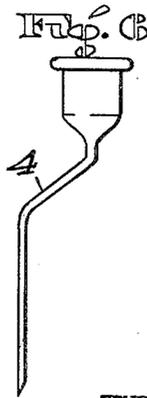
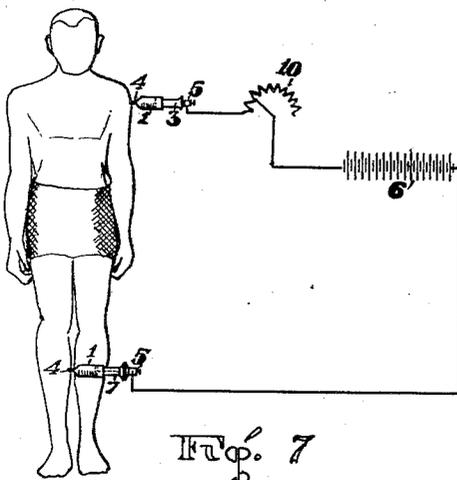
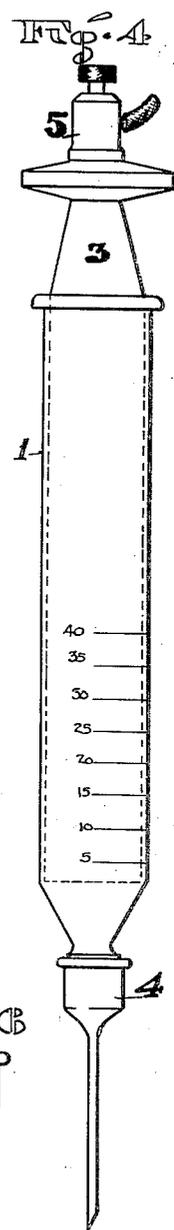
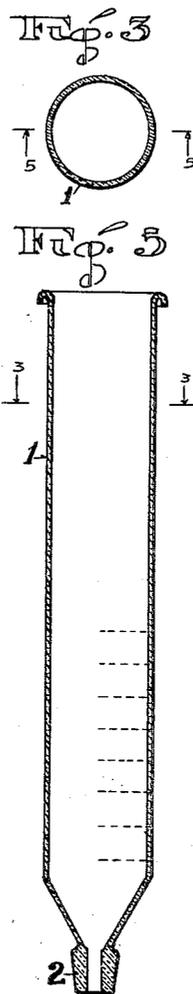
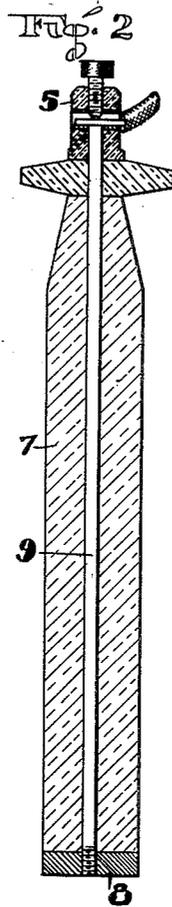


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ELECTROTHERAPEUTICAL APPARATUS

Filed Aug. 7, 1926



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UNITED STATES PATENT OFFICE.

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ELECTROTHERAPEUTICAL APPARATUS.

Application filed August 7, 1926. Serial No. 127,944.

This invention relates to instruments for electrolytically treating the human blood-circulatory system, whereby injurious deposits may be removed from the walls of veins, arteries and capillaries of the body.

An object of our invention is to provide instruments for electrolytically treating the blood-circulatory system whereby injurious deposits may be satisfactorily removed from the body.

Another object of our invention is to provide satisfactory apparatus for removing by electrolysis certain injurious substances from the body.

A further object of our invention is to provide apparatus for satisfactorily removing deleterious substances from the veins, arteries and capillaries of the human body, whereby the blood circulatory system may be restored to a healthy condition.

A further object of the present invention is to provide apparatus for electrically treating the human body, whereby certain unhealthy conditions may be removed therefrom. Another object of our invention is to provide improved apparatus for electrolytically treating the blood stream whereby the composition of the blood plasma may be altered.

It is well known in medical science that the membranes covering the capillaries of the human body act as filters of the blood and that through years of such constant filtration a more or less obstructive coating of deleterious substances collects upon the surfaces of the membranes and interferes with the normal passage of the blood therethrough.

The accumulation of the obstructive substances on the surfaces of the membranes renders them more or less impervious to the blood flow, which necessarily results in the starvation of the tissues of the body. The diffusion of the blood through the membrane coverings of the capillaries to the lymph of the body tissues is caused primarily by the difference in osmotic pressure; that is, the variation in character and intensity of the solutions on either side of the membranes creates a difference of potential which tends to induce a flow through membranes in the direction of a more intense solution. The blood in the arterial capillaries is at somewhat higher pressure than the lymph of the tissues, and this difference of cardiac pressure must also aid the

passage of the blood plasma through the membranes. This function is at high efficiency for only the first few years of life and thereafter there is a tendency for undissolved deleterious substances to accumulate gradually on the inner and outer walls of the capillaries and in the cell structures, even though a certain portion of the substances is redissolved by the blood plasma and passed to the excretory organs. The most common of these harmful accumulations are carbonates, phosphates, calcium salts, sulphates and substances of an organic and inorganic nature, and in the more advanced stages of a person's life they frequently cause what is called "high blood pressure."

Heretofore there has never been discovered any apparatus for satisfactorily removing such accumulations or deposits from the human blood circulatory system, and although temporary relief has been administered by injections being made into the veins and arteries, the resulting effect was in no manner permanent, and the patient soon thereafter found himself suffering from the same ailment.

By means of the novel and improved apparatus constituting the present invention, it is possible to accomplish a result which in effect comprises the removal of certain organic and inorganic accumulations from the walls of the veins, arteries and capillaries of the human body, thereby restoring their original softness, pliability and healthy condition.

The apparatus constituting the present invention permits the electrolysis of the blood circulatory system, which is accomplished by causing the blood in two removed parts of the body to contact with an anode and a cathode of a direct electrical current circuit. The passing of the electrical current through the blood circulatory system from the anode to the cathode dissociates the various organic and inorganic solutes of the blood plasma, the negative elements of these solutes assembling at the anode and the positive elements collecting on the cathode. By disturbing the equilibrium of the composition of the blood direct electrolysis of the blood stream excites the glandular activity of the body and thus increases the solvent action of the blood stream upon accumulations in the veins, arteries and capillaries.

We have provided apparatus particularly adapted to cause an electrolytic action within the blood circulatory system, and although instruments embodying various modified forms or principles of construction may be satisfactorily used, we have illustrated on the accompanying drawings the preferred form of our improved apparatus for carrying out the method or process herein described.

In the accompanying drawings forming a part of the present application for Letters Patent, we have shown two forms our invention may assume, but it will be evident to those skilled in the art that other modifications thereof may be easily constructed, so for this reason it is our desire to have the appended claims determine the limits our invention may assume.

In the accompanying drawings:

Fig. 1 is a side view of an all metal plunger forming a part of our invention, showing a part thereof in cross-section;

Fig. 2 is a sectional view of a plunger constructed in a different manner and constituting another part of our invention;

Fig. 3 is a sectional view of a glass barrel forming a part of a syringe taken on the line 3—3 of Fig. 5;

Fig. 4 is a side view of a syringe embodying our invention;

Fig. 5 is a sectional view of a glass barrel taken on the line 5—5 of Fig. 3;

Fig. 6 is a side view of a hollow needle showing one form of construction; and

Fig. 7 is a view illustrating the manner in which our invention may be applied to a patient to be treated.

Referring to the drawings, the numeral 1 designates the hollow glass barrel of a syringe, having one end tapered to form a tip 2, and the other end entirely open so that a plunger 3 constructed entirely from aluminum or other suitable less electro-positive metal may be inserted therein. To the top of the barrel 1 is attached a hollow needle 4, constructed from steel, nickel or other suitable high resistance metal and provided with a pointed end adapted to be inserted into a blood vessel of the human body.

The all metal plunger 3 is secured to a binding post 5 which is connected to the negative terminal of a direct current circuit, supplied with electricity by suitable batteries 6, or any other suitable means. In practical use the needle 4 is attached to the tip 2 and the metal plunger 3 is inserted inside the hollow barrel 1, thereby forming a cathode syringe adapted to draw a quantity of blood from the body of a patient into the hollow barrel thereof.

An anode syringe, which comprises a part of our invention and is used in conjunction with the cathode syringe just described, is comprised of a hollow glass

barrel 1, having one end tapered to form a tip 2 and the other end entirely open so that a plunger 7 may be inserted therein. The plunger 7 is comprised of a bar of suitable shape and size, constructed from glass or other similar material having one end suitably attached to a button 8, made from silver, gold or other highly electro-positive material, and the other end suitably secured to a binding post 5 which is connected to the positive terminal of the direct current circuit furnished with electricity by the batteries 6. Suitably connected to the button 8 and extending centrally through the glass plunger 7 to the binding post 5, to which it is connected, is a wire 9, composed of a metal similar to that from which the button 8 is constructed. In practical use the needle 4 is attached to the tip 2, and the plunger 7 with the button 8 secured thereto, is inserted inside the hollow barrel 1, thereby forming an anode syringe adapted to draw a quantity of blood from the body of a patient into the hollow barrel thereof.

The plungers 3 and 7 are suitable in size to closely fit inside the hollow glass barrels 1, thereby enabling the blood from a patient to be satisfactorily drawn through the hollow needles 4 into the glass barrels where it contacts with the metal plunger 3 and the button 8 of the plunger 7.

In operation, the needle 4 of one syringe is inserted into a blood vessel of the leg or lower part of the body of a patient and a suitable quantity of blood is drawn into the hollow barrel 1 by drawing the plunger outwardly the desired distance. The needle 4 of the other syringe is inserted into a blood vessel of an arm or other part of the body, and a suitable quantity of blood is drawn into the barrel 1 of the syringe in the manner just described. The anode syringe, comprised of the parts shown in Figs. 2 and 5, may be applied to the lower portion of the body and the cathode syringe, comprised of the parts shown in Figs. 1 and 5, may be applied to the upper part of the body, or vice versa, it being necessary only that the plunger 3 and the metal button 8 of plunger 7 contact with the blood drawn into the hollow glass barrels 1. The terminal of the anode syringe is then connected by binding post 5 to the positive terminal of a direct current supply of electricity furnished by batteries 6, or any other suitable means for supplying a direct current. The terminal of the cathode syringe is connected by binding post 5 to the negative terminal of the direct current supply of electricity, and the current in measured quantities and pressures is controlled by a rheostat 10 which is suitably connected to the batteries 6.

The direct current of electricity of approximately fifteen milliamperes under a

pressure of approximately sixty volts is then passed through the blood circulatory system, thus commencing the electrolysis of the blood. As the electrical current is passed through the blood circulatory system, ionization of calcium sulphate particles takes place and sulphur is deposited on the metal plunger 3 of the cathode syringe. As a portion of the inorganic solutes is thus removed from the blood stream, the solvent action of the plasma becomes proportionately greater and the blood is then able to dissolve the destructive films of calcium salts on the capillary membranes. Aggregates of various more or less soluble salts attached to the walls of the blood vessels are thereupon undermined by the dissolution of the more soluble components, and the whole structure is swept away by the blood stream. As the electrical current is passing through the blood circulatory system, the metabolism of the cells is stimulated, thereby promoting more rapid and complete chemical changes in the lymph. For instance, microscopic particles of normal calcium sulphate may be speedily rendered non-obstructive by conversion to soluble acid calcium sulphate. Increased activity in this respect raises the proportion of carbon dioxide in the blood and thus the capacity of the blood to dissolve carbonates is increased. The stimulation of the nerve centers by the electrical current passing through the blood system tends to cause the capillaries to dilate, thus enabling a greater quantity of blood to pass through them and thereby causing a dislodgment of obstructive particles such as salts and dead corpuscles.

The electrolysis of the blood by means of the present invention frees the circulatory system of deleterious and obstructive substances, and the removal of these salts necessarily softens and clears the blood vessels, thereby enabling the blood to nourish and cleanse the tissues more satisfactorily.

In ordinary cases the electrical current is passed through the blood stream for approximately thirty minutes at a time and as often as needed; but in some instances when the physical condition of the patient requires that the amount, duration and/or pressure of the current be altered to produce the most beneficial results, the operator of the apparatus may accordingly vary the same so that no harmful results may follow the treatment.

Although the manner of application of our improved apparatus to the human body has been described in detail, it is evident to those skilled in the art that the same may be employed in other ways and may be satisfactorily used in the treatment of bodily ailments other than the one herein described. We therefore do not desire to have our in-

vention limited in its use to the treatment of the human blood stream, but desire it to be broadly included within the spirit of the appended claims in which it is defined with more or less particularity as apparatus of an electrotherapeutical nature. The present application relates particularly to the novel apparatus employed in carrying out the process as described and claimed in our co-pending application "Electrotherapeutical processes" filed August 7, 1926, Serial No. 127,945.

Having described our invention, what we claim is:

1. Electro-therapeutical apparatus comprising, a plurality of syringes having means therein for contacting with the human blood stream, and an electrical current circuit connected to said means, whereby an electrical current may be passed through the said blood stream.

2. A syringe comprising, a hollow barrel having a hollow needle attached to one end thereof, a plunger movably located inside the hollow barrel and provided with a metallic button on one end thereof, means connected to the other end of the plunger, whereby the plunger may be connected to the terminal of an electric current circuit, and connecting means leading from the metallic button to the first mentioned means.

3. An electro-therapeutic apparatus for the electrolysis of blood in a human circulatory system comprising, distinct and separate anode and cathode elements, independent means cooperating with each of said anode and cathode elements to contact said elements with blood drawn from but still in continuity with said circulatory system at two separated points in said system and preserve the circulatory action thereof, and means for connecting a source of direct current of electricity to said cathode and anode elements.

4. An electro-therapeutic apparatus for the electrolysis of blood in a human circulatory system comprising, separate and distinct anode and cathode elements, each of said elements having independent means for withdrawing a portion of said blood, while leaving this portion in continuity with said circulatory system, and contacting with the withdrawn blood, and means for connecting a source of direct current of electricity to said cathode and anode elements.

5. An electro-therapeutic apparatus comprising, an anode element and suction means for producing contact with the blood of the human circulatory system and said anode element, a separate and distinct cathode element of the same nature for contacting the human blood circulatory system with said cathode element, and means for connecting a source of direct current of electricity to said cathode and anode elements whereby elec-

trolysis of the blood is rendered possible during its circulation.

5 6. An electro-therapeutic apparatus comprising, a syringe having a piston forming an anode element, a separate and distinct syringe having a piston forming a cathode element, and means for connecting a source of direct current of electricity to said cathode and anode elements, whereby blood drawn from
10 a circulatory system at two separate points may enter the syringes and be contacted by said anode and cathode elements and electrolysis of the blood rendered possible during its circulation.

15 7. An electro-therapeutic apparatus comprising, a syringe having a hollow barrel, a plunger within said barrel and provided

with an anode element at its suction end and adapted to withdraw within said barrel and come in contact therewith blood from a
20 human circulatory system, a second separate and distinct syringe having a hollow barrel, a plunger within said barrel and provided with a cathode element at its suction end and adapted to draw within said barrel and come
25 in contact therewith blood from a human circulatory system, and means for connecting a source of direct current of electricity to said cathode and anode elements whereby electrolysis of the blood is rendered possible
30 during its circulation.

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