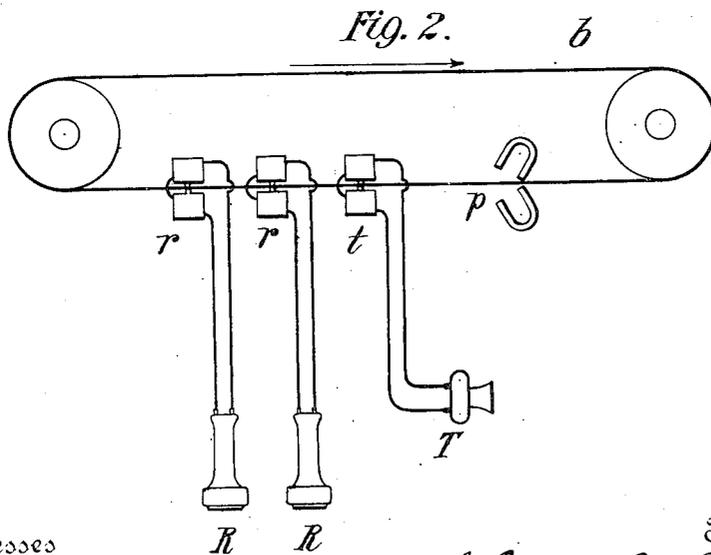
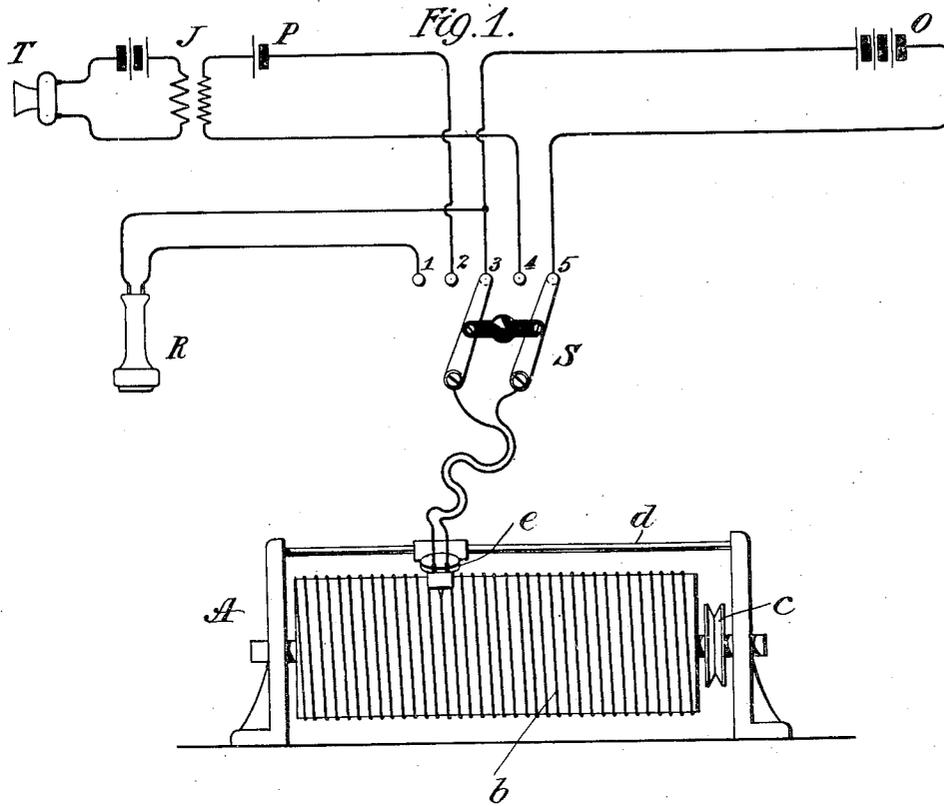


V. POULSEN & P. O. PEDERSEN.
TELEGRAPHONE.

APPLICATION FILED JUNE 12, 1902. RENEWED MAY 2, 1907.



Witnesses

Frank S. Coburn
Waldo M. Chapin

Inventors

V. Poulsen & P. O. Pedersen
By their Attorney, *Wm. Roubaum*

UNITED STATES PATENT OFFICE.

VALDEMAR POULSEN AND PEDER OLOF PEDERSEN, OF COPENHAGEN, DENMARK, ASSIGNORS
TO AMERICAN TELEGRAPHONE COMPANY, A CORPORATION OF THE DISTRICT OF
COLUMBIA.

TELEGRAPHONE.

No. 873,083.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, VALDEMAR POULSEN and PEDER OLOF PEDERSEN, subjects of the King of Denmark, residing at Copenhagen, in the Kingdom of Denmark, have invented certain new and useful Improvements in Telegraphones, of which the following is a specification.

This invention relates to the telegraphone invented by V. Poulsen and described in U. S. Patent No. 661619 issued to him Nov. 13, 1900. The telegraphone comprises a steel body in which a magnetic record of speech, sounds, telegraphic signals or interruptions of alternating currents is made by an electro-magnet whose pole or poles are within magnetizing distance of said body while the latter is moving with respect thereto, and while the electrical undulations created by said speeches are traversing said magnet. For obliterating the magnetic record thus produced, a continuous current is ordinarily traversed the magnet, while the portion of the steel body containing the record is again moved past the magnet. The constant magnetism of the magnet obliterates the magnetical record and leaves the steel body in a permanent uniform magnetic condition throughout. In order to make a new record upon that portion of the steel body thus uniformly magnetized, it is desirable to restore the steel body to the most favorable condition to receive and preserve such record, and this is done by using, what we call a polarizing battery in-circuit with the magnet and so connected that its influence will nullify or partially nullify the uniform magnetic condition existing in the steel body and bring it back to a natural state, or nearly so, where it will be most able to receive and preserve the magnetic record.

The polarizing battery is preferably put into circuit in such a manner that it accomplishes its purpose simultaneously with the making of the new record. In other words, it is connected in the circuit leading from the secondary winding of the transmitter induction coil, to the recording magnet. By thus using the polarizing battery the sensitiveness of the steel body increases because the molecules are put into a state of agitation at the moment the record is made, and simultaneously the demagnetizing force of the record decreases.

To illustrate the manner of carrying out the invention the accompanying drawing shows in Figure 1, a diagram of circuits and apparatus connected up in proper manner for the purpose; and in Fig. 2 an illustration of the use of permanent magnets.

Referring to Fig. 1, A represents the telegraphone, consisting of a horizontal cylinder *a* having wound upon its surface the steel recording wire *b* and adapted to be rotated by power applied at the pulley *c* or in any suitable manner. *e* is the telegraphone electro-magnet whose pole pieces engage the wire *b*, so that it will slide along the rod *d* when the cylinder turns by reason of the spiral arrangement of the wire *b*. T is a telephone transmitter, I its induction coil and R a telephone receiver. P is the polarizing battery in the secondary circuit of the induction coil. O is an obliterating battery and S is a switch for connecting the various apparatuses with the telegraphone magnet *e*. The switch consists of two bars connected with the terminals of the magnet and adapted to be moved into contact with different pairs of the terminals 1, 2, 3, 4 and 5. When the switch is on terminals 2 and 4 the transmitter and polarizing battery are connected with the telegraphone magnet; when on terminals 1 and 3, the receiver is connected with the telegraphone-magnet and when on 3 and 5, as shown, the obliterating battery is connected with the telegraphone magnet. Hence when a record is being made on the steel body the transmitter is connected; when the record is being reproduced, the receiver is connected and when the record is being obliterated, the battery O is connected.

It is not necessary to use separate batteries for polarizing and obliterating, as one and the same battery can be employed, provided suitable means are used for varying the direction and strength of the current according to whether the battery is used for obliterating or recording.

Since the operations herein described are magnetic, it is obvious, that the obliterations of the record and the restoration of the magnetizable body to a favorable condition can be accomplished with permanent magnets or both permanent and electro-magnets. Where the steel body is in the form of an endless band and separate recording and reproducing magnets are used simultaneously, it

is convenient to use permanent magnets for obliterating the record and restoring the steel body to favorable condition. This plan is illustrated in Fig. 2, wherein *b* is an endless band or wire traveling in the direction of the arrow. The recording magnet is at *t*, connected with transmitter T. The reproducing magnet (one or more) is, at *r*, connected with receiver R. The record made at *t* must be obliterated before the band again comes under the magnet *t*. For this purpose permanent magnets are placed at *p* to obliterate the record and arranged with the poles in such a manner, that the band is restored to the most favorable condition for recording. The number and positions of the magnets can be varied in different manners corresponding to the recording magnet. Obviously electro-magnets could be substituted for one or more of the permanent magnets.

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

1. In an apparatus for recording speech, sounds or current variations electro-magnetically, the combination of a magnetizable body, a recording magnet, a source of constant current and means whereby said current can be sent through the magnet successively in opposite directions and eventually with different strengths.

2. In an apparatus for recording speech, sounds or current variations electro-magnetically, the combination of a magnetizable body, a recording magnet, means for uniformly magnetizing said body with opposite directions of the magnetic lines of force, substantially as described.

3. In an apparatus for recording speech, sounds, or current variations electro-magnetically, the combination of a magnetizable body, a recording magnet, means for uniformly magnetizing said body and means for further magnetically influencing said body to bring it to a magnetic condition most favorable to receive and preserve a record, substantially as described.

4. In an apparatus for recording speech, sounds or current variations electro-magnetically the combination of a circuit transmitting apparatus in said circuits a battery in said circuit, a magnetizable body, a recording electro-magnet, a second circuit containing a battery and a switch whereby either battery can be connected in circuit with the electro-magnet in a manner to send current through the magnet in opposite directions, substantially as described.

5. The method of operating telegraphones which consists in obliterating a magnetic record by uniformly magnetizing the body containing the record and then uniformly remagnetizing said body with magnetic lines of force of opposite direction to bring it to the most favorable condition to receive a new message, substantially as described.

6. The method of operating telegraphones which consists in obliterating a magnetic record by uniformly magnetizing the body containing the record and then uniformly remagnetizing said body with an opposite direction of the magnetic lines of force, substantially as described.

7. The method of operating telegraphones, which consists in obliterating a magnetic record by uniformly magnetizing the body containing the record and then simultaneously remagnetizing said body with a uniformly magnetizing current, the magnetic lines of force of which have the opposite direction of the obliterating lines of force, and a message current, substantially as described.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

VALDEMAR POULSEN.
PEDER OLOF PEDERSEN.

Witnesses as to Poulsen:
E. S. HAYEMANN,
CARL SCHAU.

Witnesses as to Pedersen:
WM. A. ROSENBAUM,
FRANK S. OBER.