

## **New or improved electromagnetic therapeutic apparatus.**

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*(Under International Convention.)*

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Accepted, 2nd Feb., 1905

COMPLETE SPECIFICATION.

**New or Improved Electromagnetic Therapeutic Apparatus.**

I, EMILE BACHELET, of Tacoma in the County of Pierce and State of Washington, United States, Electrician, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:

5 This invention relates to electromagnetic therapeutics, it being a novel efficacious apparatus for treating diseases by application of electro-magnetism in a novel manner.

The object of the invention is to enable powerful magnetic currents or lines of force to be directed through the human body or any part thereof without  
10 direct contact of the body with the poles or anodes and to enable the magnetic waves to be concentrated and directed at will through the patient without having necessarily any direct application of apparatus to his body, so that the patient may be placed wholly or partly within a magnetic field and a magnetic current directed through his entire body or any portion thereof without  
15 necessarily interfering with his physical comfort or occupation.

The invention in brief comprises two electromagnets arranged in series and some distance apart, preferably so that they act together to create an intense magnetic field, having a centre or core of great intensity in the direct line between the coacting adjacent poles of the magnets. The magnets may be  
20 relatively fixed or movable or one may be fixed and the other movable. In the case of relatively movable magnets care must be taken to have the proper poles in opposition to wit: The north pole of one magnet must be in opposition to the south pole of the other, so that the centre of the magnetic field will pass axially through both magnets and be of greatest intensity, the operator by  
25 adjusting the magnets positively determining the flow of greatest magnetic force through any portion of the body of the patient. Preferably I employ an intermittent or alternating current which may be derived from any suitable generator either direct or by use of a transformer. I may also use a direct current; but in the latter case I prefer to place an interrupter in the circuit  
30 as it is in many cases desirable to use an alternating or intermittent current

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for the purpose of breaking down diseased tissues or relieving congested conditions of the blood. I may also use an interrupter in connection with an alternating current, to render the vibrations more acute and increase the length of the field or lines of force. The magnets may be energized by connecting them in series or multiple or independently, and I would consider it within the scope of my invention to use a permanent magnet in place of one of the electromagnets. 5

The magnets need not necessarily be of the same power and size, the vital feature of the invention being the employment of magnets acting in series so that the operator by properly positioning them can direct the flow of greatest lines of force through any part of the body of the patient in any position of the latter without encumbering him with unsightly or uncomfortable contacts or anodes. I further provide means for varying the strength of the magnets without changing the source or wasting the current by cutting out or in, more or less of the magnet coils. I have used solenoids without cores with excellent results, but can use the cores if desired. The preferred form of electromagnet without a core is shown in the Specification of United States Patent No. 743372, dated 3rd November 1903— 10 15

The accompanying drawings illustrate diagrammatically my improved apparatus in several different arrangements, and I will now describe the same more in detail with reference thereto, and the claims following the description of the operation of the apparatus summarize the novel features for which protection is desired. 20

Fig. 1 is a diagram illustrating two electro-magnets connected in series and acting in series. 25

Fig. 2 is a similar view illustrating two magnets acting in series and connected in multiple.

Fig. 3 is a similar view illustrating two magnets in series and energized by independent currents.

Fig. 4 is a detail view indicating a mode of using the apparatus. 30

Fig. 5 is a diagram showing the preferred mode of winding the magnets.

In the drawings A A<sup>1</sup> designate two electro-magnets which are separated but arranged in series—that is, with the north pole of one magnet adjacent to the south pole of the other. It therefore follows that the magnets coact in establishing a common field of force in which the magnetic lines of force will be found thickest and continuous between the adjacent opposed poles of the magnets, as indicated by the arrows. An object interposed between the two magnets therefore will be subjected to the greatest number and power of the lines of force generated by both magnets. 35

In Fig. 1 both magnets are connected in series with a common source B of electrical energy, which is shown as a battery, but may be any other suitable mechanical or chemical generator. An interrupter C is placed in the circuit so that the current will be broken or undulating, thereby creating pulsations of the magnetic field, as is well known, and intensifying the action of the magnets. 40

In Fig. 2 the magnets A A<sup>1</sup> are similarly arranged to act together in series, but they are connected in multiple, their south poles being connected to one terminal of the generator D, while their north poles are connected to the other terminal of said generator. This generator is preferably an alternating-current dynamo or may be any other kind of generator. Interrupters may be placed in the circuits of the magnets, if desired. 45 50

In Fig. 3 the magnets A A<sup>1</sup> are in series; but magnet A is in a circuit energized by a generator E and magnet A<sup>1</sup> in a circuit energized by a generator F, said generators E and F being of different powers or types. Interrupters may also be placed in the circuits of the magnets in Fig. 3 if desired. In all these modifications it will be noted that the magnets act in series, so that the axial lines of force pass through both magnets or flow directly from one 55



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magnet to and through the other, and therefore it is obvious that by moving one magnet relatively to the other, so that a direct line between their opposed poles will pass through the body of the patient, such part of the patient will be traversed by the greatest number of direct axial lines of force without the magnets actually contacting with the patient.

One manner of treatment is indicated in Fig. 4 in which the magnets are placed at opposite sides of a room and the patient seated in the chair there between will be subjected to the action of the magnetic current flowing directly from magnet A to magnet A<sup>1</sup>, as indicated in the drawings. It will be seen that by my apparatus the lines of force developed by the electromagnet A, for example can be concentrated or prolonged in the direction of the magnet A<sup>1</sup> and thus giving an definitive direction enabling the operator to certainly control and direct their application to the patient, and this is the principal feature of the invention, and I do not restrict myself to the employment of a second electromagnet A<sup>1</sup> for the purpose of elongating or directing the magnetic field or lines of force generated by magnet A. Any other device which will accomplish the desired object may be substituted for the magnet A<sup>1</sup> within the scope of my invention. The possibility of varying and localizing the application of the magnetic currents by varying the relative positions of the magnets will be obvious.

In Fig. 5 I have indicated a preferred construction of the magnet in that the magnet is preferably wound in a flat wide annular coil or ring, which is divided into sections connected with contacts *a*, any one of which can be brought into electrical communication with binding post *a*<sup>2</sup> by the switch-arm *a*<sup>1</sup>. The other terminals of the coils are all connected to a common terminal *a*<sup>3</sup>, and therefore by shifting switch *a*<sup>1</sup> more or less of the magnetic coils are cut into the circuit, and consequently greater or less magnetic force is generated by the magnet, while the same effect could be realized by the introduction of a rheostat in the circuit; this construction of the magnet economizes the power and is more compact and desirable than a rheostat, particularly when the apparatus is made in portable form and operated by batteries.

In Fig 5 a core A<sup>2</sup> is indicated in the magnet which core should be laminated when used; but I do not restrict myself to the employment of cored magnets.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed I declare that what I claim is:

1. In an electromagnetic therapeutic apparatus, an electromagnet and means for prolonging the lines of force generated by said magnet and giving direction thereto substantially as described.
2. An electromagnetic therapeutic apparatus comprising one electromagnet, means mechanically disconnected from said electromagnet for prolonging and directing the line of force generated thereby and means for varying the strength of the magnetic field substantially as described.
3. In an electromagnetic therapeutic apparatus two magnets arranged in series mechanically disconnected but for the purpose and substantially as described.
4. In an electromagnetic therapeutic apparatus two mechanically disconnected electro-magnets arranged in series and means for energizing the magnets substantially as described.
5. In an electromagnetic therapeutic apparatus two electromagnets arranged in series and an interrupter substantially as described.
6. In an electromagnetic therapeutic apparatus, an electromagnet, and a second magnet in series therewith, said magnets being mechanically disconnected but relatively adjustable.
7. In an electromagnetic therapeutic apparatus two electromagnets acting in series and relatively adjustable and an interrupter substantially as described.



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8. In an electromagnetic therapeutic apparatus; two electromagnets acting in series but mechanically disconnected means for energizing said magnets, and means for varying the strength of the magnets, substantially as described.

9. In an electromagnetic therapeutic apparatus two electromagnets acting in series and relatively adjustable means for energizing said electromagnets and an interrupter substantially as described. 5

10. In an electromagnetic therapeutic apparatus; an electromagnet, means for energizing it, and an interrupter; with a second magnet acting in series with the first magnet and adjustable relatively thereto.

11. In an electromagnetic therapeutic apparatus; two electromagnets arranged in series; means for energizing said magnets, means for varying the relative strength of said magnets and an interrupter substantially as described. 10

12. A magnetic medical apparatus consisting of coils separated in space but connected together electrically and excited by means of an alternating or vibratory current whereby alternating or vibrating magnetic waves are sent to the space between said coils. 15

Dated this 1st day of October 1904

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Agents to Applicant

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Fig. 1.

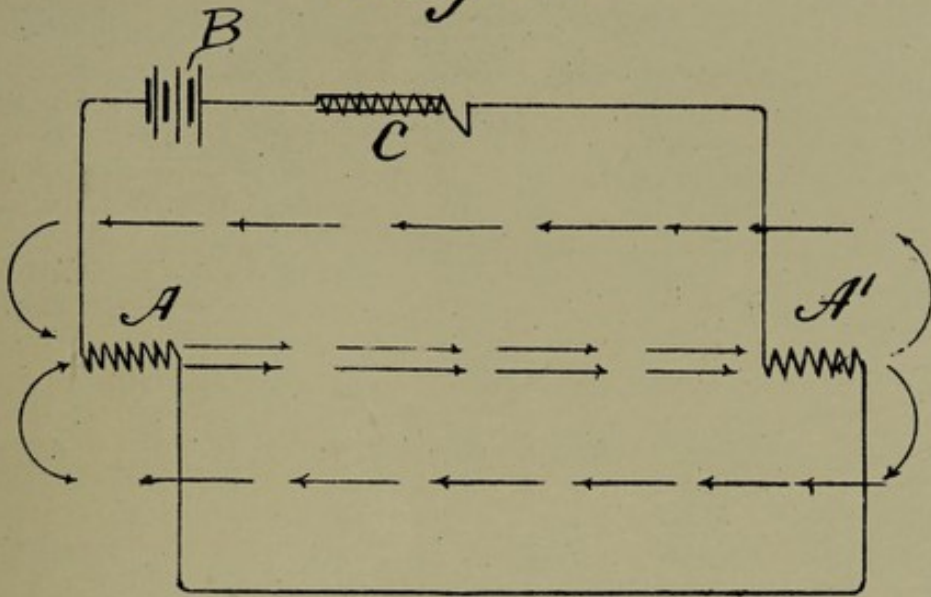


Fig. 2.

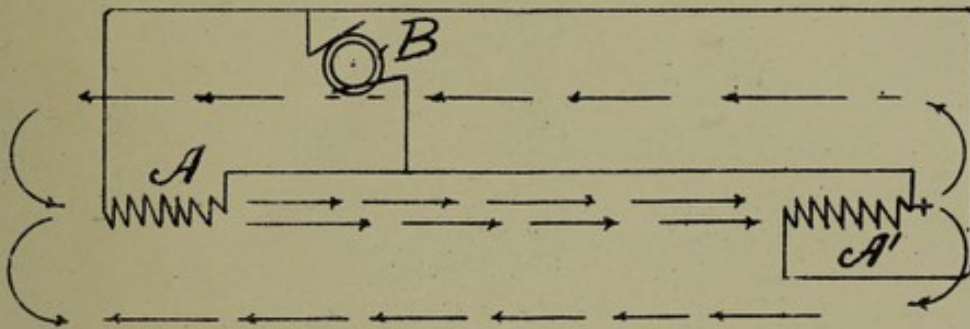


Fig. 3.

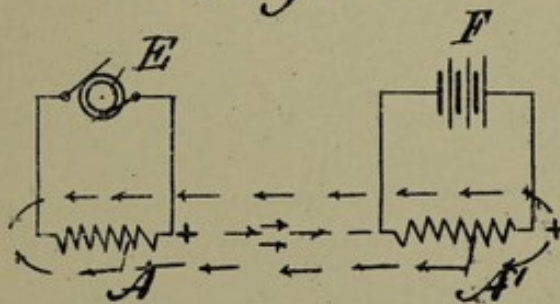


Fig. 4.

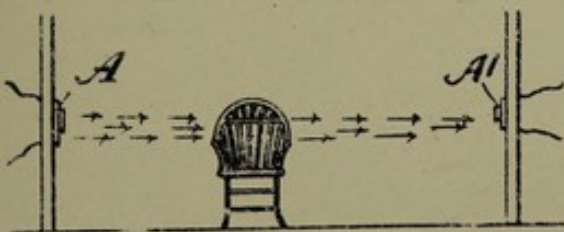
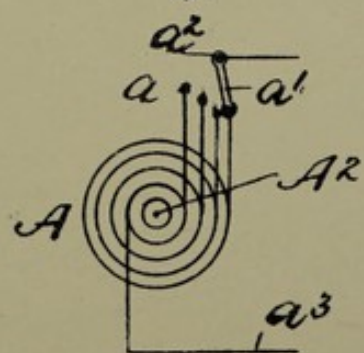


Fig. 5.



[This Drawing is a reproduction of the Original on a reduced scale.]



