Dec. 20, 1955 J. C. BECKETT ET AL 2,727,978

ION EMITTING HEATER

Filed July 27, 1953

Fig. 1.

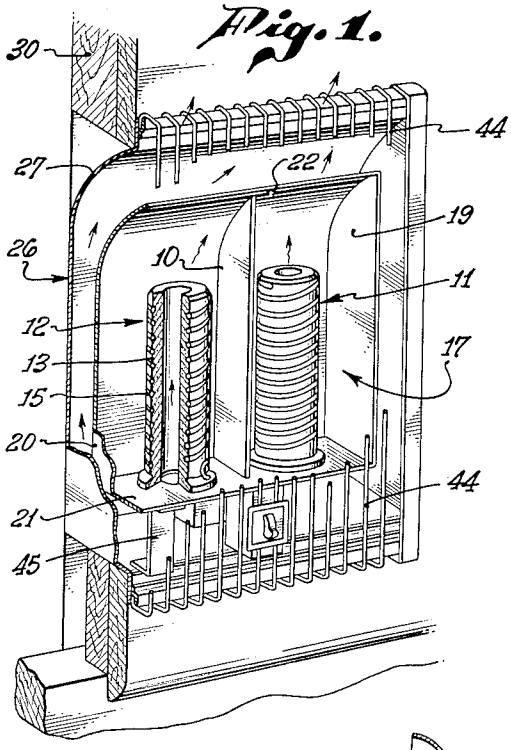


Fig. 2.

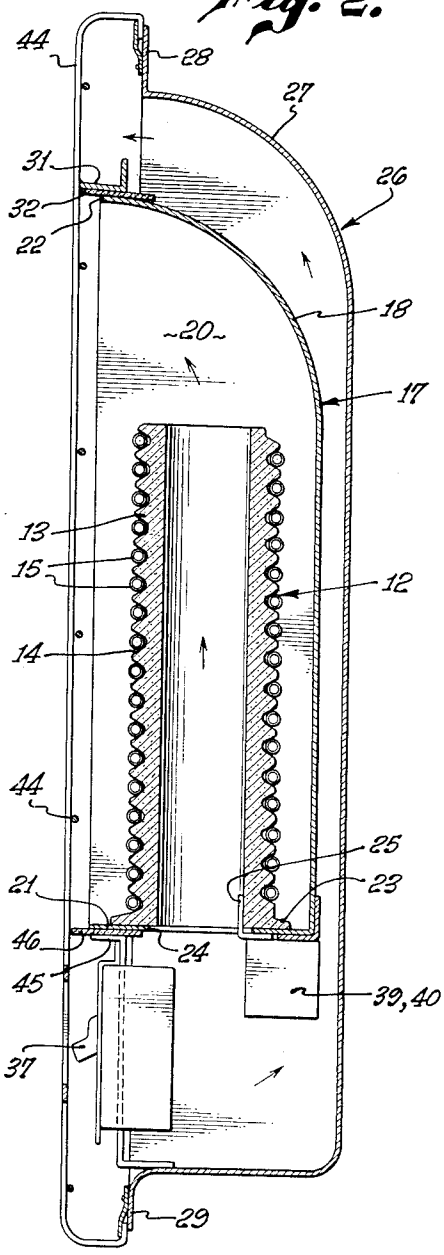
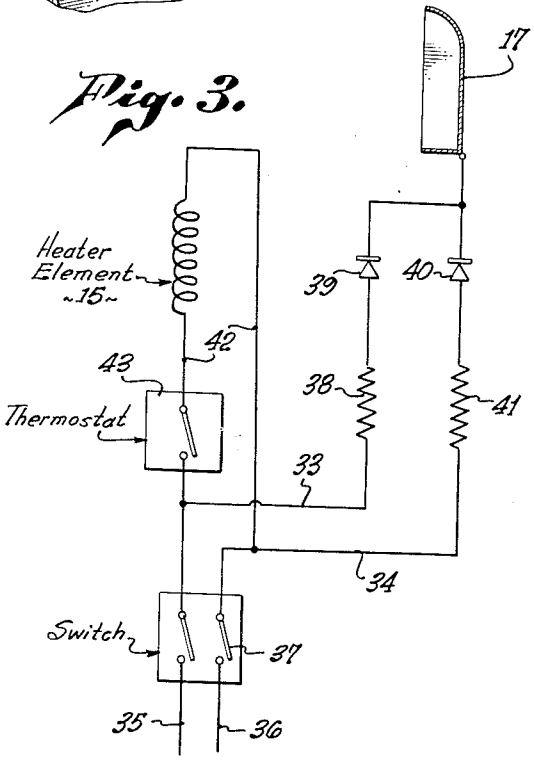


Fig. 3.



JOHN C. BECKETT,
WILLIAM W. HICKS,
INVENTORS.

BY John Flam
ATTORNEY.

United States Patent Office 2,727,978 Patented Dec. 20, 1955

2,727,978

ION EMITTING HEATER

John Collier Beckett, Kentfield, and William Wesley Hicks, San Francisco, Calif., assignors to Ionaire, Inc., San Francisco, Calif., a corporation of California

Application July 27, 1953, Serial No. 370,554

3 Claims. (Cl. 219—34)

This invention relates to an electric wall heater that serves also as an emitter of ions of preponderantly one charge.

Air containing a preponderance of either negative or positive ions is known to have certain effects upon humans and animals; and a preponderance of negative ions is known to have beneficial effects. An electric wall heater utilizing heating elements may be conveniently used as the source providing primary emission of such ions.

In order to select which type of ions can pass outwardly of the heater, use is made of a screen or suppressor that is cyclically charged either negatively or positively, depending upon whether negative or positive ions are to be permitted to pass outwardly of the heater.

It is an object of the present invention to provide an electric space heater that conveniently utilizes an air directing baffle as the screen or suppressor. In order to accomplish this result, the air directing baffle is insulatingly mounted on the heater frame such that it may support a charge imposed thereon. No substantial modifications of the usual structure of the electric space heater need be required.

Conveniently, the baffle forming the screen provides a base to which the cores supporting the heater elements are attached.

It is another object of this invention to provide a simple and inexpensive space heater that emits ions preponderantly of one charge, preferably of negative sign.

This invention possesses many other advantages, and has other objects which may be made more clearly apparent from a consideration of one embodiment of the invention. For this purpose, there is shown a form in the drawings accompanying and forming part of the present specification. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of this invention is best defined by the appended claims.

Referring to the drawings:

Figure 1 is a pictorial view of an electric wall heater with portions of the apparatus being broken away, the heater being shown accommodated in a recess of a wall;

Fig. 2 is an enlarged vertical sectional view of the wall heater, shown in section; and

Fig. 3 is a wiring diagram for the electric heater.

In the present instance, a plurality of heater units **11** and **12** is provided. Each of these heater elements comprises a hollow core **13** of ceramic material, or the like, that has substantially helical grooves **14** in which resistive heating elements **15** are carried.

The units **11** and **12** are supported in side-by-side relationship upon a bottom wall **21** of a hollow open metal box-like shell **17**.

The shell **17** comprises, in addition to the bottom wall **21**, a base **18** and side walls **19** and **20**. An intermediate vertical wall **10**, similar to the side walls **19** and **20**, is located between the units **11** and **12** and divides

the shell into two similar spaces. The shell **17** is generally trough-shaped, with its opening in substantially a vertical plane. The upper end of the rear wall or base **18** curves forwardly, and the upper edge **22** of the rear wall **18** forms the upper edge of the opening of the shell.

The core **13** of the unit **12** has an enlarged integrally formed radially flanged base portion **23**. The base **23**, surrounding the lower opening of the hollow core **13**, rests upon the base plate **21** about a through opening **24** of the base plate.

To maintain the unit **12** in position on the plate **21**, an angle bracket **25** is provided.

In a similar manner, the unit **11** is supported on the base plate.

An open housing or outer shell **26** is provided for supporting the inner shell **17** and the heater units **11** and **12**. The outer shell **26** is substantially like the inner shell **17**, but spaced from it. The shell **26** has a top curved wall as at **27**. The outer shell **26** is provided with upper and lower flanges **28** and **29**. These flanges overlie the top and bottom edges of an opening provided in a wall **30** when the housing **26** is recessed therein.

The inner shell **17**, together with the heater units **11** and **12**, is supported within the housing **26** in such manner that the shell **17** forms with the housing **26** a passage for circulating the ambient air around and upwardly of the shell **17**. Accordingly, the current of air induces the heated air from within the inner shell **17** to pass to the surrounding space. For this purpose, the bottom wall **21** of the shell **17** is supported substantially above the bottom wall of the housing **27**. The rear plate **18** of the shell **17** is spaced slightly from the vertical or rear wall of the housing **26**. The upper portions of the rear plate **18** of the shell **17** and the upper wall of the housing **26** are spaced and correspondingly curved to direct the air smoothly outwardly and upwardly of the heater.

Air also passes upwardly through the hollow core **13** via the aperture **24** in the bottom wall **21** of the shell **17**. The air passing in the core is warmed and flows upwardly and outwardly as directed by the curved inner surface of the top portion of the rear wall **18** of the inner shell **17**. A grille structure **44**, clamped to the flanges **28** and **29** of the housing **26**, encloses the heater units for safety purposes.

As will be described more fully hereinafter, the ion emitting characteristics of the wall heater can be controlled by providing an electrode about the units **11** and **12**. The inner shell **17** can itself form this electrode. The inner shell **17** is thus insulatingly mounted with respect to the housing **26** to make it possible for the shell **17** to carry an electric charge to create the desired field characteristics.

For this purpose, appropriate angled brackets **31**, attached to the grille **44**, are secured to the upper portion of the shell **17** through insulation pads **32**.

Brackets **45** (Fig. 1), attached to the outer shell **26**, engage the bottom wall **21** of the inner shell **17** through insulation pads **46**.

When the resistive heating elements **15** are energized, the high temperature at the elements **15** causes primary emission of charged particles. The air about the elements **15** becomes ionized.

If ions circulated to the ambient air are preponderantly of one charge, certain effects on humans are achieved.

In order to discriminate against ions either of positive or negative charge, an electrostatic field for suppression of undesired ions and attraction of the desired ions is provided by appropriately charging the shell **17**.

A rectifier system, including half-wave rectifiers **39**, **40**, charge the shell **17**. The inner shell **17** is connected

by a lead 33 through one of the rectifiers 39 and through a current limiting resistor 38 to one line 35 of a two-wire source. The inner shell 17 is also connected by a lead 34 through the other rectifier 40 and a current limiting resistor 41 to the other line 36 of the source. A double pole switch 37 is interposed in the rectifier current. Accordingly, if the lines 35, 36 are supplied with alternating current energy, a pulsating but unidirectional charge is supplied to the inner shell 17.

If the rectifiers 39 and 40 are so arranged that this unidirectional charge is positive, for instance, the electrode formed by the shell 17 will attract the negative ions created by the resistive heating elements 15. The core 13 is negative with respect to the shell 17, and thus repels these negative ions.

Negative ions attracted toward the shell 17 seldom reach the shell 17 for the reason that the strong current of air carries these ions outwardly of the heater before they can arrive at the shell 17.

The positive ions are repelled by the positively charged shell 17, and are correspondingly attracted to the core 13. These positive ions thus seldom leave the core 13, and are absorbed or neutralized before they can enter the air stream.

Accordingly, substantial quantities of negative ions are passed outwardly of the heater as compared with positive ions.

The movement of the ions into the ambient air is achieved by the combined effects of the circulating air and the field characteristics provided by the shell and filament and core structures.

Fig. 3 illustrates the heater element 15 supplied by connections 42 through a thermostat 43 from the double pole switch 37 in parallel relationship with the leads 33 and 34. The switch 37 and rectifiers 39, 40 may conveniently be mounted beneath the bottom wall 21 of the shell 17, or otherwise as desired.

The particular manner of insulatingly supporting the inner shell or baffle 17 makes it possible for this shell to operate as an electrode for appropriately discriminating against passage of ions of one charge outwardly of the wall furnace. No substantial structural additions are required for the heater in order that the effects of ions of one preponderant charge be produced.

The inventors claim:

1. In a heater structure for emitting heated air outwardly therefrom into a space to be heated with the emitted air containing a greater proportion of charged air particles of one electrical sign in relationship to particles of the opposite electrical sign than exists in the air at the intake of the heater structure: a resistive heating element capable of producing charged particles of both electrical signs in ambient air; an open shell spaced from and extending about at least a portion of the element; said heater structure inducing a current of air to flow about said element and outwardly of said shell; and means for impressing a charge of said opposite electrical sign on said shell to attract the heating element produced charged particles of said one sign; the spacing between the shell and the heating element being sufficiently large to permit the air current to intercept a substantial portion of said attracted particles of said one electrical sign and to carry them into the space to be heated without their reaching the shell; and the charge on the shell suppressing movement of heating element produced charged particles of said opposite sign away from the heating element in the space substantially between the heating element and the shell.

2. A heater structure as defined in claim 1, wherein said means for impressing a charge of said opposite electrical sign on said shell comprises a rectifier means cooperable with an alternating current source.

3. A heater structure as defined in claim 1, and further including an outer shell having an open side, said first mentioned shell being nested within said outer shell and having an open side, the open sides of said two shells being correspondingly oriented, and means insulatingly supporting said first mentioned shell in spaced relation to said outer shell, the two shells defining between them an air flow path for inducing convection movement of air outwardly from the open side of the first mentioned shell.

References Cited in the file of this patent

UNITED STATES PATENTS

1,518,067	Hicks	Dec. 2, 1924
1,898,632	Kercher	Feb. 2, 1933
2,140,348	Clark	Dec. 13, 1938
2,654,017	Hicks	Sept. 29, 1953