F. W. HEWITT.

ELECTRIC HEATING UNIT.

APPLICATION FILED MAY 13, 1918.

1,328,229. Patented Jan. 13, 1920.

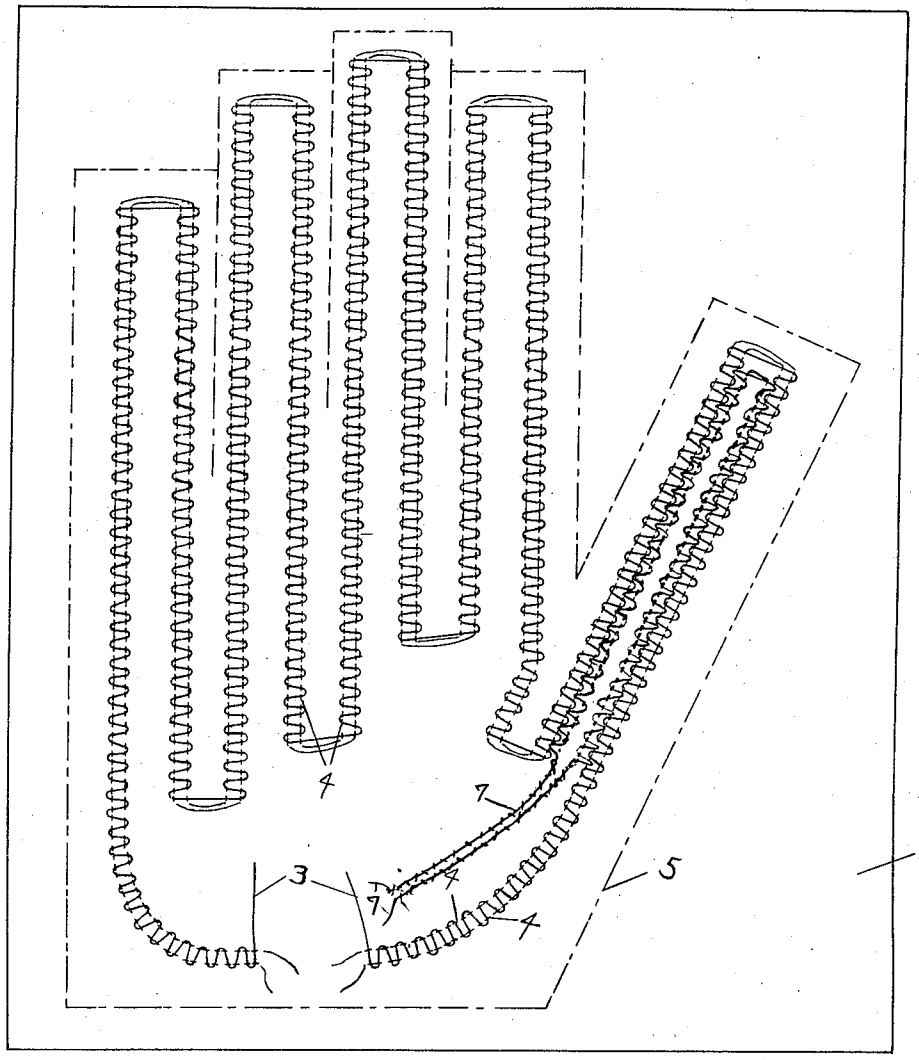


Fig 1

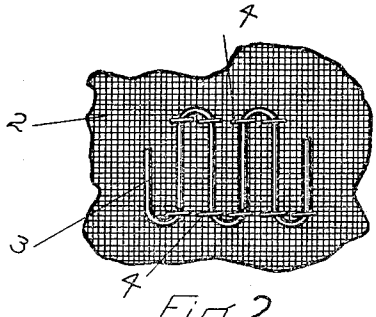


Fig 2

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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATING UNIT.

1,328,229. Specification of Letters Patent. Patented Jan. 13, 1920.

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To all whom it may concern:

Be it known that I, FRANK WALDO HEWITT, a citizen of the United States, and resident of Arlington, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Electric Heating Units, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to electric heating units of the character used in articles of wearing apparel, bath mats, heating pads for therapeutic purposes and in a great variety of articles of manufacture. The sale of electrically heated articles of this general character has been handicapped by several considerations among which may be mentioned their comparatively high cost, the relative unreliability of the heating units frequently used in such articles due to the liability of the electric conductor to break or become short-circuited, the relatively cumbersome construction which formerly was necessary and the fact that the heating units heretofore devised have been too bulky and cumbersome for many uses, nor would they permit of the degree of comfort, pliability or flexibility necessary in many articles. The present invention aims to overcome these objections and cure these deficiencies, and it provides a novel form of electric heating unit which can be manufactured very economically, can be given practically any form or shape required, either with a single resistance wire or a plurality of wires, insures proper flexibility and a uniform distribution of the heating element throughout the article, and is not liable to become either short-circuited or open-circuited, produces an article free from ridges, lumps or other uncomfortable features, and by utilizing a plurality of circuits and independent outlets increases the reliability of the heating unit by continuing a heat supply, even though one line should become broken or short-circuited. My present invention, broadly considered, comprises a heating unit having a relatively fine resistance wire attached to a lining or in the interior of a textile article with the resistance wire positioned in a reflex, zig-zag, or other form and secured in its desired conformation by rows of stitching. I also contemplate the employment of a plurality of such resistance wires, preferably following each other in a similar zig-zag arrangement and secured by stitching, preferably by parallel rows of stitching as such rows can be put in economically and quickly. By having such plurality of circuits and plurality of outlets either throughout the article or in one portion, should one wire or circuit become broken, heat will still be supplied, although in a lesser degree, by the other circuit. I also contemplate the use of a very fine resistance wire, which will retain its flexibility and which may be used either as a naked wire without other covering than that of the textile article and linings, or which may be insulated by a very fine, thin braid or other covering which will not substantially interfere with the radiation of heat therethrough, so that full advantage of the current supplied will be obtained. In my improved article of manufacture, I prefer to secure the resistance wire, or a plurality of such wires, to a lining by means of stitching, preferably in parallel rows, which will anchor the heating wire at the bent portions, either one or more stitches being applied at such bent portions to hold and anchor the wire in its configurations irrespective of the extent to which the article may be flexed in use. Thus for example, in an aviator's glove, which is shown herein for illustrative purposes, it will be appreciated that the flexibility of the fingers and thumb of the glove is of the greatest importance, a relatively fine wire being all that can be used to advantage in heating such an article. In the form as shown in the drawings, I have applied a plurality of circuits and wires to the thumb only, although it will be appreciated that a considerable number of such thin, fine resistance wires may be applied without rendering the article too bulky, stiff, or otherwise objectionable in use, and the provision of independent circuits will insure the supply of heat, even should one circuit become useless.

The nature of the invention will be readily understood from the following de-

scription, reference being made to the accompanying drawings, in which—

Figure 1 is a plan view of a heating unit embodying this invention; and

Fig. 2 is a plan view on a larger scale of a section of the element shown in Fig. 1.

The construction shown comprises a base or support 2 of sheet material, preferably fabric, an electric conductor 3, preferably comprising a single naked resistance wire, although it may comprise a braid of a plurality of lightly insulated wires, fitted on the surface of the fabric and bent back and forth in a zig-zag form and stitches 4 that anchor the conductor to the support 2 substantially at the bent points. The conductor preferably consists of a flexible naked wire of small gage and of suitable composition to afford the required electrical resistance.

The wire may be laid in the form shown by a suitable operated wire guide working in connection with automatic stitch forming instrumentalities timed to coöperate with the wire guide so that the guide will place the wire in position for said instrumentalities to make stitches over the bent portions to anchor the wire securely to the base or support 2. This method of securing the wire is best illustrated in Fig. 2, from which it will be seen that each end of each bend in the wire is anchored by a stitch so that the free lengths of wire between successive bends, which in this construction lie substantially parallel to each other, are lengths secured against movement into contact with each other. It will be evident that by laying the conductor in this manner and securing it as just described it can be run in any outline or form desired to fit the article in which it is to be used, and that adjacent runs of the wire can be placed very closely together without any liability of short circuiting.

The form that will be given to the heating unit will of course depend upon the nature of the article in which it is to be used. In the construction shown the conductor has been arranged in suitable form for incorporation in a glove designed particularly for aviator's use, the dotted line 5 designated roughly the outline on which the supporting piece 2 will be cut to give it a suitable shape for assembling with the other parts of the glove. Such a unit may be sewed into the glove between the lining and the back of the glove. The peculiar disposition of the conductor and the method of securing it to the support 2 facilitate the assembling and making operations, not only of gloves, but of most articles in which heating units of this character are employed. It will also be seen that this construction is very flexible so that it offers no appreciable resistance to the natural movement of the user. Preferably the lengths of wire lying between the curved or bent portions are arranged substantially parallel to the plane or axis on which the support is to be flexed or bent when the article is in use. But it is evident that by making these lengths short the unit can be made so flexible that it will bend freely in any direction.

In the thumb portion I have shown a plurality of independent circuits, such a construction being readily applied throughout the article when desired. The wires 7 can be anchored along one line by the same stitching row as that holding the wire 4.

My invention enables a considerable length of heating wire or wires to be utilized in the narrow confines of an electrically heated glove or the like and yet to maintain flexibility, and an economical and efficient construction. I contemplate the manufacture of textile or other articles with the resistance wires constituting the heating unit attached to a lining as herein illustrated, either in the reflex form, a zig-zag form, staggered arrangements or the like, and I have defined all these constructions as constituting a heating unit having the conductor bent back and forth and secured by substantially parallel lines of stitches at the bent points, the resistance wire being preferably a naked wire—which I believe is new—although a lightly insulated wire can also be used when desired.

I claim—

An electric heating unit, comprising a support of flexible sheet material of greater length than width, a naked electric conductor bent back and forth to form a plurality of parallelly arranged portions transversely of the length of the support, the length of each portion of the conductor being short as compared to the distance between portions, a plurality of rows of stitching arranged parallel to each other and extending along the length of the support, said rows of stitching engaging the support and embracing said electric conductor at the junction of the bent portions and the straight portions to securely mount said electric conductor on the support and leave the straight parallel portions free, whereby the parallelly arranged straight portions are held out of engagement with each other and the flexibility of the unit increased.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FRANK W. HEWITT.

Witnesses:

ARTHUR F. LEWIS,

JAMES R. HODDER.