E. SCHATTNER.

DISTANCE CONTROL APPARATUS FOR TRANSLATING DEVICES.

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904,810. Patented Nov. 24, 1908.

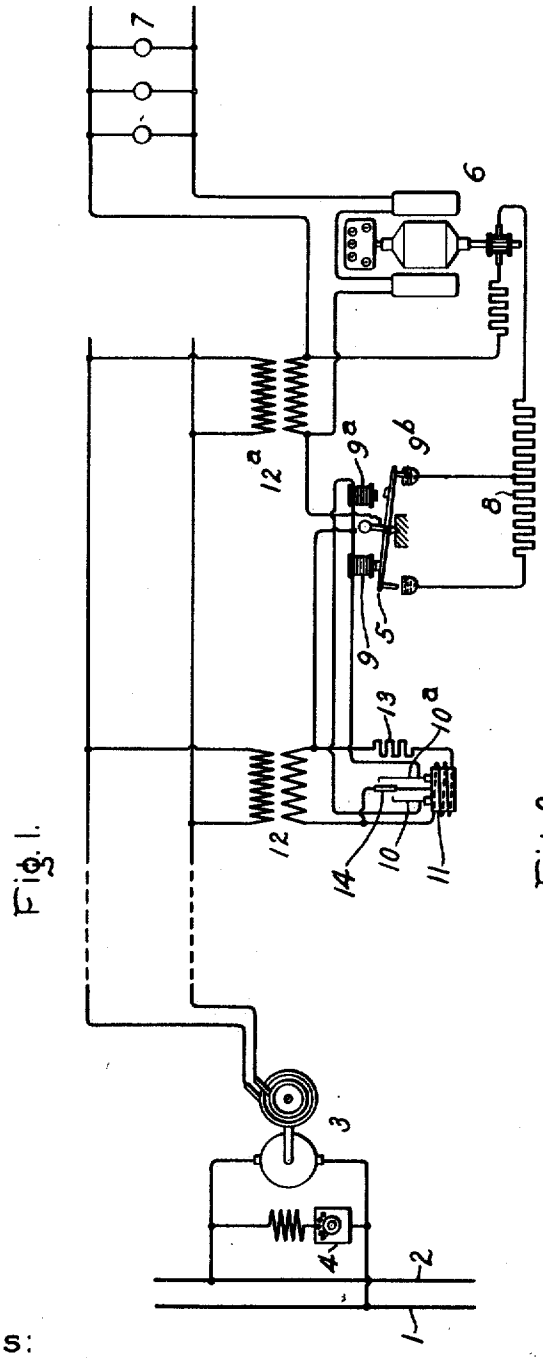

Fig. 1.

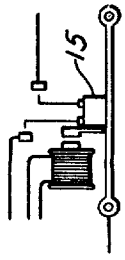

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

ERNEST SCHATTNER, OF LONDON, ENGLAND, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

DISTANCE-CONTROL APPARATUS FOR TRANSLATING DEVICES.

No. 904,810. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed August 6, 1908. Serial No. 447,898.

To all whom it may concern:

Be it known that I, ERNEST SCHATTNER, a subject of the King of Great Britain, residing at London, England, have invented certain new and useful Improvements in Distance-Control Apparatus for Translating Devices, of which the following is a specification.

This invention relates to distance control of electric switches on a circuit containing electric translating devices. In systems of this kind as commonly controlled an auxiliary wire or wires is carried from the point of control to the neighborhood of the translating devices, in which is interpolated the electro-magnetic or other means for operating the switch. My system is designed to dispense with such an auxiliary wire and permit of control by the use of the same circuit which supplies the translating devices. A system of this kind is of practical value over a considerable range of application in which it is necessary or desirable to throw the switch at determinate times either for the purpose of cutting in or out the translating devices supplied by the circuit or for some other result aimed at, at or near the switch. For example, in arc lighting circuits it is sometimes desired to cut in and out certain lamps at special hours permitting a supply station to regulate the hours during which the lamp or lamps may be burned, or in incandescent lighting it is desired to change the recording rate of an electric meter on a consumer's premises so that the customer may be given an incentive to use current more freely during the period of light load on the station, in which case it is usual to employ multiple or two-rate meters which have a slow rate of recording during hours of the day when there is no great call for current, and a fast rate at night.

To bring about the change in the meter speed it is common to throw a switch at the consumer's station which in one position determines a slow rate of recording and in the other a fast rate; and heretofore this switch control has been effected either by means of a clock periodically wound and operatively related to the switching device at the consumer's station or to use a separate control wire extending from the current-supply station and including some form of magnet control at the consumer's premises. I accomplish such distance control without using a separate wire by passing a vibratory current over the same wires which supply the translating devices, it may be for one station or for an entire distribution system, and by installing at the different stations harmonic apparatus which may be thrown into sympathetic vibration by electric waves or impulses sent out from the supply station.

The particular form of harmonic apparatus I employ is exceedingly simple and reliable, and consists of a pair of tuned reeds or springs at each distributing point and electro-magnetic means for throwing either at will into resonant vibration by impulses sent out from the supply station. Either of the reeds at any distributing point may be thrown into vibration at will from the supply station by means of such a superposed current, and when so excited closes a local circuit including a device, preferably electro-magnetic, which operates a switch, clutch or other device which governs the operation of the controlled apparatus.

I am aware that a similar mode of control has been heretofore proposed, with other means of responding to the superposed impulses, but the apparatus necessary to effect a practical result by my system are different in character and much cheaper to install.

The novel features will be hereinafter definitely set forth in the claims.

In the accompanying drawing, which diagrammatically illustrates my invention, Figure 1 is a diagram of a system embodying my improvements as applied to a two-rate electric meter. The application to other devices will be similar in character, and need not be particularly described. Fig. 2 is a modified form of resonant device.

1 and 2 represent a pair of bus-bars at a supply station.

My improvements are applicable either to a direct-current system of distribution or an alternating-current system.

3 represents an alternating-current motor-generator, the field-strength of which may be varied by a variable field rheostat 4. On any consumer's premises is placed a switch or its equivalent 5 by which the desired de-

vice is to be controlled. This device, as shown in the diagram, is a two-rate electric meter, indicated at 6, the field coils of which are in series relation to a group of lamps 7 on the consumer's premises, and the armature of which may have its potential changed by means of a switch. For example, the switch may cut in and out part of a controlling resistance 8 in series with the armature. The change is governed by two electro-magnets 9—9^a in a normally open circuit adapted to be closed by either of the reeds when excited. These reeds are thin springs of selected length and a definite rate of vibration. These reeds are indicated at 10—10^a, and either will be violently agitated when electric impulses corresponding to its rate of vibration pass over the line between the supply station or other control point and the point of their installation. In Fig. 1 these reeds are mounted on an iron core 11 around which is a wire coil supplied from a distribution circuit. The system shown being an alternating-current system, I have represented a transformer 12 as a means of furnishing energy to the magnet from the main circuit. A similar transformer, indicated at 12^a, supplies the meter and lighting currents. A suitable resistance 13 should be included in the magnet circuit to reduce the energy flow or other suitable means of accomplishing this result may be provided.

When it is desired to effect a change, that is to say, when the load on the circuit becomes such as to render a different recording rate of the meter desirable, the generator is raised slightly in speed or lowered in speed accordingly, as it is desired to change from a fast to a slow rate or from a slow to a fast rate. A small percentage of variation in the rate of the alternating-current is found to be sufficient to render reliable the operation of the resonance apparatus. Thus, if the normal periodicity of the circuit is 60, one spring may be tuned to a resonant vibration rate of 58 and the other to 62. This is depicted in the drawing by showing one spring as of less length than the other. At the time the change is desired the generator is speeded up by means of a field rheostat or, on the other hand, lowered from the normal rate, 60 to 58 or 62 respectively,—a change which does not in any substantial degree affect the translating devices but which is, on the other hand, sufficient to create a violent agitation of the particular reed corresponding to the altered rate. If, for example, the generator were lowered in speed so as to give a periodicity of 58 then the longer spring 10^a would be thrown into vibration and would make repeated contact on the contact block 14 closing a circuit at each complete oscillation through the magnet 9, thereby pulling the switch to the position indicated in the drawing and closing a circuit through the mercury cup 9^b and operating the meter at a high recording rate. Similarly, if a change to a higher rate were desired, the field of the generator would be adjusted to a periodicity of 62, thereby throwing into vibration the reed 10 and energizing the magnet 9^a which in turn would shift the switch and cut in resistance to the potential circuit of the meter, thereby slowing it down.

In Fig. 2 I have shown a slightly modified resonance device in which the electro-magnet which throws the rod into vibration acts on an iron support or armature 15 carrying the reeds.

My invention may be embodied in many other forms than that shown and described and is not restricted to the precise arrangement disclosed, and the claims are intended to cover all changes and modifications within the spirit and scope of my invention.

What I claim as new, and desire to secure by Letters Patent of the United States, is,—

1. The combination of an electric circuit, translating devices therein, and means for controlling the operation of the translating devices comprising a plurality of reeds tuned to different vibration rates, an electro-magnetic device in circuit adapted to operate on the reeds, and a generator at a point distant from the translating devices for impressing on the circuit rates of electric vibration corresponding to the rates of the several reeds.

2. The combination of a distribution circuit, translating devices, and a resonant device governing the operation of the translating devices, consisting of a plurality of differently tuned reeds and a common electro-magnetic device adapted to operate any reed by impulses derived from the supply circuit.

3. The combination of a system of distribution, translating devices supplied thereby, a switch governing the translating devices, two reeds tuned to different pitches, a local circuit governing the switch, electro-magnetic means deriving energy from the supply circuit operating on the reeds, and means for transmitting currents over the supply circuit having a rate corresponding to either reed.

4. The combination of a multiple rate meter connected to a supply circuit, of means responsive to currents of different frequency in said circuit arranged to set said meter to register at a rate corresponding to the frequency of the current last flowing in said circuit, and means for producing currents of different frequency in said circuit.

5. The combination of a system of distribution, translating devices supplied thereby, means for governing the operation of the translating devices comprising tuned reeds responding to different rates of vibration, electro-magnetic devices operatively related

to the several reeds and energized from said system, a generator of electric impulses which vary in frequency with the speed of the generator connected to said system at a point distant from the translating devices, and means for varying the speed of the generator.

In witness whereof, I have hereunto set my hand this 20 day of July, 1906.

ERNEST SCHATTNER.

Witnesses:
H. D. JAMESON,
R. F. WILLIAMS.