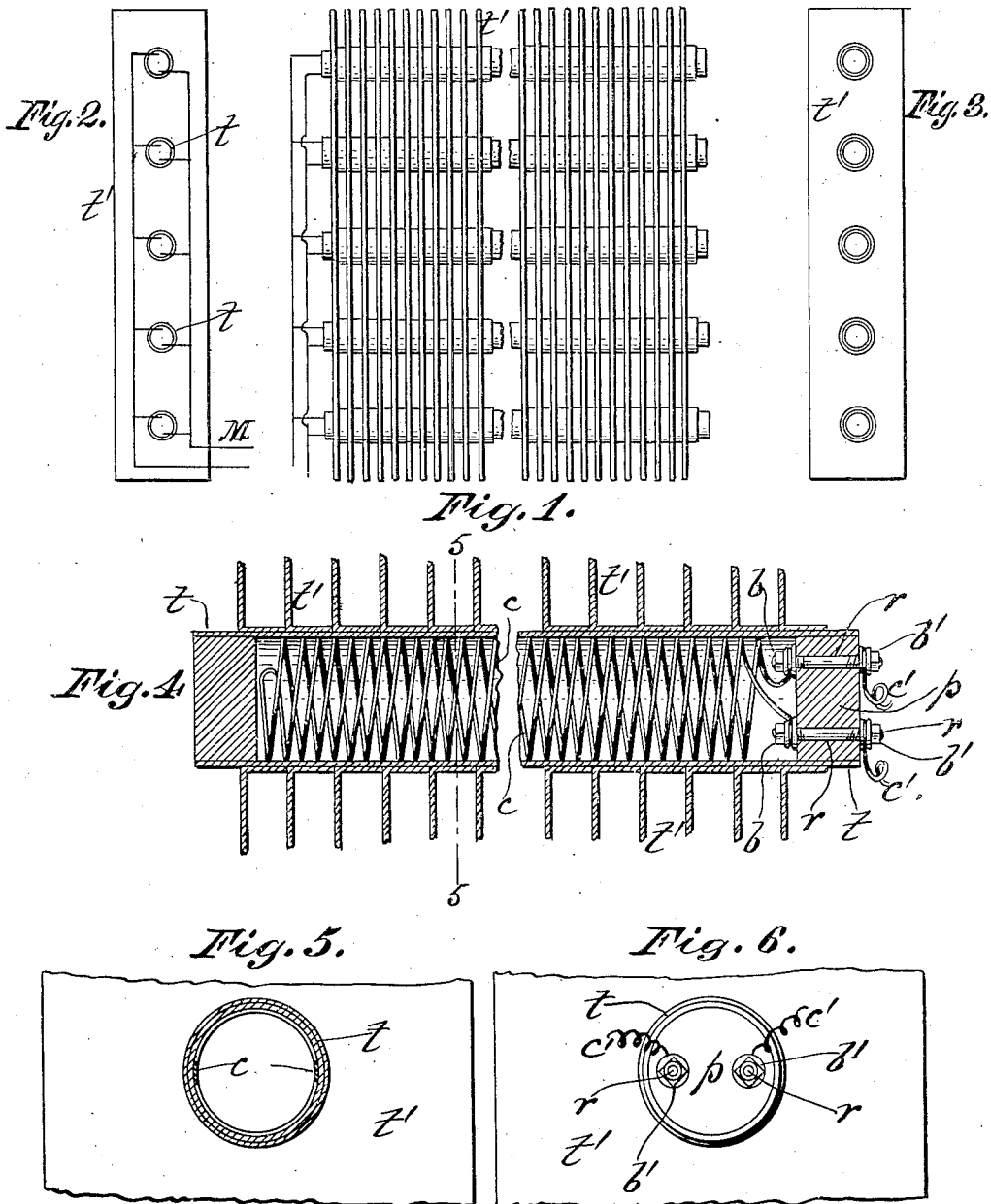


A. B. NEIMAN.
ELECTRIC HEAT RADIATOR.
APPLICATION FILED DEC. 18, 1913.

1,120,966.

Patented Dec. 15, 1914.

2 SHEETS—SHEET 1.



Witnesses:
Dorothy Matt
P. E. Schell

Inventor:
Alvin B. Neiman
By his Attorney
Leo M. Matt

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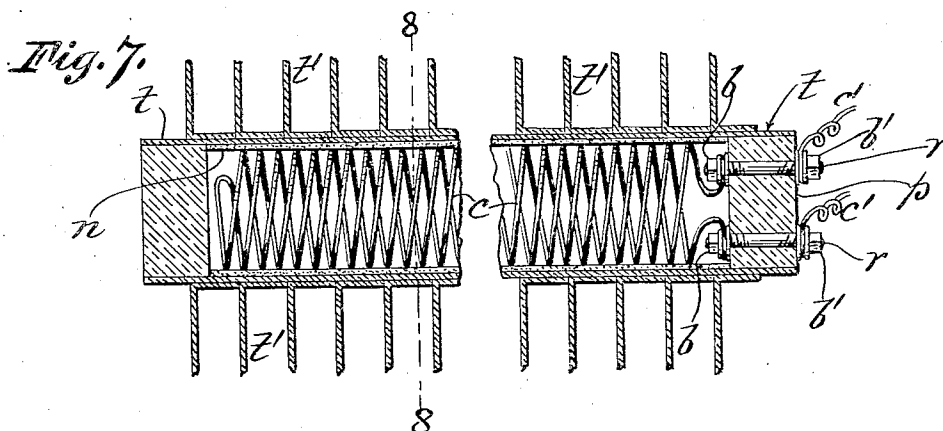


Fig. 8.

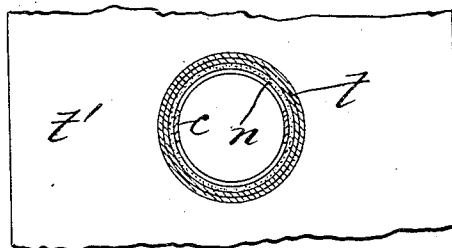
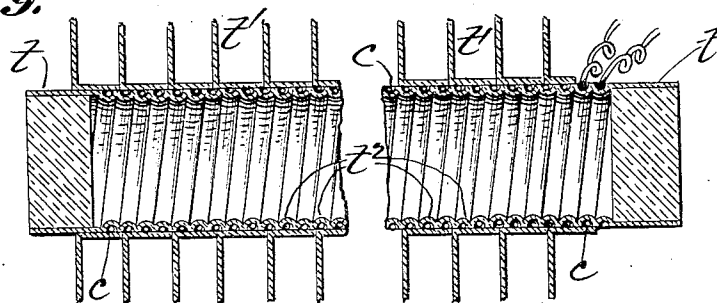


Fig. 9.



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UNITED STATES PATENT OFFICE.

ALVIN B. NEIMAN, OF NEW YORK, N. Y., ASSIGNOR TO NEIMAN HEATER CO. INC., OF
NEW YORK, N. Y.

ELECTRIC HEAT-RADIATOR.

1,120,966.

Specification of Letters Patent.

Patented Dec. 15, 1914.

Application filed December 18, 1913. Serial No. 807,403.

To all whom it may concern:

Be it known that I, ALVIN B. NEIMAN, a citizen of the United States, and a resident of the borough of Bronx, city, county, and State of New York, have invented certain new and useful Improvements in Electric Heat-Radiators, of which the following is a specification.

The object of my invention is the production of a simple but effective form of electrical heat radiator in which the full heating capacity of electric current employed is concentrated, augmented and utilized in raising the temperature of the radiant heating surfaces and consequently of the air surrounding the same as hereinafter described and claimed specifically,—a distinctive feature of the invention being the contacting of an insulated primary resistance conductor coil with a metallic radiator tube which is heated by the coil both directly by radiation and indirectly by conduction, and which by its relatively large superficial radiant area forms an efficient medium for the transmission of the resultant heat to the atmosphere.

In the accompanying drawings, Figure 1, is a side elevation of a radiator constructed in accordance with my invention, the central portion being broken away; and Figs. 2 and 3, end elevations thereof, the electric conductors being shown symbolically; Fig. 4, is a central longitudinal sectional elevation of a radiator tube full size, showing a preferred method of construction; Figs. 5 and 6, end views of the tube and adjacent parts shown in Fig. 4; Fig. 7, is a view similar to Fig. 4, showing a modification relating to insulation; Fig. 8, a transverse section upon plane of line 8—8 Fig. 7; Fig. 9, a view similar to Figs. 4 and 7 illustrating the external arrangement of the resistance coil.

I have herein shown and described my invention as applied to the class of radiator disclosed in Letters Patent No. 1,073,813, issued to me Sept. 23rd, 1913 in which horizontal heating tubes extend through and contact with a series of transverse radiating plates whereby a series of vertical air channels is constituted through which the air is positively conducted from the bottom to the top of the radiator in such manner as to insure the absorption by the air of a high degree of heat by convection, such form of

radiator being used by preference on account of its concentration of a maximum of radiation surface within a minimum of space. I do not wish however to confine my invention to this particular form of radiator, the essential feature as a unit being the combination with a metallic radiator tube of an electrical resistance conducting coil in continuous contact therewith but insulated therefrom, whereby the tube is heated not only by direct radiation from the resistance coil but by electrical conduction also, thereby augmenting the heating capacity of the electric current employed for the purpose, since I have found by actual experimental investigation that the resultant heat from the combination is much greater than that to be derived from the resistance coil alone.

A convenient way of applying the resistance coil *c*, to the metallic radiator tube *t*, is to apply it internally as illustrated in Figs. 4, 5 and 6, in which case a double or return coil is used, so as to position the terminals at one extremity of the tube. Thus the ends of the coil *c*, may be secured by the binding nuts *b, b*, to the threaded inner ends of the metallic terminal rods *r, r*, extending through the plug *p*, of insulating material,—the outer threaded ends of the terminal rods *r, r*, having binding nuts *b', b'*, for the connections *c', c'*, with the branch electric circuit *M*, which may be connected through the medium of a socket plug with an electric light circuit or other available source of electricity.

Both ends of the radiator tube *t*, are closed, and preferably sealed air tight so that there can be no communication with the external atmosphere;—hence the confined air in the tube becomes thoroughly heated by the coil and forms an additional medium for transmitting heat from the coil to the tube *t*, although the direct contact of the resistance coil *c*, with the tube is the main cause of the heating of the tube by direct conduction,—it being understood that the coil is composed of comparatively fine wire covered with a thin coating of enamel which acts as a non-conducting medium to insulate the wire from the tube and prevent short circuiting.

The coil *c*, not only imparts heat to the tube *t*, by direct radiation but it also heats the said tube by electrical conduction, the

convolutions of the coil arranged transversely to the longitudinal axis of the tube effecting this result, so that the efficiency of the initial or primary current in the coil is enhanced and augmented by conduction to such an extent that the heating capacity of the tube is practically doubled. In applying the coil *c*, to the interior of the tube *t*, it may be attenuated or lengthened and drawn into position, and upon release will automatically contract in length and expand in width so as to fit snugly the inner surface of the tube. A series of the metallic tubes *t*, *t*, may be connected with and be supported by the flange plates *t'*, *t'*, as heretofore intimated, the length of the tubes and number thereof combined in one radiator being varied to suit requirements and conditions of use. In lieu of using enameled or otherwise insulated wire for the resistance coil *c*, I can use plain uncovered metallic wire therefor by providing the tube *t*, as in Figs. 7 and 8, with a lining *n*, of mica or some other suitable non-conducting material which will prevent short circuiting between the tube and the coil. If preferred the resistance coil *c*, may be wound around the exterior of the tube *t*, in which case the latter may be formed with spiral grooves or corrugations *t²*, *t²*, as indicated in Fig. 9, so that the convolutions of the wire forming the coil may be countersunk within the peripheral surface of the tube to protect them and also to admit of the forcing of the flanges of the radiation plates *t'*, into the tubes *t*, and into intimate contact therewith, to facilitate conductivity.

What I claim as my invention and desire to secure by Letters Patent is,

1. A radiator of the character designated

comprising a plurality of sealed metallic tubes mounted in flanged radiator plates, a series of electric resistance coils one in each tube and insulated therefrom, said coils being in direct contact with the tube to cause heating of the latter by direct conduction, and conductors connecting each coil independently with an electric circuit for the purpose set forth.

2. A radiator of the character designated, comprising a plurality of sealed metallic tubes mounted in flanged plates, and a series of insulated electric resistance coils one contacting with each radiator tube, said coils being in direct contact with the tube to cause heating of the latter by direct conduction and conductors connecting each coil independently with an electric circuit for the purpose described.

3. In a radiator of the character designated, the combination of a metallic tube and an insulated resistance coil contacting therewith, said coil being doubled upon itself so as to position its terminals at one end of the tube, and means sealing the end of the tube and receiving such terminals for the purpose described.

4. In a radiator of the character designated, the combination of a sealed metallic tube, an insulated return wire coil contained therein and contacting therewith and terminals at one end of the tube connecting with the ends of the resistance coil, and means sealing one end of the tube and receiving said terminals for the purpose described.

ALVIN B. NEIMAN.

Witnesses:

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DOROTHY MIATT.