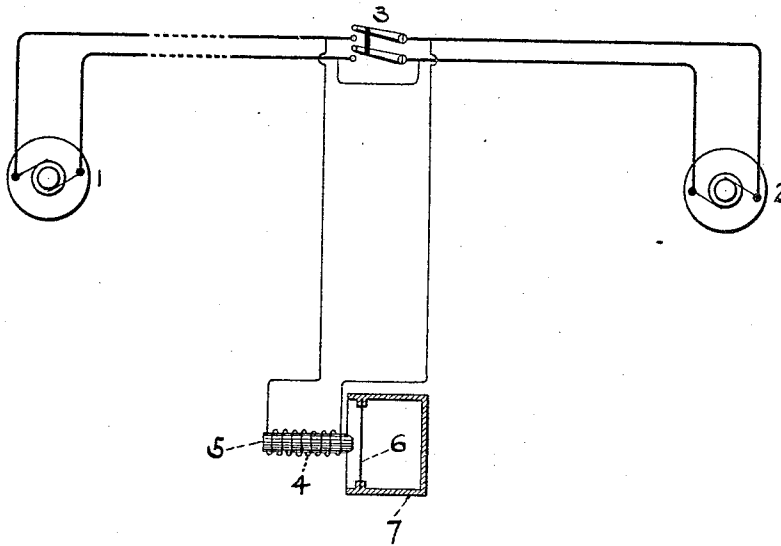


(No Model.)

R. D. MERSHON.
AUDIBLE SYNCHRONISM INDICATOR.

No. 529,399.

Patented Nov. 20, 1894.



WITNESSES:

George Brown Jr.
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RALPH D. MERSHON, OF PITTSBURG, PENNSYLVANIA.

AUDIBLE SYNCHRONISM-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 529,399, dated November 20, 1894.

Application filed April 27, 1894. Serial No. 509,223. (No model.)

To all whom it may concern:

Be it known that I, RALPH D. MERSHON, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Audible Synchronism-Indicators or Synchrophones, of which the following is a specification.

My invention relates to a method and means whereby alternating current motors or generators may be synchronized before connecting them in circuit with each other.

The object of my invention is the provision of a form of synchronizing device or synchronism indicator, which shall appeal to the ear of the operator, so that his attention need not be divided, and so that the indicator may be placed in any desired situation with respect to the motors or generators to be synchronized and to the switch whereby they are thrown in circuit.

My invention depends upon the electric interference or coincidence of the alternating current waves produced by the two machines to be synchronized, and the electrical conditions thus set up are interpreted to the ear by means of a diaphragm of any well known type, such as is used in telephones, subjected to the action of the magnetic field resulting from the action of the interfering electrical waves.

By the use of my invention the moment of synchronism may be detected by the use of a single magnetic pole produced by a single magnetic field and it will be seen that my invention depends therefore solely upon coincident electrical actions as opposed to coincident mechanical or magnetic actions.

My invention is illustrated in the accompanying drawing, which shows in diagram an illustrative form of my said invention.

In the drawing let the machine to be synchronized be shown at 2 and the machine with which it is to be synchronized be represented at 1. It will, of course be understood that either of these machines may be a motor or both may be generators. The switch whereby they are finally connected on occurrence of synchronism is shown at 3.

In the practice of my invention I employ a coil 4 which is placed in series with the two machines and which is made to surround a core 5 or other magnetic body for the production of a single magnetic field. The sound is produced by means of the diaphragm 6, which may be provided with a sounding box 7 for increase of sound. It will be seen that in using this form of device there will be two cases, either of which may occur. The relative condition of the two machines at the moment when the switch should be thrown to connect them should be that of exactly or very nearly exactly synchronous speeds and of opposing electromotive forces in the circuit which is formed between the two machines at the moment of closing the switch. It will be seen, however, that the coil 4 may be connected in two different ways with relation to the circuit between the machines and that the occurrence of synchronism may therefore produce one of two conditions in the coil 4, namely, either in exact opposition of electromotive forces or a coincidence and mutual addition of these forces. The effect of this resultant electrical action will, of course, be opposite in the two cases and the magnetic field produced at the proper moment for closing the switch will either be *nil* on the one hand or will on the other hand be a fluctuating field of maximum intensity. In the former case the operator must watch for the occurrence of silence, inasmuch as the magnetic field when equal to zero will produce no vibration of the diaphragm; while in the latter case the operator must watch for the occurrence of maximum sound in determining the moment when to throw the switch.

It should be stated here that the absence of sound recurs at regular intervals intervening between an increase and decrease of sound, forming what may be called a beat. These beats occur at progressively greater intervals of time as the machines come into synchronism and the moment of silence or maximum sound which is chosen for throwing the switch should be when these beats are very slow.

I do not wish to be understood as limiting myself to the exact details shown, as these

details may be modified to a great extent by those skilled in the art without departing from the spirit of my invention.

What I claim is—

- 5 1. The method of indicating the occurrence of synchronism between two machines which consists in producing a varying magnetic field due to the resultant action of the super-
10 posed electromotive forces of the two machines and causing this field to act upon a body capable of vibration under the influence of magnetism.

2. In an audible synchronizer a coil in series with the two machines to be synchronized and a vibrating body actuated by the magnetic field produced by said coil. 15

In testimony whereof I have hereunto subscribed my name this 11th day of April, A. D. 1894.

R. D. MERSHON.

Witnesses:

JAMES WM. SMITH,
HAROLD S. MACKAYE.