditions where such motor-generator is employed, I may provide means controlled by the transmitting key for increasing the energization of the field of said generator, said means in that embodiment of my invention above described consisting of the adjustable resistance 17 which is normally included in series with the field 15 of the generator. When such arrangement is employed the operation is as follows: After the extension of the key leaves the contact 13 (if the latter be employed) and in any event before the key itself makes contact with the terminal 8, the said extension strikes the back contact 19 thereby short-circuiting that portion of the resistance 17 which is included between the adjustable contact 18 and the point 18′. The current which energizes the field 15 then flows from the main 2′ to the point 12 by way of the point 10′, through the extension of the key to the back contact 19, thence to the adjustable contact 18 through a portion of the resistance 17 to the contact 16 and thence through the field 15 back to the source. The resistance in series with the field 15 being reduced and the energization of said field being increased, it follows that the voltage developed by the alternator is increased so that when the circuit of the primary 5 has been closed, the load thereby thrown on the generator will not reduce said voltage below that value which can be ascertained and provided for by selecting the position of the contacts 16 and 18 with respect to the resistance 17.

The apparatus above described whereby a rapidly varying load may be applied to a generator is particularly adapted for wireless telegraph transmitting systems and is more efficient for the maintenance of constant speed and voltage than the various compound wound motors and generators of commerce because the latter are not designed to take care of such rapidly varying loads as occur in a space telegraph transmitting system or for loads which have the wide range of variation necessarily created during the operation of a wireless telegraph transmitting system.

It is not necessary to vary the resistances 10 and 17 directly by the key 7, for it will be apparent that various arrangements of relays may be introduced for accomplishing the same result and it will be understood of course that various other modifications may be made by those skilled in the art, both in the apparatus and circuit arrangements herein described and illustrated, without departing from the spirit of my invention.

I claim:

1. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator having a normally energized field associated with said oscillation circuit, a transmitting key, and means controlled by said key for increasing the energization of the field of said generator.

2. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key and means controlled by said key for decreasing the energization of the field of said motor.

3. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, means controlled by said key for increasing the energization of the field of said generator, and other means controlled by said key for decreasing the energization of the field of said motor.

4. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator having a normally energized field associated with said oscillation circuit, a transmitting key and means controlled by said key for increasing the voltage developed by said generator.

5. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key and means controlled by said key for increasing the torque of said motor.

6. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, means controlled by said key for increasing the voltage developed by said generator and other means controlled by said key for increasing the torque of said motor.

7. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a transmitting key, a resistance in series with the field of said generator and means controlled by said key for decreasing said resistance.

8. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, a resist-

ance in series with the field of said motor and means controlled by said key for increasing said resistance.

9. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, a resistance in series with the field of said generator, means controlled by said key for decreasing said resistance, a resistance in series with the field of said motor and other means controlled by said key for increasing the last mentioned resistance.

10. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a transmitting key, an adjustable resistance in series with said generator and means controlled by said key for decreasing said resistance.

11. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, and adjustable resistance in series with the field of said motor and means controlled by said key for increasing said resistance.

12. A space telegraph transmitting system comprising an oscillation circuit, an alternating current generator associated therewith, a motor mechanically connected with said generator, a transmitting key, an adjustable resistance in series with the field of said generator, means controlled by said key for decreasing said resistance, an adjustable resistance in series with the field of said motor and other means controlled by said key for increasing the last mentioned resistance.

In testimony whereof, I have hereunto subscribed my name this 11th day of August 1909.

CHESTER R. SAFFELL.

Witnesses:

E. B. TOMLINSON,

GEO. K. WOODWORTH.