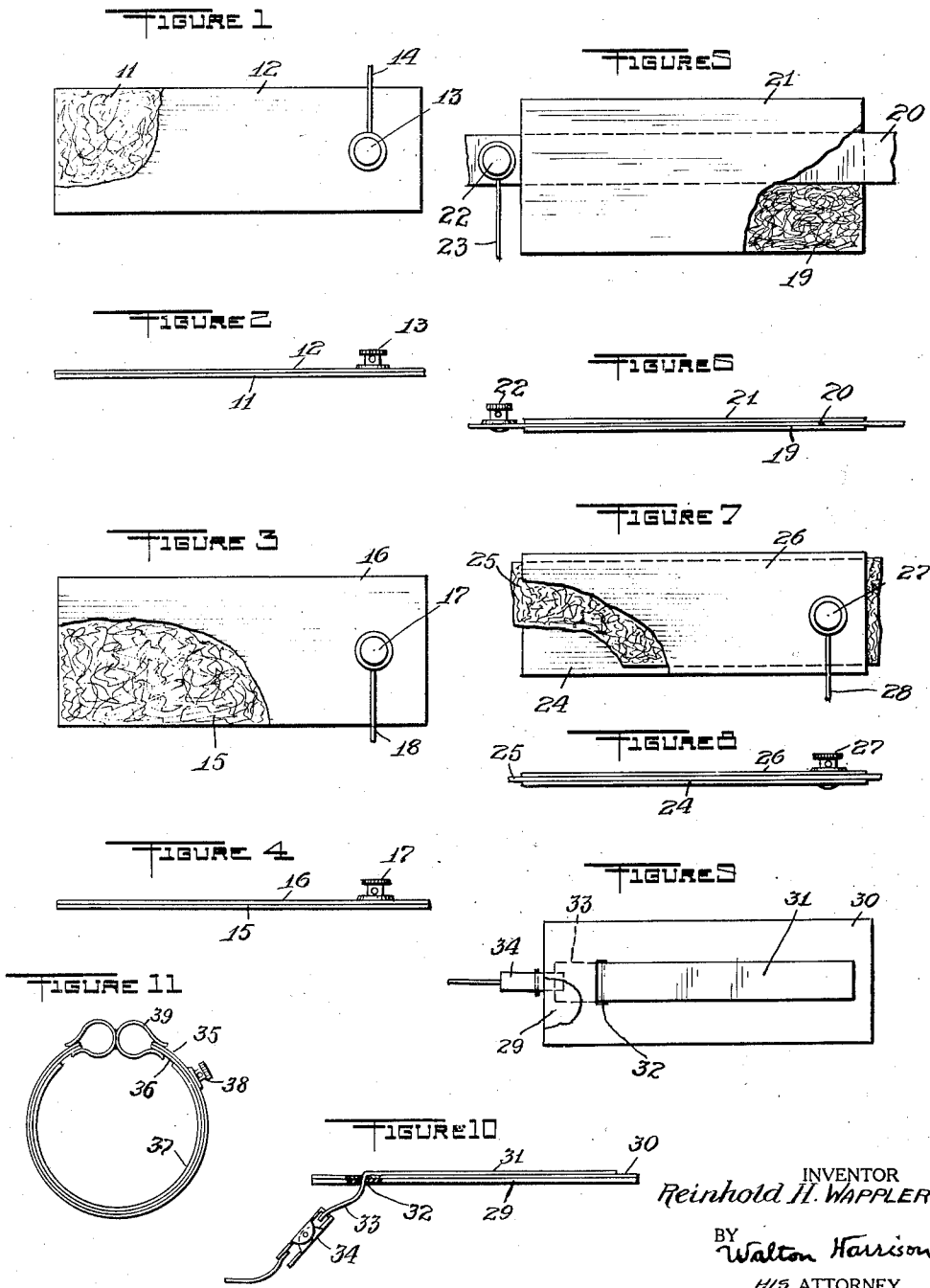


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R. H. WAPPLER
METAL FOIL ELECTRODE

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METAL-FOIL ELECTRODE.

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My invention relates to electrodes, of a kind suitable for use in supplying electric currents to the skin of a patient, for purposes of therapeutic treatment, electrical massaging and the like.

More particularly stated, my invention comprehends a metal foil electrode; that is, an electrode having the form of a sheet and provided with a facing of metal or other conducting material, the sheet with its facing being as a whole so flexible that it can be applied to the skin after the manner of a plaster, and can be fitted around or between various physiological members of different form, such for instance as the fingers, toes, wrists or ankles, and can be fitted effectively upon such parts as the nose, ears or throat.

Reference is made to the accompanying drawing forming a part of the specification, and in which like reference characters indicate like parts throughout the several figures.

Figure 1 is a plan view of one form of my invention, the device being shown as partly broken away.

Figure 2 is a side elevation of the device shown in Figure 1.

Figure 3 shows another form of my invention, a portion of the device being shown as broken away.

Figure 4 is a side elevation of the device shown in Figure 3.

Figure 5 shows a plan view of still another form of my device, a part being broken away.

Figure 6 is a side elevation of the mechanism appearing in Figure 5.

Figure 7 is a plan view of another form, certain parts being broken away.

Figure 8 is a side elevation of the device shown in Figure 7.

Figure 9 is a plan view of still another form of my invention, parts of the same being broken away.

Figure 10 is a side elevation of the structure shown in Figure 9.

Figure 11 is a side elevation of still another form of my invention.

A flexible member 11 of sheet material, such as a sticking plaster, is adhesive on one of its faces, and adhering to this face is a coating of copper foil 12. Mounted upon this coating of foil is a binding post 13, to which is secured a wire 14. The binding

post is quite small and flat, in order to be out of the way as far as practicable.

In the form shown in Figures 3 and 4, a flexible member of sheet material 15, adhesive on one of its faces, serves as a base and carries a coating 16 of tin foil. A binding post 17 is secured to this coating, and is used to secure a wire 17.

In the form appearing in Figures 5 and 6, a flexible sheet of material is shown at 19, and is adhesive on one of its faces. Engaging the adhesive face is a strip 20 of copper, and extending over this strip and over the adjacent portion of the adhesive face of the plaster is a coating 21 of tin foil. A binding post 22 is mounted upon the strip 20, and leading to the binding post is a wire 23.

In the form shown in Figures 7 and 8 the member 25 is a flexible sheet of material, such as a plaster, adhesive on both of its faces. Adhering to these faces are two coatings 24 and 26, made of tin foil. The coating 26 carries a binding post 27, and leading to the latter is a wire 28. The two coatings 24 and 26 are both in communication with the binding post, and may be used either together or singly for the purpose of distributing the electric currents.

In the form shown in Figures 9 and 10 a flexible sheet of material 30 is adhesive on both of its faces, and clinging to one of these faces is a strip 31 of tin foil, and to the other a sheet 29 of soft rubber, serving as a backing. The strip 31 is provided with an end portion 33, which protrudes through a slot 32, and secured upon this end portion is a clip 34, serving as a binding post. Thus while the strip 31 is adapted to make a good contact with the patient's skin, and while in practice the electrode is so worn by the patient that the sheet 29 of rubber is outside, the tin foil strip 33 and clip 34 are also outside, and always accessible for making an electrical connection.

The flexible sheet with its adhesive face or faces is made of insulating material.

In the form shown in Figure 11 a sheet of soft rubber appears at 35, and a sheet of flexible material, adhesive on both of its faces, is shown at 36. A strip of tin foil appears at 37, and is in communication with the binding post 38. A clamp 39 is clipped upon the ends of the electrode, and serves to hold the electrode in position upon the part to which it is applied, as for instance an

arm or a leg. The clamp, 39, is not energized electrically, and therefore may be placed directly in contact with the patient's skin without the possibility of causing the
5 current to make a burn. The clamp 39 may be used with the form shown in Figure 10.

The operation of my device is as follows:

The electrode is by aid of the binding post or the clip and wire which it carries,
10 connected with a suitable source of electricity, such for instance, as a faradic battery or other device furnishing currents or current pulsations suitable for use in therapeutic operations, electrical massaging or
15 the like. A pair of the electrodes here described may be used together, or a single electrode may be used in connection with an electrode of ordinary construction. The electric currents or pulsations are turned on,
20 regulated and stopped, in the manner well understood in this art.

A very great advantage offered by my improved electrode is that, in consequence of its flexibility, it may be easily bent around
25 a member such as the thumb, one or more fingers, one or more toes or the like, one or both wrists or ankles, or may be fitted partially around or against any physiological member of peculiar contour, or may be
30 curved or otherwise readily formed so as to fit partially into parts such as the outer ear, or made to follow the contour of the skin covering the armpits, or the like.

I find that by means of this improved
35 electrode the electric currents can be distributed far more uniformly than is the case with most other electrodes, and that the treatment can thus be rendered more effective.

Another advantage possessed by my im- 40 proved electrode is that it can be made up of cheap material and more or less perishable, and on that account may be cut by scissors into various sizes and shape, the finished article having a high degree of flexibility 45 and being adapted to make good contact with the skin of the patient upon any part of the body, regardless of the shape of the parts to which the current is to be applied. The electrode thus made up can be used 50 once, and then if need be thrown away.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is as follows:

1. An electrode, comprising a flexible 55 sheet of non-conducting material provided with a slot, and a coating of metal foil secured flatwise against said flexible sheet of material, said coating of metal foil being provided with a portion extending through 60 said slot in order to facilitate making an electrical connection with said coating of metal foil, said flexible sheet of non-conducting material and said coating of metal foil being as a whole flexible, substantially 65 as described.

2. An electrode comprising a flexible sheet of non-conducting material, a flexible sheet of metal foil secured flatwise against said first mentioned sheet but shorter than 70 the latter as to leave an end portion of said first mentioned sheet extending beyond the end of said metal foil, and a clamp connected with the portion thus extended.

Signed at Long Island City, N. Y. C., in 75 the county of Queens, and State of N. Y., this 18th day of December, 1923.

REINHOLD H. WAPPLER.