

July 11, 1933.

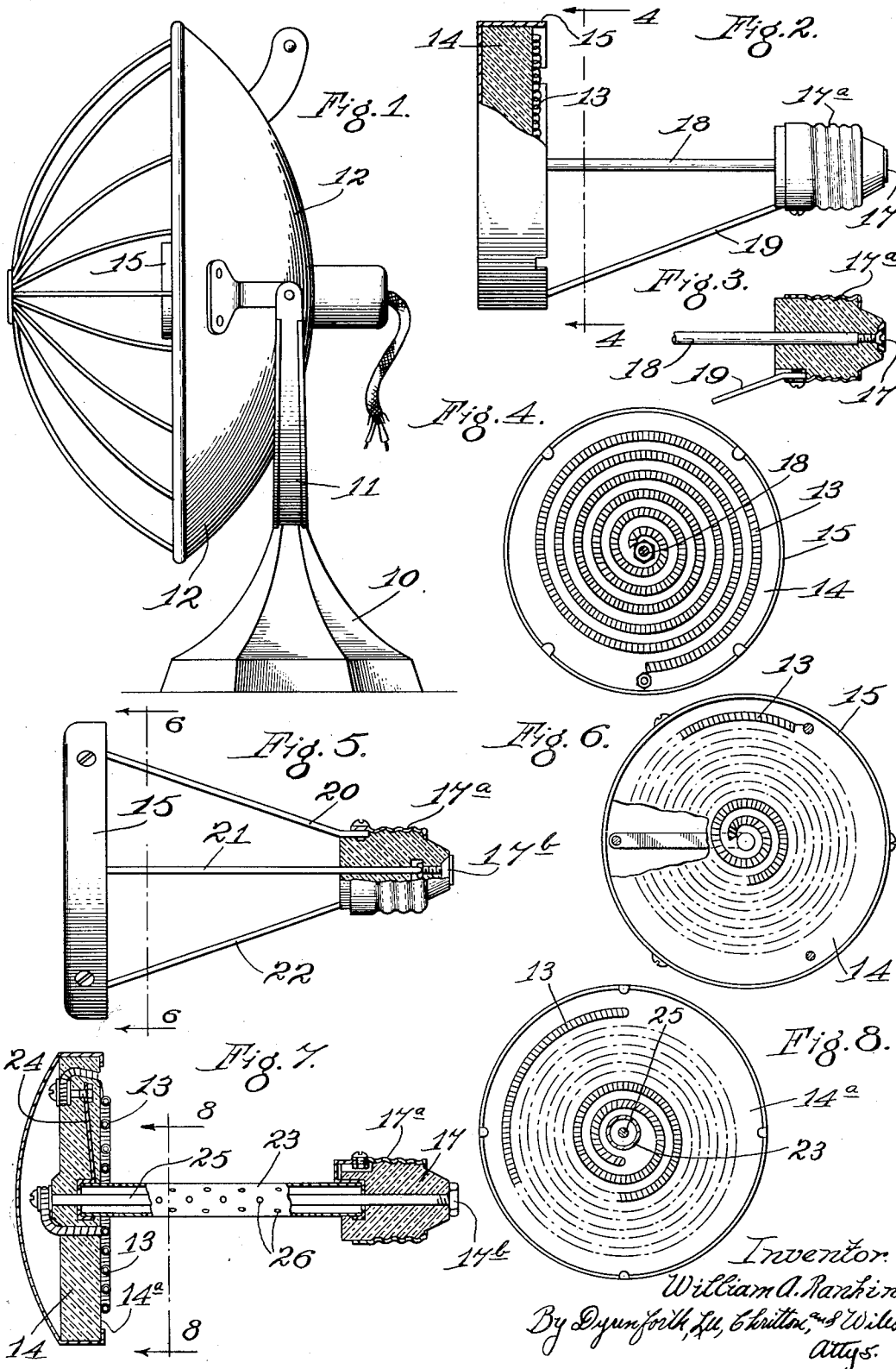
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1,917,461

ELECTRIC HEATER

Filed Feb. 7, 1931

3 Sheets-Sheet 1



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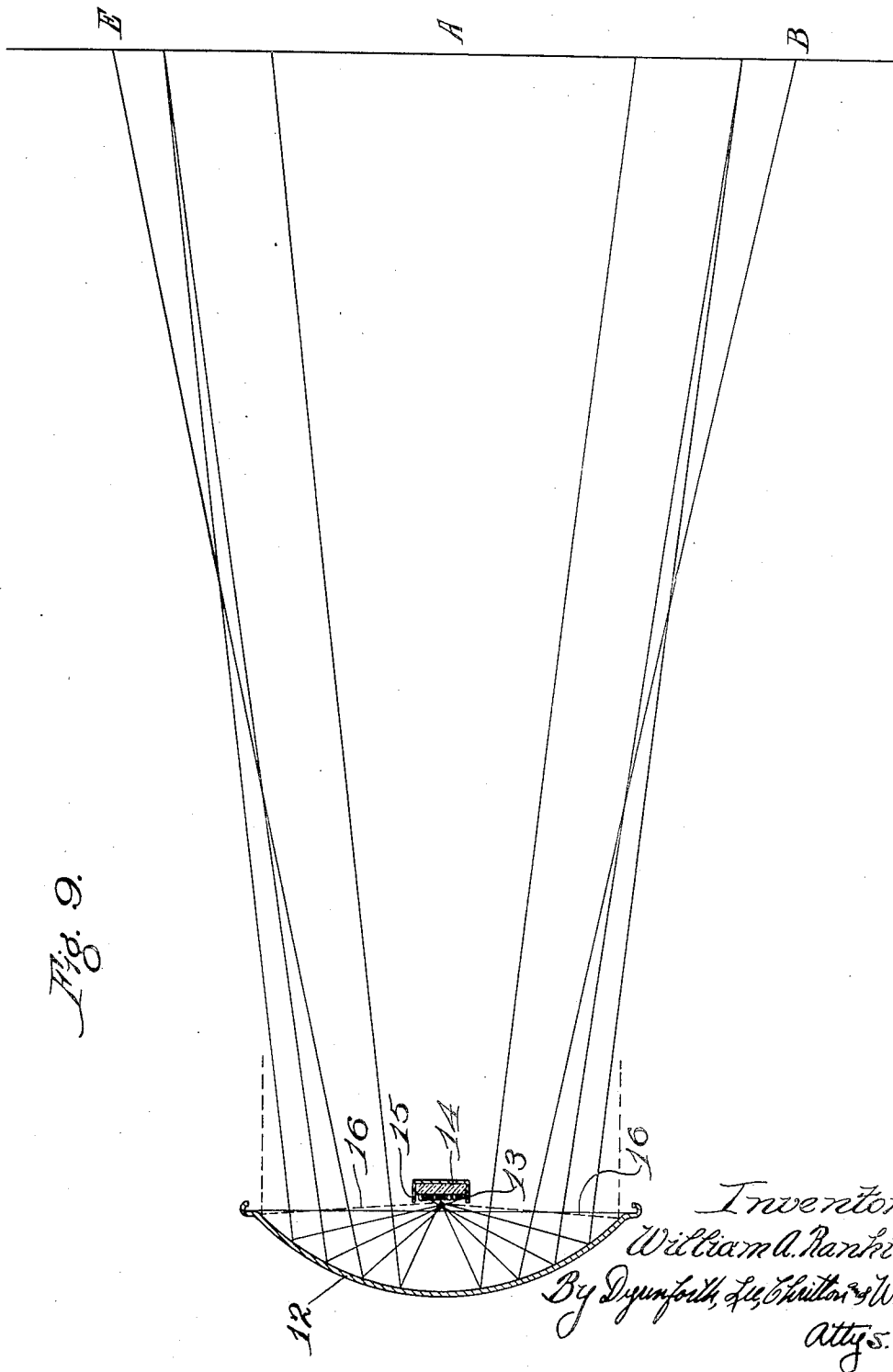
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ELECTRIC HEATER

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3 Sheets-Sheet 2



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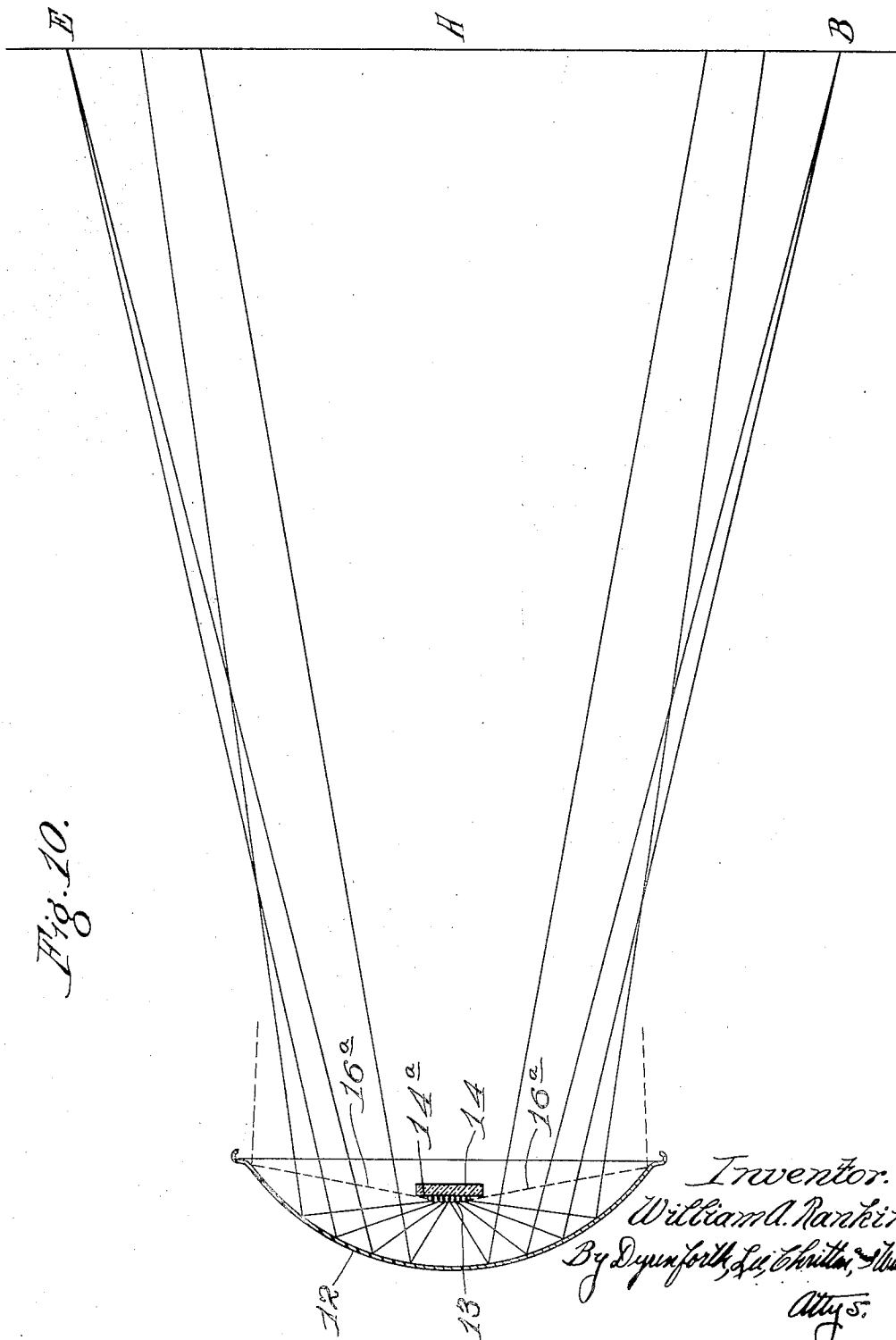
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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ELECTRIC HEATER

Application filed February 7, 1931. Serial No. 514,270.

This invention relates to improvements in heaters and, more especially, electric heaters of the portable type, commonly referred to as space heaters.

Among the features of my invention is the provision of such a heater that is more efficient in operation and use than those made before. The heater belongs to the same general class as that shown in patent, No. 1,671,378, issued May 29, 1928 to the assignee of Frederick D. Pitt, but has distinct improvements thereon. One of the principal features is the arrangement of the reflector, heating elements and other parts so that no ray of radiant heat will pass directly from the element into space. That is, every ray is either shielded, shaded or blanketed, or else impinges against some part of the reflector. This virtually amounts to saying that all the radiant rays that are used are reflected rays. This is important because in heaters of this kind, the reflector ordinarily is designed to give the desired direction, diffusion, and so forth, of the rays issuing from the heater. It is desirable, therefore, to direct as many of the rays as possible against the reflector so that they will issue therefrom in the proper manner. In heaters of the older types, there are frequently many rays passing directly from the heating element into space without first impinging against the reflector. These rays ordinarily escape more or less in a sideways direction far outside of the field or area into which the heater is directed. As far as heating this particular field or area is concerned, therefore, these rays escaping to the sides are virtually lost or wasted. For example, an examination of the views of the heater shown in Pitt patent, No. 1,671,378, above referred to, will show that portions of the heating element are visible from the side of the heater. For example, an examination of Figs. 1, 2 and 6 will show that portions of the heating element 36 are visible from the side. This means that some rays of heat from these portions of the element will escape directly to the side of the heater, entirely outside of the desired scope or range of the same. In Fig. 6, for example, the field of the heater shown

in this patent is illustrated as a vertical circular surface perpendicular to the axis of the reflector and substantially six feet in diameter. This surface is the vertical circular plane with the three feet radius A—B. As described in the patent, and as particularly shown in Fig. 6, it is contemplated that most of the rays issuing from the heater will strike this surface. A close examination of Fig. 6 and the other figures of this patent, however, will show that many rays are free to pass from the heating element out to the sides without striking the reflector at all. These rays move substantially at right angles to the axis of the reflector or at such a wide angle that they never strike the surface E—A—B at all. These rays are, therefore, wasted. One of the principal features of my invention is the provision of a device in which practically no rays will be wasted in this manner.

The feature just referred to is accomplished by providing a concave reflector and making the heating element of such a shape, or so placing the same, or suitably shielding the same, so that every ray passing into space from the element will first impinge against the reflector. Every ray issuing from the heater, therefore, will fall inside of the range, field, or scope for which the reflector is designed.

Other features and advantages of my invention will appear more fully as I proceed with my specification.

In those forms of devices embodying the features of my invention, shown in the accompanying drawings—

Figure 1 is a view in side elevation and partly in section; Fig. 2 is a view in side elevation and partly in section, on an enlarged scale, of the heating element and support removed; Fig. 3 is a vertical sectional view of the plug portion of the heating element; Fig. 4 is a view taken as indicated by the line 4 of Fig. 2; Fig. 5 is a view similar to Fig. 2 showing a modified form of heating element and support; Fig. 6 is a view taken as indicated by the line 6 of Fig. 5; Fig. 7 is a view similar to Fig. 2 showing a modified form; Fig. 8 is a view taken as indicated by the line

8 of Fig. 7; and Figs. 9 and 10 are diagrammatic views.

As shown in the drawings, the heater includes a suitable base or standard 10 with a forked support 11 carrying a concave reflector 12. The reflector is provided with a suitable curvature to give the desired diffusion of rays reflected therefrom. For example, as shown in Figs. 9 and 10, the reflector may be substantially spherical and of such size and so placed that it will heat substantially uniformly a surface of a certain size exposed to the heater at a desired distance in front of the heater. For example, as shown in Figs. 9 and 10, the surface to be heated may be considered as included in a vertical plane perpendicular to the axis of the reflector and, for example, circular in shape, with a six foot radius. In these figures I have diagrammatically indicated the section of such a surface by the line E—B, it being understood that this line E—B may be, say, six feet long and represent a six foot diameter of a circular area, the center of the same being indicated by A. The diagrams shown in Figs. 9 and 10 correspond to the diagrammatic view shown in Fig. 6 of Pitt patent, No. 1,671,378, above referred to.

In Figs. 9 and 10, the heating element is indicated by 13, it being understood that this element may be of any desired substance adapted to be electrically heated preferably to luminosity. For example, the heating element may be a spiral coil of nickel chromium alloy wire, as is commonly used for heating elements in devices of this kind. Numeral 14 indicates a suitable support for the heating element. In Fig. 9, the support 14 is provided with a circular rim, curtain or shield 15. In the device shown in Fig. 10, the support projects some distance laterally beyond the edge of the heating element 13, as indicated by 14^a. An examination of these figures will show that no ray can pass directly from the heating element 13 into space. In Fig. 9, I have indicated by the broken line 16 the widest angle that a direct ray can take from the heating element and it will be seen that this ray engages the edge of the reflector 12. Any rays issuing to wider angles are intercepted by the curtain 15. Likewise, in Fig. 10, such a ray is indicated by 16^a. Any rays wider than this are intercepted or reflected by the projecting edge 14^a of the support 14, which performs the same function therefore as the rim 15. Reference to the diagram in Fig. 6 of the Pitt patent, No. 1,671,378, above referred to, will show that the features that I have shown and described are not present in that device. It will be evident from an inspection of Pitt's Fig. 6 that some rays can pass directly from the heating element to the sides, without striking the reflector and without striking the surface E—B.

Any suitable means may be provided for mounting and supporting the heating element. For example, as shown in Fig. 2, the heating element 13 may be carried on a suitable support 14 made of insulating material and provided with the curtain or shield 15 above described. As shown in Fig. 4, the heating element 13 may consist of spiral wire spirally laid on the support 14. The entire heating element and support may be mounted in the heater by means of a plug 17 of the usual screw type, it being understood that the center of the reflector 12 is provided with a receptacle of the well-known Edison screw-type to receive the plug 17. The member 14 may be supported from the plug 17 by means of the central support 18 which may also serve as one of the conductors, the same being joined to one of the terminals of the heating element 13. The other end of the heating element 13 may be connected by means of a wire 19 to the outer portion 17^a of the plug 17. The end of the support 18 is likewise connected electrically to the central contact member 17^b of the plug 17.

In Figs. 5 and 6, I have shown a slightly different form of heating element, support, and associated parts. As here shown, the heating element 13, support 14 and curtain 15 are substantially the same as above described, except that the member 14 is not quite so thick. The central supporting member 18, however, is dispensed with and in its place are provided three supporting members 20, 21 and 22. The members 20 and 21 have their outer ends connected to the terminals of the heating element 13 and their inner ends connected to the outer part 17^a and the central part 17^b of the plug 17, respectively. The member 22 does not operate as a conductor, but may serve as a support.

In the heating element, support and associated parts shown in Figs. 7 and 8, I also provide an insulating member or base 14 carrying the electric resistance element 13, as above described. The curtain or rim 15, however, is dispensed with and the edge 14 of the support projects beyond the heating element 13 a sufficient distance, as indicated by 14^a, to prevent any rays from escaping the reflector, as shown in Fig. 10. For supporting the element, I have here shown the plug 17 provided with a central supporting tube 23 connected by means of the bar 24 to one end of the heating element 13. The other terminal, as indicated by 25, lies inside of the tube 23 and is connected to the central part 17^b of the plug 17. The tube 23 is connected to the outer part 17^a of the plug. The tube 23 may be provided with perforations 26 to assist in cooling the same.

While I have shown and described certain embodiments of my invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construc-

tion and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims, in which it is my intention to claim all novelty inherent in my invention as broadly as permissible, in view of the prior art.

What I regard as new, and desire to secure by Letters Patent, is:

1. An electric radiant space heater including; a concave reflector; a heating element; means for supporting the heating element in front of the reflector; and a shield intercepting substantially all rays issuing from said heating element except those impinging against said reflector, and permitting substantially all rays impinging against said reflector to issue from the heater.

2. A device of the character described including; a concave reflector; a support ar-

ranged in front of the reflector; a heating element mounted on said support; means for intercepting substantially all rays issuing from said heating element except those impinging against the reflector, and permitting substantially all rays impinging against said reflector to issue from the heater; and a peripheral curtain on the support intercepting side rays issuing from the heating element at a wide angle.

3. A device as claimed in claim 2 in which the support is substantially flat.

4. A device as claimed in claim 2 in which the peripheral curtain on the support is in the form of a marginal extension of said support.

In witness whereof, I have hereunto set my hand, this 30th day of January, 1931.

WILLIAM A. RANKIN.