(No Model.)

F. L. PRUYN.

ELECTRIC HEATER.

No. 566,795. Patented Sept. 1, 1896.

Fig. 1.

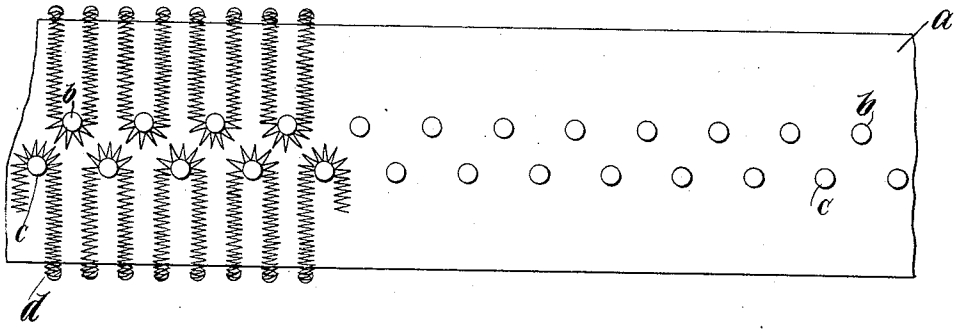


Fig. 2.

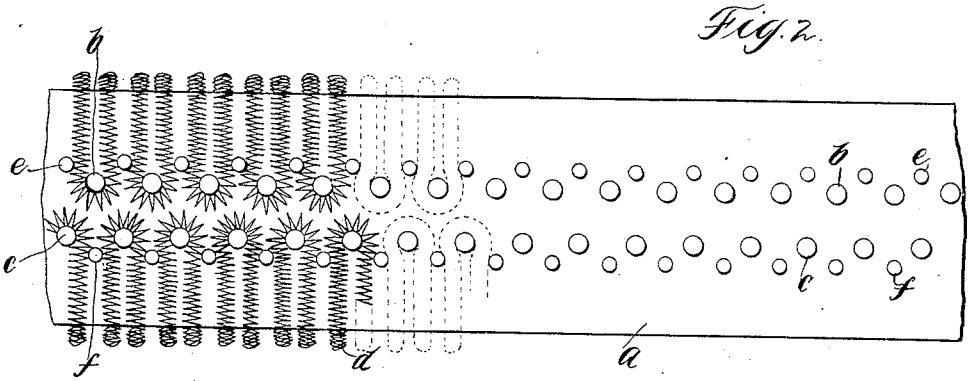
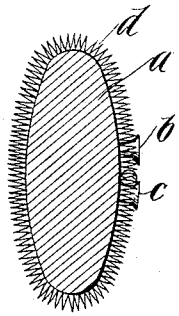


Fig. 3.



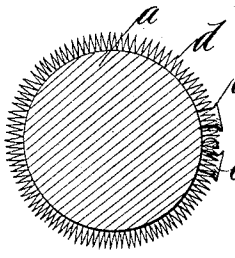


Fig. 4.

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UNITED STATES PATENT OFFICE.

FRANCIS LANSING PRUYN, OF ALBANY, NEW YORK.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 566,795, dated September 1, 1896.

Application filed August 1, 1895. Serial No. 557,830. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS LANSING PRUYN, a citizen of the United States, residing at Albany, in the county of Albany and State of New York, have invented a certain new and useful Improvement in Electric Heaters, (Case No. 1,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a resistance-coil for electrical heaters, the object being to provide a cheap and effective construction of resistance-coils for heaters of that type in which the heat is generated by the passage of a current of electricity through electrical conductors.

It has been proposed heretofore to construct a heating-coil by providing an insulating-support in the form of a cylinder upon the surface of which a spirally-coiled conductor is wound in a spiral path about the support. In this construction there is a tendency for the convolutions of the coiled conductor to come into contact, thus short-circuiting a greater or less number of convolutions, and to prevent this the support must be provided with spiral grooves or ridges to maintain the convolutions in position, which construction is objectionable as being expensive; or a layer of insulating material must be interposed between the adjacent convolutions, which construction is also expensive and is further objectionable, as it necessitates the employment of a perishable insulating material. It is customary to immerse the resistance-coil thus constructed in a body of oil, and in consequence the employment of a perishable insulating material is undesirable, the most advantageous construction being that in which the non-insulated metallic conductors rest directly upon the insulating-surface of the support, which is made of porcelain or enameled metal.

In accordance with my invention I provide upon the support a series of pins of non-conducting material projecting from the surface of the support, the coiled conductor being wound about the surface of the support around the pin and back again over the support in the opposite direction to a second pin, around which it is wound, the conductor then extending to a third pin, and so on. The pins are arranged in two longitudinal rows, a pin of one row lying between two pins of the other row, the pins being so disposed that when the conductors are wound thereon they will overlap in a longitudinal direction, but will not overlap in a transverse direction. This arrangement enables the bringing of the convolutions of the wire very close together. By this disposition the convolutions of the conductor occupy parallel positions and are effectively maintained in these parallel positions and there is no tendency for the convolutions to come in contact.

I will describe my invention by reference to the accompanying drawings, in which—

Figure 1 is a view illustrating a resistance-coil embodying my invention. Fig. 2 is a view illustrating a modification thereof. Fig. 3 is a sectional view showing a support of oblong cross-section. Fig. 4 is a similar view showing a support of circular cross-section.

Like letters refer to like parts in the several figures.

Upon one side of the support *a*, I provide two rows of pins *b b* and *c c*. The coiled conductor *d* encircles the support *a* and is wound about one of the pins *c*, after which it encircles the support in the opposite direction and winds about one of the pins *b*, the direction again being reversed and the coiled conductor encircling the support and winding about one of the pins *c*, the conductor thus alternately winding about the pins of the two series. It will be observed that this disposition of the resistance-coil or conductor brings the convolutions of the conductor into parallel planes and the longitudinal tension upon the conductors lies in the plane of the convolution, and consequently there is no tendency to shift the conductors sidewise, as results when they are wound in a spiral path, as each convolution then has a tendency to shift sidewise.

In Fig. 2 I have shown a modification, in which additional pins *e e* and *f f* are provided, situated between the series of pins *c c* and *b b*, respectively, whereby the pins *c c* and *b b* may be situated closer together and a greater number of convolutions thus provided upon a given length of the support. The portions of the conductors which wind

about the pins *b b* and *c c* may rest very close together, while pins *e e* and *f f* separate the parallel portions, so that there is no tendency for the same to come into contact.

I preferably form the support with an oblong cross-section, as illustrated in Fig. 3, the heater being thus adapted for locations in which but small space is available. Where the question of space is not to be considered, the support may be made cylindrical, as illustrated in Fig. 4.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an electric heater, the combination with an insulating-support, of pins provided thereon and arranged in two longitudinal rows, the pins of the two rows alternating in longitudinal position—that is, a pin of one row occupying a position between the positions of two pins of the other row—and a coiled conductor passing around a pin of one of said rows, then encircling the insulating-support and passing around a pin of the other row, the coiled conductor being thus passed back and forth around the support and looped about the pins of the two rows alternately, the pins of the two rows being diposed so that the loops will not overlap in a transverse direction while overlapping in a longitudinal direction; whereby a greater number of convolutions may be placed upon the support than if the pins were arranged in a single longitudinal row, since the loops overlap longitudinally instead of transversely, and in consequence the convolutions may be brought closer together; substantially as described.

2. In an electric heater, the combination with an insulating-support, of pins *b b c c* provided upon said support on one side, a spirally-coiled conductor encircling said support and passing around said pins, and auxiliary pins *e e f f* situated between the convolutions of said conductors; substantially as described.

In witness whereof I hereunto subscribe my name this 29th day of July, A. D. 1895.

FRANCIS LANSING PRUYN.

Witnesses:
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