

Aug. 5, 1924.

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R. DEMELE

ELECTROMAGNET

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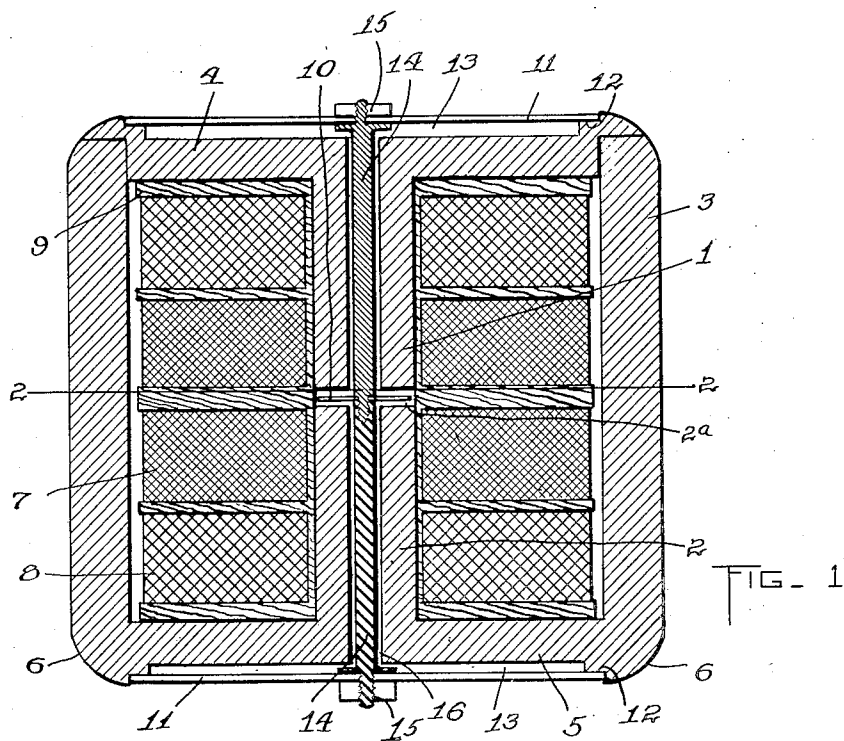


FIG. 1

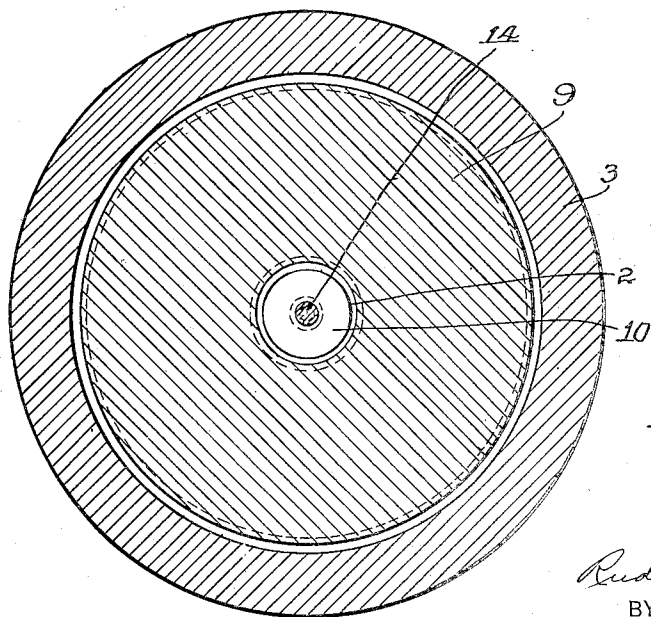


FIG. 2

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UNITED STATES PATENT OFFICE.

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ELECTROMAGNET.

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To all whom it may concern:

Be it known that I, RUDOLF DEMELE, a citizen of the Republic of Czechoslovakia, and resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Electromagnets, of which the following is a specification.

The present invention relates to electromagnets and an object thereof is to provide a magnet in which the gap between the pole pieces is entirely inclosed. A further object of the invention is to provide inclosed pole pieces within a casing of magnetic material which forms a magnetic connection between the pole pieces and reduces the leakage of the lines of force to a minimum. Another object of the invention is to provide for entirely inclosing the magnetic gap of an electro-magnet and to arrange in said gap, an armature which will also be inclosed. A still further object of the invention is to provide a connection between a diaphragm on the exterior of a casing which incloses the magnetic gap of an electro-magnet and an armature arranged in said gap.

To these and other ends, the invention consists of certain parts and combinations of parts all of which will be hereinafter described, the novel features being pointed out in the appended claims.

In the drawings:

Fig. 1 is an axial section through the magnet, and

Fig. 2 is a cross section on the line 2—2, Fig. 1.

Referring to the embodiment of the invention herein illustrated 1 and 2 indicate two pole pieces which extend toward each other being spaced apart at 2^a to provide the magnetic gap. These pole pieces are inclosed within a casing formed of magnetic material. In this instance, this casing embodies an outer wall 3 preferably of cylindrical form with the pole pieces centrally arranged therein, this outer cylindrical wall being closed at opposite ends by walls 4 and 5 both formed of magnetic material, and adapted with the outer wall to serve as a magnetic connection between the pole pieces 1 and 2 respectively. The end wall 4 is, in this instance, integral with its pole piece and is formed separately from the wall 3 but the connection with the wall 3 is such that there is a minimum leakage of the lines of force. The wall 5 is formed

integrally with the pole piece 2 and also integrally with the wall 3. The cylindrical formation of the outer wall with the round corners 6 merging into the end walls 4 and 5 also reduces the loss of the lines of force to a minimum so that there is a closed field through which the lines of force travel. The poles and the casing may be made of any suitable magnetic material such as iron or magnetized steel and the magnetism of the poles is maintained through any suitable means. In this instance, each pole is surrounded by winding 7 of small wire and a winding 8 of large wire, the large winding being connected in series as are also the small windings. Any suitable non-conductor such as mica may be arranged between the windings and the pole pieces as indicated at 9.

The armature is, in this instance, in the form of an iron disk 10, arranged in the space 2^a between the pole pieces 1 and 2. This armature may be connected to any part but, in this instance, the electro-magnet is employed for vibrating membranes or disks 11 which are arranged exteriorly of the casing of the magnet and are preferably supported by said casing. To this end each head of the casings has an annular seat 12 providing a space 13 within said seat and on each of these seats one of the membranes or disks 11 is positioned. Connection between the membranes or disks of the armature 10 may be established in any suitable manner. In this instance, the armature is provided with stems 14 extending from opposite sides thereof and secured at 15 to the membranes or disks 11, the pole pieces 1 and 2 being provided with circular openings 16 through which the stems 14 extend.

It is apparent that the vibrations of the armature 10 due to fluctuations in the magnetic field will produce vibrations in the membranes or disks. This magnet is especially advantageous when used in the receiver of any telephone or when used in the receiver of a wireless telegraph system. It is well-known that messages received in a wireless telegraph or telephone system are in most instances extremely feeble and faint and in many cases indecipherable. This armature makes it possible to obtain better audible conditions than have heretofore been secured. There is a higher grade of efficiency due to the minimum

leakage of the magnetic lines of force. The round and circular construction of the coils permit a larger amount of wire turns while making the magnet more sensitive to weak currents. Due to the fact that the magnet has a minimum leakage of magnetic lines it will maintain its full magnetic strength for a much greater period than types now used. When the magnet is being used for a telephone receiver, the audibility is greatly increased due to the fact that there are two membranes vibrating whereas one has heretofore been used. Owing to its increased audibility a wireless operator will not be required to carry the bulky and heavy receivers over their heads as a few feet of hose will be sufficient to carry the sound to the ear of an operator while the bulk of the instrument is supported at some convenient place. The poles being entirely inclosed, there is no danger of dust, dirt or iron filings lodging in the gap between the poles and decreasing the efficiency of the instrument, and making the instrument useless. The fine wire windings and the adjustment of the armature are inclosed and are thus protected at all times against injury.

What I claim as my invention and desire to secure by Letters Patent is:

1. An electro-magnet comprising two pole pieces extending one toward the other and having a gap between them, each pole piece being provided with a longitudinally extending bore, an armature disk arranged in the gap between the pole pieces and having its edges free, a casing formed of magnetic material enclosing the pole pieces, gap and armature and forming a magnetic connection between the pole pieces, a stem extending in opposite directions from the pole pieces through the longitudinal bores of the latter, and means for supporting the stem on opposite sides of the armature.

2. An electro-magnet comprising two pole pieces extending one toward the other and having a gap between them, each of said pole pieces being provided with a longi-

tudinal extending bore, an armature arranged in the gap between the pole pieces, a casing formed of magnetic material inclosing said pole pieces, gap and armature and forming a magnetic connection between the pole pieces, means arranged at opposite ends of the casing to be operated by the armature and a stem extending through the longitudinal bores of the pole pieces and connected with said means.

3. An electro-magnet comprising two pole pieces extending one toward the other and having a gap between them, each pole piece being provided with a longitudinal bore, an armature arranged in said gap, a casing formed of magnetic material inclosing said pole pieces, gap and armature and forming a magnetic connection between the poles, a stem extending in opposite directions from said armature through the bores of said pole pieces, and two diaphragms supported for vibration upon said casing and connected with said stem.

4. An electro-magnet comprising a cylindrical formed wall of magnetic material, heads closing the opposite ends of the wall, pole pieces extending inwardly from said heads toward each other, said pole pieces being provided with longitudinal bores extending through the heads to the exterior casing, an armature in the gap between the pole pieces, a stem extending in opposite directions from the armature through said bores, and a diaphragm mounted on the heads over the bores and connected with the stem.

5. An electro-magnet having a casing of magnetic material inclosing its gap and forming a magnetic connection between its pole pieces, an armature arranged in the gap and inclosed by the casing, a stem extending from said armature to the exterior of the casing, and a diaphragm supported on the exterior of the casing and connected to said stem.

RUDOLF DEMELE.