

E. N. LIGHTFOOT,
ELECTRIC HEATER.
APPLICATION FILED JAN. 9, 1920.

1,374,591.

Patented Apr. 12, 1921.

3 SHEETS—SHEET 1.

Fig. 1.

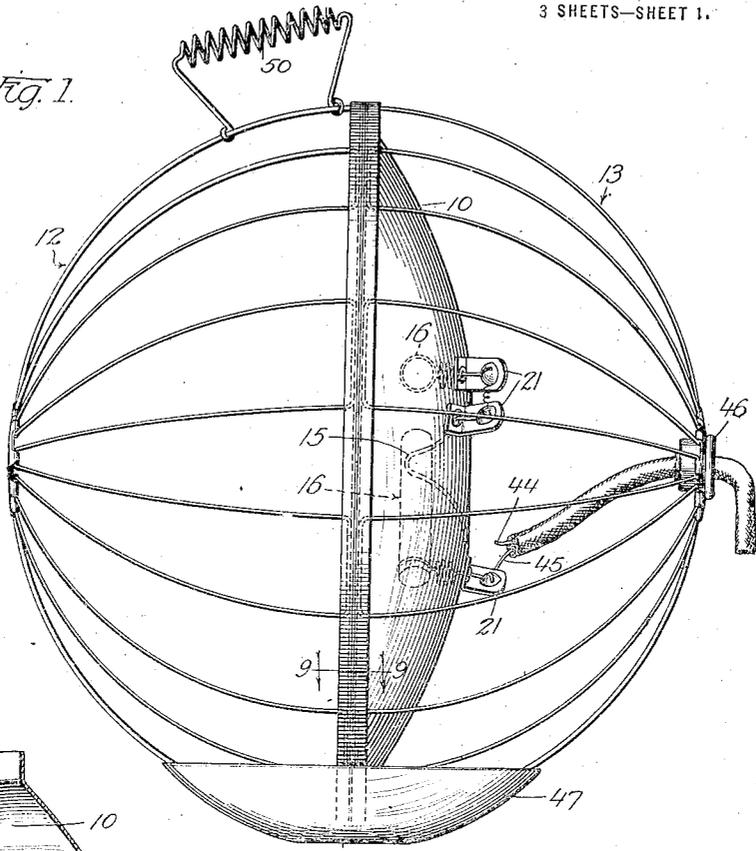


Fig. 7.

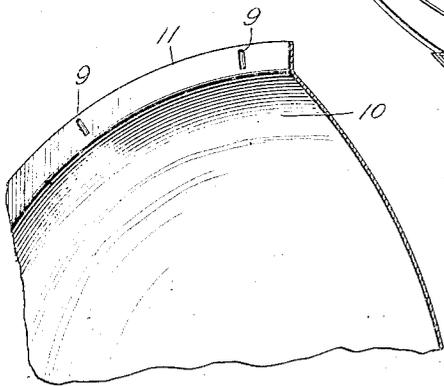


Fig. 9.

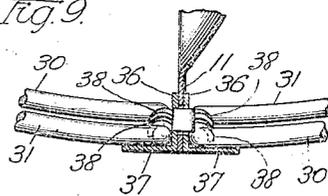
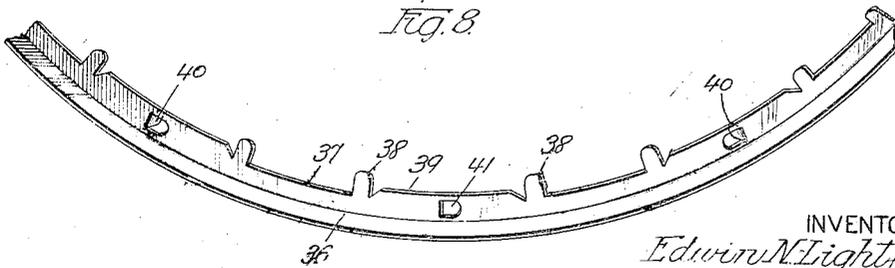


Fig. 8.



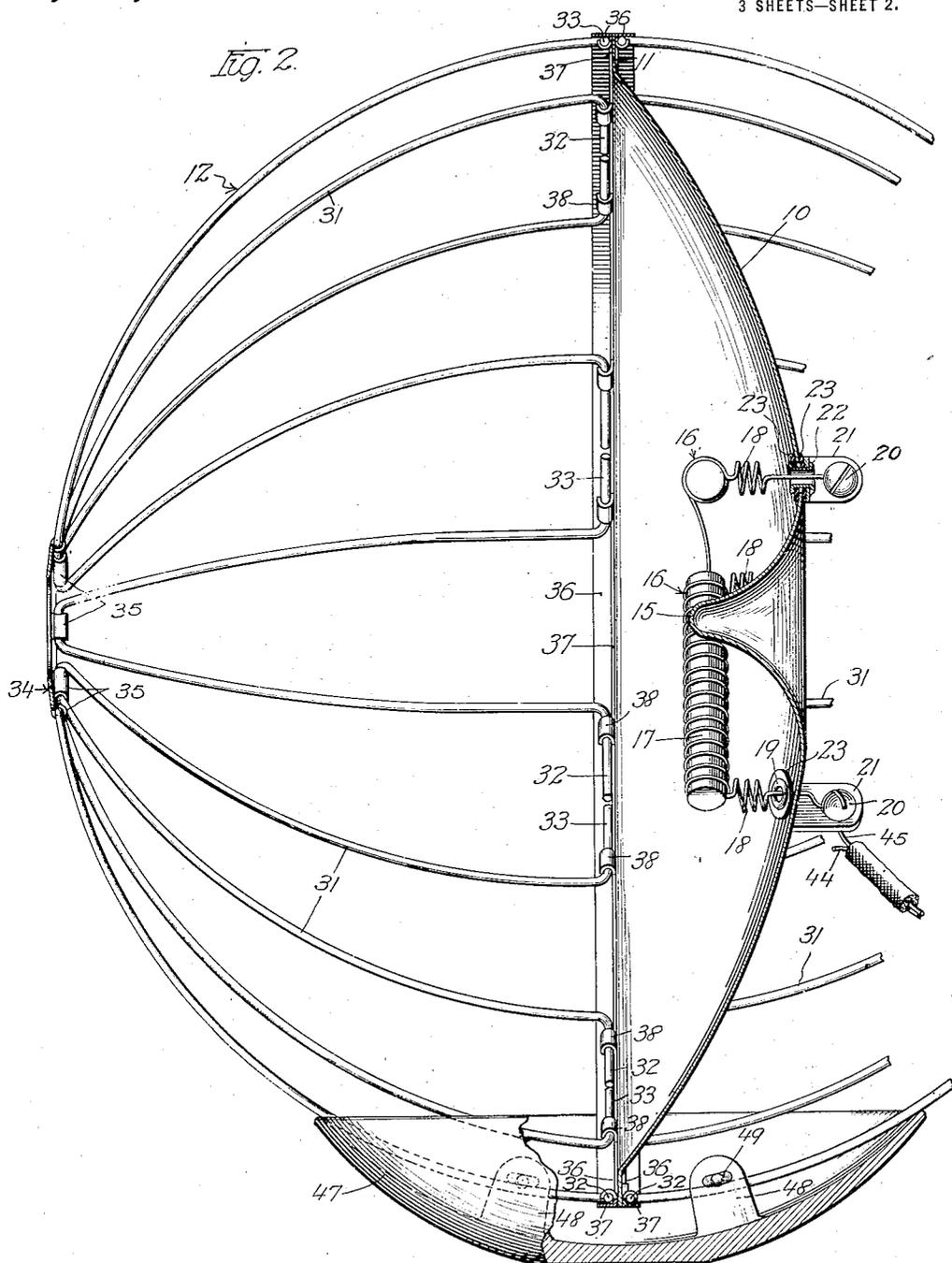
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

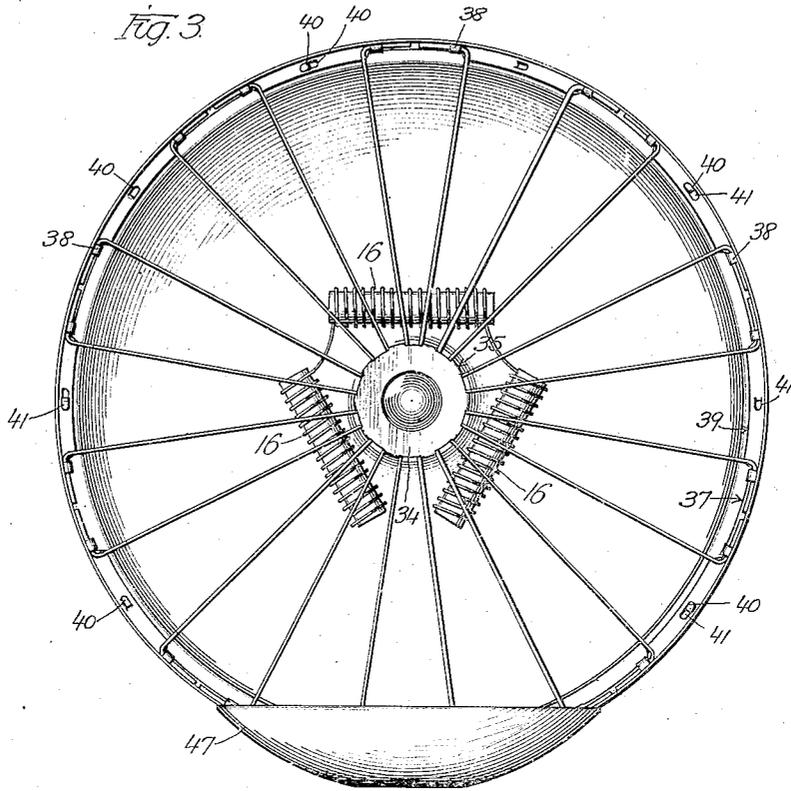


Fig. 4.

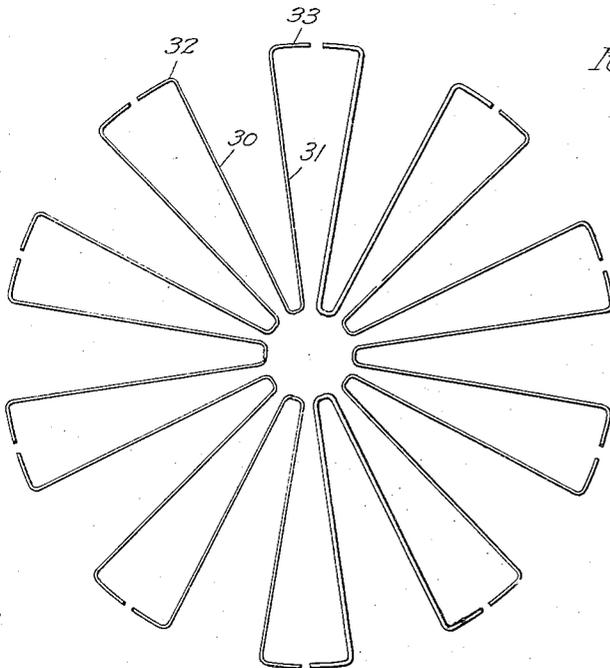


Fig. 5.

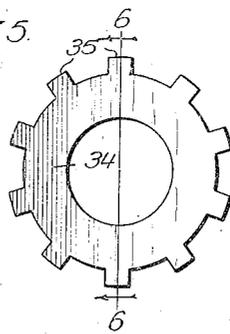
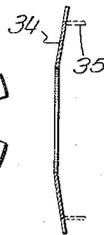


Fig. 6.



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UNITED STATES PATENT OFFICE.

EDWIN N. LIGHTFOOT, OF NEW YORK, N. Y., ASSIGNOR TO THE CUTLER-HAMMER MFG. CO., OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ELECTRIC HEATER.

1,374,591.

Specification of Letters Patent. Patented Apr. 12, 1921.

Application filed January 9, 1920. Serial No. 350,384.

To all whom it may concern:

Be it known that I, EDWIN N. LIGHTFOOT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to electric heaters.

It relates more particularly to electric heaters in which the heat waves generated by a resistance coil or heating unit are reflected from a highly polished surface.

An object of this invention is to provide a substantially spherical radiant electric heater.

Another object is to provide an electric heater having a supporting cage which under all circumstances tends to maintain the heater in an upright position.

Another object is to provide an improved electric heater having a substantially spherical supporting cage which protects the heating element or elements.

Another object is to provide an improved electric heater of few parts which may be easily and quickly assembled.

Another object is to provide an improved electric heater having a reflector supported between the two substantially hemispherical sections of a protective cage.

Other objects and advantages will appear as the specification proceeds.

One embodiment of this invention is illustrated in the accompanying drawings wherein,

Figure 1 is a side elevation of the electric heater.

Fig. 2 is a vertical section through the electric heater.

Fig. 3 is a front elevation of the electric heater.

Fig. 4 is a plan of the guard wires of one of the sections of the protective cage.

Fig. 5 is a plan of the annular plate in which the inner ends of the guard wires are positioned.

Fig. 6 is a sectional view on line 6—6 of Fig. 5.

Fig. 7 is a perspective of a section of the reflector rim.

Fig. 8 is a perspective on an enlarged scale of a section of one of the annular plates of L-shaped cross section in which the outer ends of the guard wires are positioned.

Fig. 9 is a sectional view on line 9—9 of Fig. 1.

The electric heater comprises in general a concave reflector having a convex central portion about which a plurality of resistance elements are positioned in uniform spaced relation thereto. The reflector with its resistance elements is positioned within a substantially spherical supporting cage which also serves to protect the resistance elements. The cage is weighted so that it always tends to maintain the reflector in a predetermined position.

As shown in the drawings, the heater comprises a concave reflector 10 having a laterally extending rim or flange 11 by means of which the reflector is secured to the protective cage, comprising two substantially hemispherical sections indicated generally at 12 and 13.

The concave reflector 10 has a convex central portion 15 about which are positioned a plurality of resistance elements 16 in uniform spaced relation thereto.

Each resistance element comprises a resistance wire 16 wound upon an insulating tube 17. Each insulating tube with the resistor wound thereon is resiliently supported in spaced relation to the reflector by means of coil springs 18 extending through openings 19 in the reflector. Each spring 18 at its rear end is secured to a terminal 20 carried by an L-shaped bracket 21. Each bracket is attached to the reflector by means of an eyelet 22 extending through one of the openings 19, the eyelet and the bracket being insulated from the reflector by insulating bushings 23. The springs 18 are in circuit with the resistor and the source of current supply.

The two substantially hemispherical sections of the supporting protective cage are of similar construction and the description of one will serve for both.

The substantially hemispherical section of the cage is constructed of a series of U-

shaped wires or rods having legs 30 and 31 joined at their base and having their outer ends 32 and 33 extending at substantially right angles thereto. The U-shaped guard wires at their inner ends are held in spaced relation by means of an annular plate 34 having clips or lugs 35. Each lug 35 is adapted to be bent over and engage the base of a U-shaped guard wire thereby securely attaching it to the annular plate 34. The outer laterally extending ends 32 and 33 of the series of U-shaped guard wires are positioned in an L-shaped channel formed by an annular plate 36 and its peripheral flange 37. The annular plate 36 is provided with a series of lugs 38 which may be bent over the laterally extending ends 32 and 33 of the series of U-shaped guard wires, thereby securely attaching these guard wires to the annular plate. The plate 36 is also provided with a series of angularly disposed flanges 39 adapted to fit between the outer ends of the legs 30 and 31 of the U-shaped guard wires, whereby the guard wires are uniformly spaced.

A series of tongues or lugs 40 are punched from the annular plate 36 for purposes which will more fully hereinafter appear. A series of holes 41 interposed between the lugs 40 are also formed in the annular plate 36.

The two hemispherical sections 12 and 13 of the supporting protecting cage are locked together by means of the lugs 40 of one section engaging the holes 41 of the other section. The ends of these lugs are then bent over so that the two sections of the cage are firmly locked together. The flange or rim 11 of the reflector 10 is interposed between the adjacent faces of the annular plates 36. The tongues or lugs 40 extend through openings or slots 9 provided in the flange of the reflector, thereby definitely and rigidly positioning the reflector between the two sections and within the protective cage formed thereby.

Conductors 44 and 45, connected with a suitable source of current supply, may extend through the opening in the annular plate 34 of the section 13 and be connected with the terminals of the resistance elements. These resistance elements may be connected in parallel or series as desired. A bushing 46 is provided for the opening in the annular plate 34 to more thoroughly insulate the entering conductors from the protective cage.

In order that the heater may be maintained in a definite predetermined position, usually with the reflector 10 in upright position, the supporting protective cage is weighted. This weighting of the protective cage is accomplished by means of a bowl shaped weighting member 47 which conforms very closely to the shape of the pro-

TECTIVE cage. In order that the weight may be locked to the cage, a plurality of upwardly extending lugs 48 are formed on the inside of the weight. Cotter pins 49 extending through openings in the lugs 48 cooperate with the lower guard wires to lock the weight to the cage. The cage may be adjusted to different positions on the weighted base by sliding the wires 32 through the lugs 49. The reflector 10 is thus maintained in stable equilibrium. By "stable equilibrium" is meant that characteristic given to the heater by the rounded, weighted base whereby if moved out of its normal position, it will always tend to return to its normal position and automatically right itself. These lower guard wires are made heavier than the other guard wires of the protective cage and form a substantial and rigid support for the weight.

In order that the heater may be readily moved, it is provided with a handle 50 attached to one of the guard wires which is likewise of heavy construction like those by which the weight is attached to the cage.

The hemispherical sections of the cage are assembled as units. The reflector and the resistance elements and terminals supported thereby are likewise assembled as a unit. These three units and the weight may be very easily and quickly assembled to form a complete electric heater.

When weighted in the manner described, the heater is maintained in a position with the reflector substantially upright. The position of the weight with respect to the cage may be altered to maintain the reflector at any desired angle. Since the heater is weighted it will always right itself regardless of the position in which it may be placed.

It is to be understood that the embodiment of the invention shown in the drawings and hereinbefore described is merely for the purpose of illustration and that many other embodiments and adaptations may be made and will readily occur to those skilled in the art.

What is claimed is:

1. An electric heater comprising a reflector, a resistance element supported in spaced relation thereto, and a substantially spherical cage within which the reflector is positioned.

2. An electric heater comprising a reflector, a resistance element supported in spaced relation thereto, and a ball-shaped cage within which the reflector and the resistance element are positioned, said cage being weighted to maintain the reflector in a predetermined position.

3. An electric heater comprising a reflector, a resistance element supported in spaced relation thereto, a substantially spherical cage within which the reflector is positioned,

and a weight secured to the cage and tending to maintain the reflector in an upright position.

4. An electric heater having in combination a reflector, a resistance element supported in spaced relation thereto, and a protective cage comprising substantially hemispherical sections between which the reflector is positioned.

5. An electric heater having in combination a reflector provided with a laterally extending flange, a resistance element supported in spaced relation to the reflector, a protective cage comprising substantially hemispherical sections, and means for securing the flange of the reflector between the adjacent edges of the hemispherical sections with the reflector positioned within the cage.

6. An electric heater having in combination a reflector provided with a laterally extending flange, a resistance element supported in spaced relation to the reflector, a protective cage comprising substantially hemispherical sections, and means carried by said sections and cooperating with the flange of the reflector for positioning the reflector within the cage.

7. An electric heater comprising a concave reflector having a convex central portion, a plurality of resistance elements supported in uniform spaced relation to the convex portion, and a spherical cage support for the reflector.

8. An electric heater comprising a concave reflector having a convex central portion, a plurality of resistance elements supported in uniform spaced relation to the convex portion, and a substantially spherical supporting protecting cage within which the reflector is positioned.

9. An electric heater comprising a reflector, a resistance element supported in spaced relation thereto, a substantially spherical cage within which the reflector is positioned, and a bowl shaped weight attached to the cage and maintaining the heater in a predetermined position.

10. An electric heater having in combination a reflector, a resistance element supported in spaced relation thereto, and a protective supporting cage within which the reflector and its resistance element are positioned, said cage comprising substantially hemispherical sections, each section being formed of spaced guard wires.

11. An electric heater having in combination a reflector provided with a laterally extending flange, a resistance element supported in spaced relation to the reflector, and a protective cage within which the reflector and resistance element are positioned,

said cage comprising substantially hemispherical sections between the margins of which the reflector flange is clamped.

12. An electric heater comprising a resistance element and a substantially spherical supporting protecting cage within which the resistance element is positioned.

13. An electric heater comprising a resistance element, a support therefor, a protecting cage within which the resistance element is positioned, and a weighted curved base for the cage whereby the cage is restored to normal position if accidentally tipped to one side or the other.

14. An electric heater comprising a resistance element, means for supporting the element, a cage completely surrounding said means, and a weighted curved base for the cage whereby the heater is maintained in stable equilibrium.

15. A heater having stable equilibrium comprising a reflector, a resistance element supported in spaced relation thereto, a protecting cage within which the reflector is positioned, and a weighted bowl shaped base for the cage.

16. A heater comprising a resistance element, a support therefor, a protecting cage surrounding the support, and a weighted bowl shaped base adjustably connected to the cage whereby the heater may be held in any one of a plurality of stable positions.

17. In an electric heater comprising a reflector, a resistance element supported in spaced relation thereto, and a protecting cage for the resistance, means cooperating with the cage to render the heater stable in a plurality of different positions.

18. In an electric heater comprising a reflector, a resistance element supported in spaced relation thereto, and a protecting cage for the resistance, means cooperating with the cage to render the heater stable in a plurality of positions, the means including a bowl shaped base attached to the cage.

19. In an electric heater comprising a resistance element and a support therefor, means for automatically restoring the heater to normal position when tilted from said normal position.

20. In an electric heater comprising a resistance element and a support therefor, means for automatically restoring the heater to normal position when tilted from said normal position, said means comprising a weighted bowl shaped base having a flattened portion on the bottom.

In witness whereof, I have hereunto subscribed my name.

EDWIN N. LIGHTFOOT.