

Sept. 27, 1932.

E. W. BALLENTINE

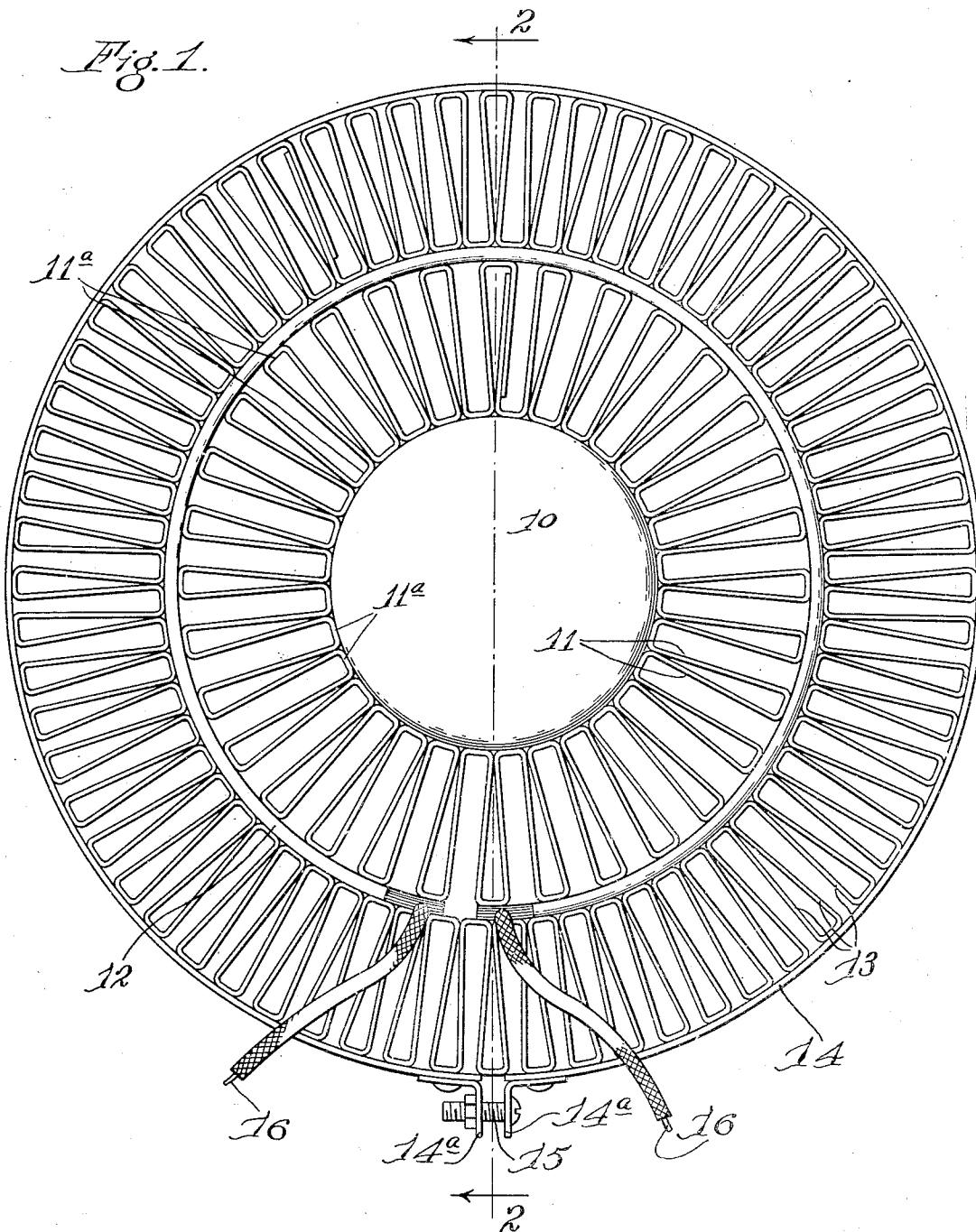
1,879,889

ELECTRIC AIR HEATER

Filed June 29, 1931

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

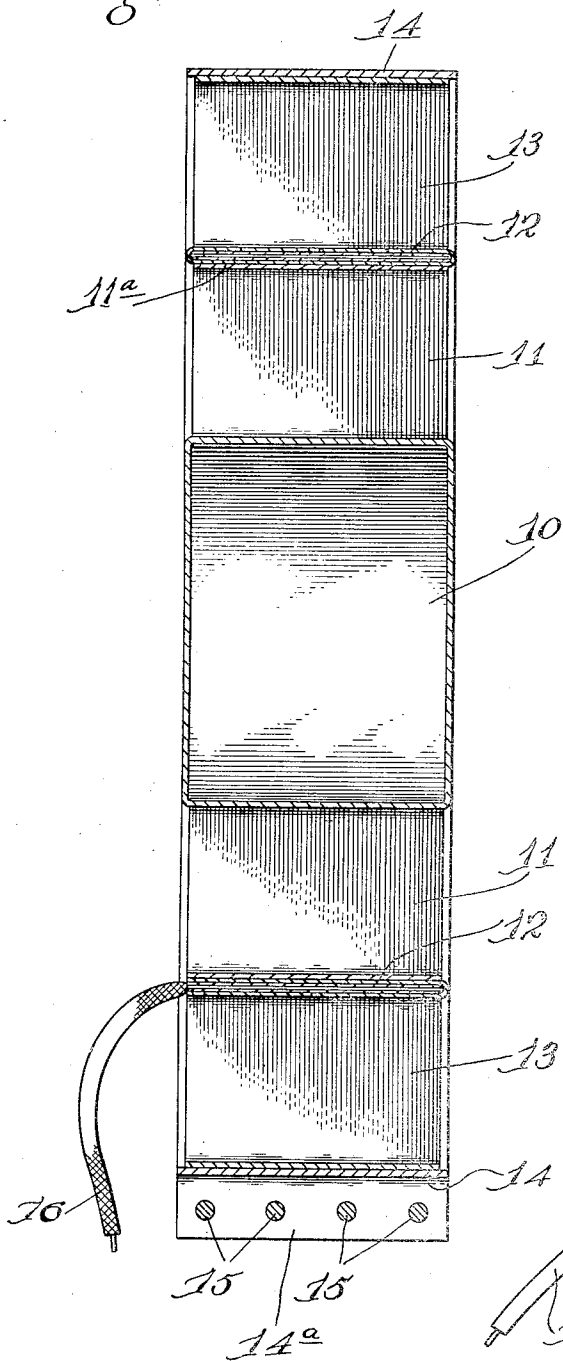
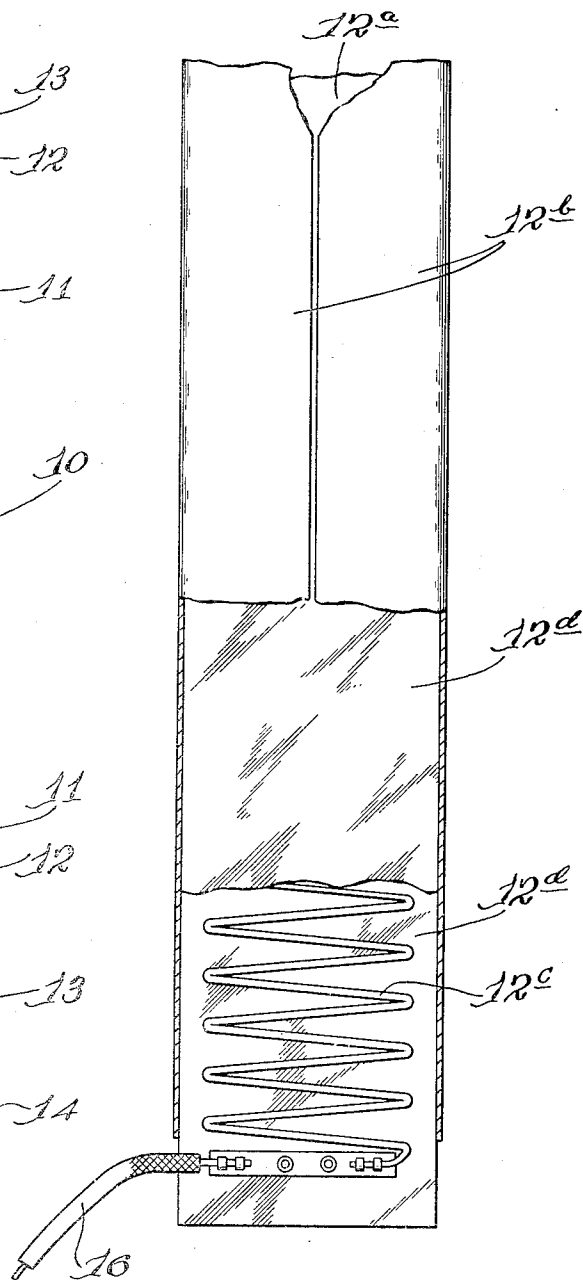


Fig. 3.



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UNITED STATES PATENT OFFICE

EARLE W. BALLENTINE, OF CHICAGO, ILLINOIS, ASSIGNOR TO SOLAR INDUSTRIES, INC.,
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ELECTRIC AIR HEATER

Application filed June 29, 1931. Serial No. 547,708.

This invention relates to improvements in electric heaters and, more especially, an electric air heater.

Among the features of my invention is the provision of such a heater that is strong and rugged in construction, and efficient in service and operation.

Another feature of my invention is the provision of a heater especially adapted for use with an electric fan to heat the current of air issuing from said fan. When used in this way, the heater will also operate as an air straightener. The heater is so made that the central part is substantially non-effective so far as heating is concerned, thus particularly adapting the device for use with a fan mounted on a motor shaft where the motor blanks off the central part of the air stream.

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

In that form of device embodying the features of my invention shown in the accompanying drawings—

Figure 1 is a view in front elevation; Fig. 2 is a view taken as indicated by the line 2 of Fig. 1; and Fig. 3 is a fragmentary view of the heating element with portions broken away to show the interior construction.

As shown in the drawings, the heater includes a substantially cylindrical central support 10, here shown as a hollow cylindrical casing closed at each end. Around the central support 10 is arranged an inner ring of substantially radial radiating fins 11, 11. As here shown, these fins are formed by reflexing a strip or ribbon of metal. When thus formed, the ends of alternate parts of fins are attached by the portions of metal 11^a, such portions with the fins 11 forming one continuous strip or ribbon of sheet metal which is reflexed as above described to form the ring of radiating fins 11. Surrounding the inner ring of radiating fins 11 is a circular heating element 12, the detailed construction

of which will be described hereinafter. Arranged around and outside of the heating element 12 is an outer ring of radiating fins 13, 13. As here shown, these fins are also formed out of a single strip or ribbon of metal reflexed in the same manner as above described to form the inner ring of radiating fins 11. Around the outer ring of radiating fins is a circular band 14, the ends of which are somewhat separated and bent outwardly, as indicated by 14^a, to receive the bolts 15 which are tightened to contract the ring 14 to press the fins tightly against the heating element 12. This pressure contact causes very efficient and rapid transmission of heat from the heating element to the fins with consequent rapid dissipation, thus contributing to the efficiency of the heater. Numerals 16, 16 may indicate the lead wires to the heating element 12.

The heating element 12 may be formed in any desired manner. For example, as here shown, the same includes an elongated metal sheath formed of a strip of metal with its longitudinal edges folded over towards each other. For example, 12^a may indicate one wall of the sheath, and 12^b, 12^b, the edges of the sheath folded over to form the opposite wall thereof. Inside of the sheath is an insulated resistor, here shown as a reflexed flattened resistance wire 12^c laid between two sheets of mica 12^d, 12^d. The element is bent into circular form, as shown in Fig. 1, when it is placed in the heater.

The fins, band 14, central support and sheath of the heating element are preferably made of the same kind of metal or of different metals having substantially the same co-efficient of expansion so that there will be no undesirable variations in tensions or pressures of the various parts of the heater with different temperatures. I found, for example, that aluminum or aluminum alloys are suitable for the manufacture of these parts.

With the construction shown, the band 14

may be drawn very tight and the tensile strength of the same utilized to give a very high and uniform compression or radial pressure inwardly to press the fins tightly against the heating element.

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 construction 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 heater, including; a ring of radiating fins, a circular heating element around the ring of radiating fins; and a circular band around the fins and heating element, said band being contracted to press the fins against the heating element.

2. An electric heater, including; an inner ring of radiating fins; a circular heating element around the inner ring of radiating fins; an outer ring of radiating fins around the heating element; and a circular band around the outer ring of fins, said band being contracted to press the fins against the heating element.

3. An electric heater, including; a circular central support; a circular heating element around said support; a ring of radiating fins around said support and in contact with the heating element; and a circular band around the heating element and the fins, said band being contracted to compress the fins against the heating element.

4. An electric heater, including; a circular central support; an inner ring of radiating fins around said support; a circular heating element around the inner ring of fins; an outer ring of radiating fins around the heating element; and a circular band around the outer ring of fins, said band being contracted to press the fins against the heating element.

5. An electric heater as claimed in claim 1, in which the fins are radial.

6. An electric heater as claimed in claim 2, in which the fins are radial.

7. An electric heater as claimed in claim 3, in which the fins are radial.

8. An electric heater as claimed in claim 4, in which the fins are radial.

9. An electric heater as claimed in claim 1, in which the fins are radial and formed of a reflexed continuous strip of metal.

10. An electric heater as claimed in claim 2, in which the fins are radial and formed of a reflexed continuous strip of metal.

11. An electric heater as claimed in claim 3, in which the fins are radial and formed of a reflexed continuous strip of metal.

12. An electric heater as claimed in claim

4, in which the fins are radial and formed of a reflexed continuous strip of metal.

13. An electric heater as claimed in claim 1, in which the radiating fins and circular band are made of material having substantially the same temperature co-efficient of expansion.

14. An electric heater as claimed in claim 2, in which the radiating fins and circular band are made of material having substantially the same temperature co-efficient of expansion.

15. An electric heater as claimed in claim 3, in which the radiating fins and circular band are made of material having substantially the same temperature co-efficient of expansion.

In witness whereof, I have hereunto set my hand this 26th day of June, 1931.

EARLE W. BALLENTINE.