March 19, 1929. J. C. WOODSON 1,705,696

INCASED HEATER

Filed May 15, 1924

Fig. 1.

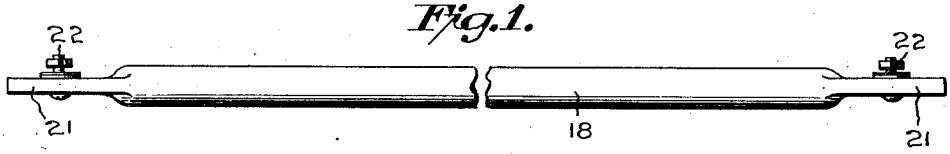


Fig. 2.

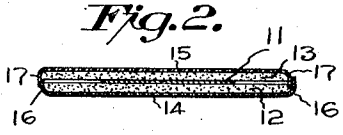


Fig. 3.

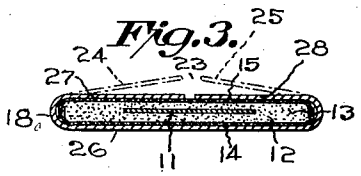


Fig. 4.

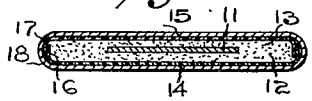


Fig. 5.

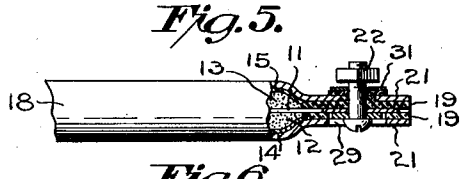
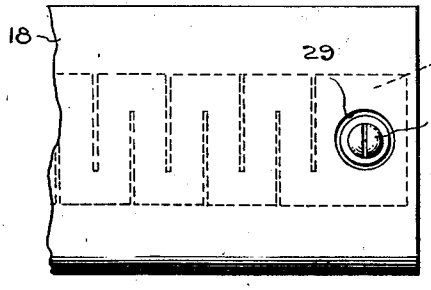


Fig. 6.



WITNESSES:

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Patented Mar. 19, 1929. 1,705,696

UNITED STATES PATENT OFFICE.

JAMES C. WOODSON, OF EAST PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

INCASED HEATER.

Application filed May 15, 1924. Serial No. 713,438.

My invention relates to electric heating units and particularly to incased heaters.

The object of my invention is to provide an electric heating unit which is simple in design and rugged in construction.

In practicing my invention, I provide an electric resistor element interposed between opposed layers of a plastic, electrically insulating material contained in metallic members of substantially channel shape, whose projecting flanges interfit when in operative position. A metallic casing of substantially flat tubular section encloses, loosely, the assembled resistor member, plastic layers and channel members. This assembled structure is then dried and the casing rolled or swaged, in such manner that it firmly holds the channel members in operative position. Terminal connections are provided at each end of the casing in a manner hereinafter more fully described.

In the single sheet of drawings,

Figure 1 is a front elevational view of an electric heating unit embodying my invention;

Fig. 2 is a view in lateral section of an assembly of a resistor member, opposed layers of plastic material, and interfitting metallic containing members employed in my invention;

Fig. 3 is a view in lateral section of a modification of my invention;

Fig. 4 is a view in lateral section of the device illustrated in Fig. 1;

Fig. 5 is a framentary front elevational view partly in section showing the terminal construction employed in the device illustrated in Fig. 1; and

Fig. 6 is a fragmentary top plan view of an electrical heating unit embodied in my invention.

Referring more particularly to Figures 1 and 4, a resistor element 11 is interposed between a pair of opposed layers 12 and 13 of initially plastic, electrically insulating material that are contained, respectively, in a pair of opposed metallic containing members 14 and 15 of substantially channel shape. The projecting flanged portions 16 and 17 of the containing members interfit with each other, when in operative position, to form a unitary structure.

A metallic casing 18 of substantially flat tubular shape loosely encloses the assembled unitary structure and is of sufficient length to extend longitudinally therebeyond at each end thereof. The casing 18 may then be rolled, swaged, or pressed to establish a firm contact with containing members 14 and 15 to firmly hold the assembled unitary structure in operative position.

The resistor member 11 is of substantially the same length as casing 18 and is insulated therefrom at the longitudinally extending portions thereof by suitable refractory electrically insulating material 19 substantially as illustrated in Fig. 5. The material 19 is held firmly in operative position by contracting the longitudinally extending portion 21 of casing 18 sufficiently to firmly engage said insulating material 19. The restricted portion 21 of the casing 18, the insulating material 19 and the resistor member 11 have cooperating perforations (not shown) to provide for the insertion of a terminal member 22 that extends laterally therethrough.

Other structures may be employed without departing from the spirit of my invention and I have shown another embodiment thereof in Fig. 3 that provides an assembled structure substantially as hereinbefore described. An enclosing casing 18_a comprises substantially a flat sheet of metal 26 having the edges bent up to form a channel member having sides 24 and 25. The containing members 14 and 15, having the resistor 11 and the plastic material 12 located therein, are placed in the channel member 18_a and located in proper position for further assembly. The sides 24 and 25 of channel 18_a are preferably pressed downwardly under high pressure, whereby the containers 14 and 15, the resistor 11, the plastic material 12, and casing 18_a are firmly and ruggedly held in efficient thermal relation with each other. The sides 24 and 25 of the casing 18_a will assume a horizontal position substantially as indicated by numerals 27 and 28. Since the sides 24 and 25 do not meet, when in the position indicated by numerals 27 and 28, a slot 23 is formed in the assembled device.

In assembling the electrical heating unit embodied in my invention, the container members 14 and 15 are filled with moistened electrically insulating material. The resistor member 11 is placed upon the layer of insulat-

ing material contained in container 14 and the container 15 superimposed thereupon in such manner that the layer of insulating material 13 contained therein is in intimate contact with resistor member 11, and the projecting flanges 16 and 17 of container members 14 and 15 interfit each with the other.

This procedure establishes a structure of substantially unitary nature that is inserted in a casing 18 and loosely held therein. The entire assembly is now dried and the casing rolled, swaged, or pressed to establish intimate contact with containers 14 and 15 and to firmly hold them in operative position. The ends 21 of the casing 18 are further contracted to tightly hold insulating material 19 that has been interposed between the resistor member 11 and the ends 21 of the casing 18. One surface of casing 18 is countersunk as at 29, and a hole drilled through the entire structure to provide for the insertion of terminal 22. A washer member 31 is provided to insulate and separate terminal member 22 from the casing 21.

It is obvious that a structure as hereinbefore described provides a simple and rugged electrical heating unit that is easy to manufacture and practical in service.

Various modifications and changes may be made without departing from the spirit and scope of the invention, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claim.

I claim as my invention:

The method of making an electrical heating unit that comprises the filling of a containing member of substantially channel shape with a plastic electrically insulating material having a resistor member embedded therein, the superimposing of another containing member of substantially channel shape upon the other to enclose a resistor member therebetween, then enclosing said containing members within a metallic casing of substantially flat tubular shape, then drying and then compressing the casing in such a manner that it holds said containing members and said resistor member firmly in operative position.

In testimony whereof, I have hereunto subscribed my name this 25th day of April, 1924.

JAMES C. WOODSON.