March 7, 1933. I. T. BENNETT 1,899,933

ELECTRIC HEATER

Original Filed Jan. 30, 1928 2 Sheets-Sheet 1

Fig. 1.

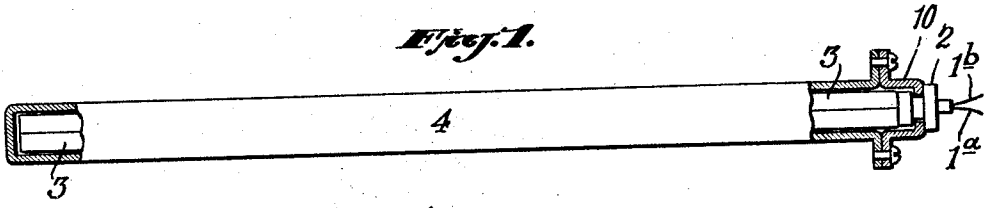


Fig. 2.

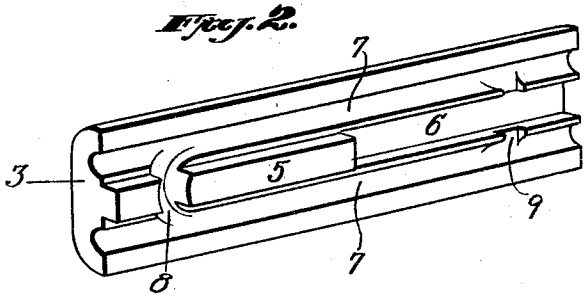


Fig. 3.

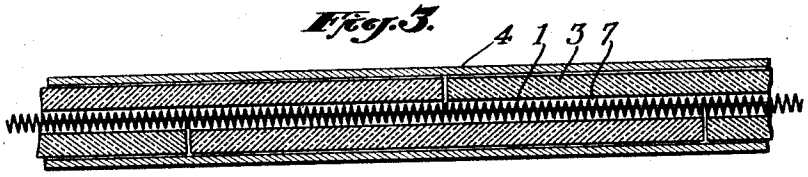


Fig. 4.

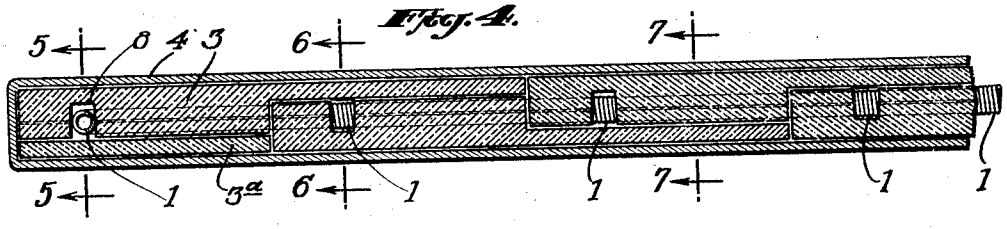


Fig. 5.

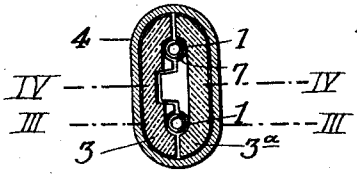


Fig. 6.

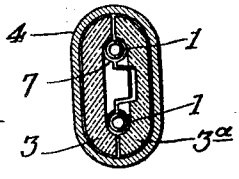


Fig. 7.

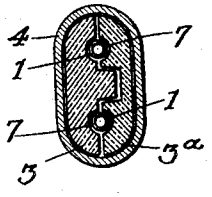


Fig. 8.



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Fig. 9.

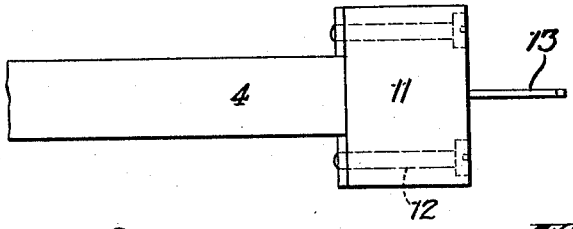


Fig. 10.

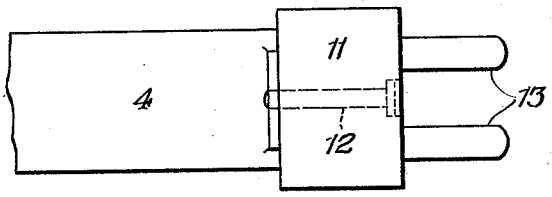


Fig. 11.

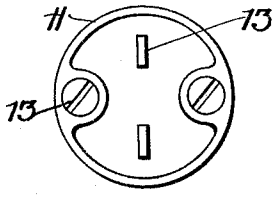


Fig. 12.

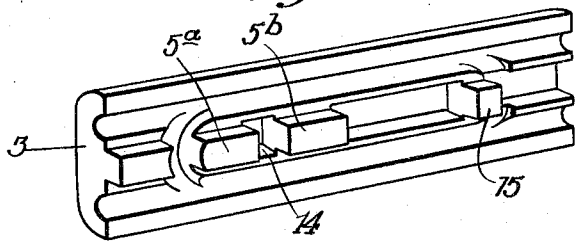
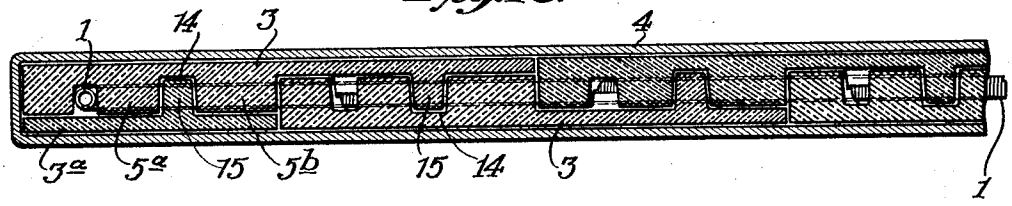


Fig. 13.



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Patented Mar. 7, 1933 1,899,933

UNITED STATES PATENT OFFICE

IRVING T. BENNETT, OF BROOKLYN, NEW YORK, ASSIGNOR TO THOMAS E. MURRAY, OF BROOKLYN, NEW YORK; JOSEPH BRADLEY MURRAY, THOMAS E. MURRAY, JR., AND JOHN F. MURRAY EXECUTORS OF SAID THOMAS E. MURRAY, DECEASED

ELECTRIC HEATER

Original application filed January 30, 1928, Serial No. 250,350. Patent No. 1,796,317, dated March 17, 1931. Divided and this application filed April 25, 1928. Serial No. 272,584.

The present application is a division of an application filed January 30, 1928, Serial No. 250,350, for improvements in radiators, and is directed to the electric heating element alone or in connection with other apparatus.

The accompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a side elevation, partly broken away, of a complete heater;

Fig. 2 is a separate view in perspective of an insulating block;

Fig. 3 is a horizontal section through the heater at the level of one length of the heating element (III—III, Fig. 5);

Fig. 4 is a horizontal section through the middle of the heater (IV—IV, Fig. 5);

Figs. 5, 6 and 7 are respectively sections on the lines 5—5; 6—6 and 7—7 of Fig. 4;

Fig. 8 is a separate view of part of the electric resistance element.

Figs. 9, 10 and 11 are respectively a plan and side and end views of a modification;

Figs. 12 and 13 are views corresponding to views 2 and 4 also illustrating a modification.

The heating element comprises a loop of coiled resistance wire 1 extending in two lengths from end to end and passing out through an insulator 2 (Fig. 1) to circuit wires 1^a and 1^b. The coil is enclosed directly between insulating blocks 3 carried in a tubular casing 4 of oblong cross-section. The casing may be of any suitable material, preferably copper because of its heat conductivity. In the course of time the resistance element in electric heaters is liable to burn out or to deteriorate.

According to the present invention it is made removable and replaceable. The insulation immediately surrounding the wire is made in sections like Fig. 2 of comparatively short length. This contributes to ease of manufacture and to strength of the pieces and ease of introduction into the casing.

The casing is best made in standard lengths, each a multiple of one-half the length of one of the blocks, so that one size of blocks may be used for all sizes of radiator. The porcelain and wire cost much less than complete strip heaters of known type, and even the cost of the casing 4 may be added without equaling that of standard strip heaters.

Each block 3 has a rib 5 extending over about half its length and fitting in a groove 6 constituting the remaining half of the length of the opposite block. Longitudinal grooves 7 accommodate the coil 1. Near the ends of each block there are transverse grooves 8 and 9 so that near the inner closed end of the casing 4 the coil can pass continuously from one to the other of the grooves 7 as illustrated, for example, at the left of Fig. 4.

The wire coil 1, as shown in Fig. 8, may be a close spiral or may be stretched more or less to separate the convolutions and thus to provide a greater or less volume of heat for a given length of heater.

The ends of the wire run through an insulating block 2 (Fig. 1) which is grooved and engaged by an inward flange on a cap 10 which is screwed or otherwise removably fastened on to the end of the casing 4.

When a heating element is to be introduced, the center of the coil is looped through the transverse opening 8 of one of the blocks and laid in the grooves thereof between said block and a half length piece, such as 3^a (Fig. 4). The two blocks are held together and inserted into the open end of the casing 4. Additional blocks are then added at alternate sides, pushing each in turn into the casing until the later is full, the last block being another half section like 3^a. The length of wire for a desired heat value having been fixed, it may be stretched to the full lengths of different standard casings. Or coils of different lengths, giving different heat values, may be used for different casings.

Such an electric heating element is adapted to be used as a part of various apparatus or separately in electric furnaces, ovens, soldering irons, curling irons or irons for other uses, immersion heaters, space heaters and the like.

Where the standard strip heaters are made a part of another apparatus, the burning out of the heater sometimes means the scrapping of the entire apparatus or at least the scrap-

ping of the casing, insulation and resistance element.

With the present improvement, the casing is permanent and the porcelain would generally be in good condition so that only the wire would need replacement. This costs only a small fraction of the cost of the ordinary standard heaters.

Figs. 9, 10 and 11 show the heater equipped with a different style of end connection. This is a block 11 with insulating material fastened by screws 12 to flanges on the end of the casing 4 and carrying connections to the heating coil within and to a pair of blades 13 similar to those on the ordinary connection plug, by which the heater connection may be readily made and broken.

According to Figs. 12 and 13, the porcelain blocks are made interlocking with each other so that they may all be withdrawn simply by pulling out the end one and without putting any strain on the wire. For this purpose each block is provided with a recess 14 between the two parts 5^a and 5^b of its projecting rib, and is provided also with a projection 15 adapted to fit into the recess 14 of its mating block, as illustrated in Fig. 13. Otherwise these blocks are substantially the same as that of Figs. 2, 3 and 4. Each block is interlocked with two blocks on the opposite side as shown in Fig. 13.

Various modifications may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. An electric heater comprising a casing containing insulating material in the form of removable molded blocks and a resistance element enclosed thereby, the mating blocks being interlocked with one another in a direction transverse to the line of withdrawal so that the withdrawal of one causes the withdrawal of its mate.

2. An electric heater comprising a casing, a number of longitudinally divided insulating blocks disposed end-to-end and having a pair of spaced longitudinally extending grooves and a connecting groove and a resistance element disposed in a pair of lengths extending longitudinally through the grooves of said succession of blocks and connected at one end by a return bend passing through said connecting groove.

3. An electric heater comprising a casing, a plurality of insulating blocks disposed therein and a heater element enclosed by said blocks, each of said blocks being shaped substantially the shape of one half of the casing in cross-section, and having an internally disposed longitudinal groove therein, said grooves being adapted to align with the grooves of the oppositely positioned and the abutting blocks to form a passageway for the said heater element, said blocks also being adapted to interlock transversely to the longitudinal axis of said blocks one with the other to form a unit assembly removable from said casing.

4. An electric heater comprising a casing, a plurality of insulating blocks disposed therein and a loop shaped heater element enclosed by said blocks, each of said blocks being shaped substantially the shape of one half of the casing in cross-section and having a pair of internally disposed longitudinal grooves therein, said grooves being adapted to align with the grooves of the oppositely positioned and the abutting blocks to form a passageway for the said heater element, and each of said blocks having a transverse groove connecting said longitudinal grooves disposed therein with respect to the transverse groove of an oppositely positioned block to align therewith to form a passageway adapted to receive the loop end of said heater element, said blocks also being adapted to interlock transversely to the longitudinal axes of said blocks to form a unit assembly removable from said casing.

5. In an electric heater, a plurality of molded insulating blocks shaped substantially to the shape of one half of the cross-section of the casing adapted to receive it, each block having an internally disposed longitudinal groove therein adapted to align with the grooves in an oppositely positioned and an abutting block to form a passageway therethrough for a heater element, and each block being adapted to interlock with its adjacent block to form a unitary assembly removable from its casing.

6. In an electric heater, a plurality of molded insulating blocks shaped substantially to the shape of one half of the cross-section of the casing adapted to receive it, each block having a pair of internally disposed longitudinal grooves therein adapted to align with the grooves in an oppositely positioned and an abutting block to form a passageway therethrough for a loop shaped heater element and a transverse groove connecting said longitudinal grooves disposed therein with respect to the transverse groove of an oppositely positioned block to align therewith to form a passageway adapted to receive the loop end of said heater element and each block being adapted to interlock with its adjacent block to form a unitary assembly removable from its casing.

In witness whereof, I have hereunto signed my name.

IRVING T. BENNETT.

CERTIFICATE OF CORRECTION.

Patent No. 1,899,933. March 7, 1933.

IRVING T. BENNETT.

It is hereby certified that the above numbered patent was erroneously issued to "Thomas E. Murray, of Brooklyn, New York, Joseph Bradley Murray, Thomas E. Murray, Jr., and John F. Murray, Executors of said Thomas E. Murray, deceased", whereas said Letters Patent should have been issued to "Metropolitan Engineering Company, a corporation of New York," as assignee by mesne assignments of the entire interest in said invention, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 9th day of May, A. D. 1933.

M. J. Moore.

(Seal) Acting Commissioner of Patents.

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