June 28, 1949. C. C. DOYLE 2,474,472

DOMESTIC ELECTRIC HEATER

Filed March 20, 1945 2 Sheets-Sheet 1

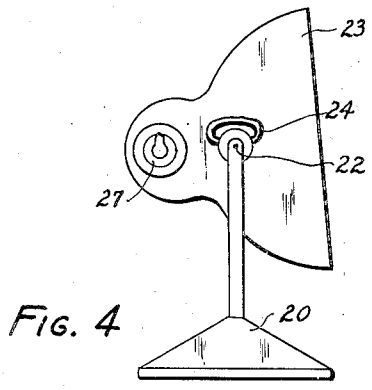


FIG. 4

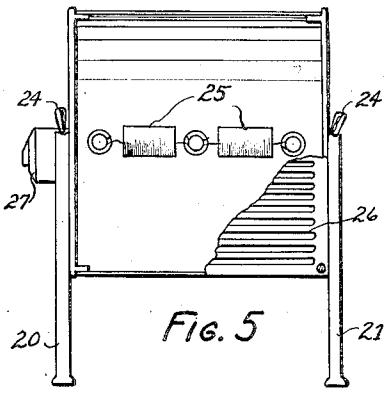


FIG. 5

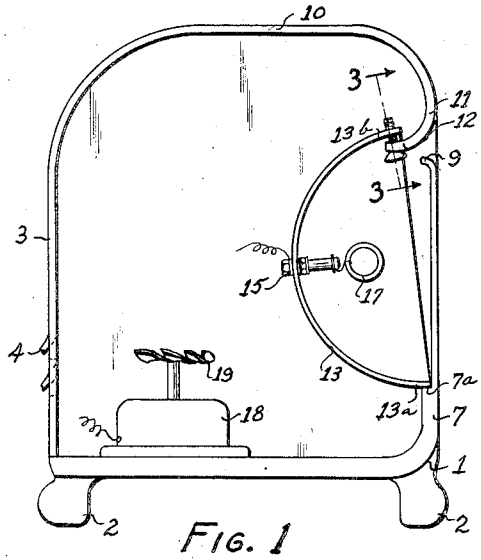


FIG. 1

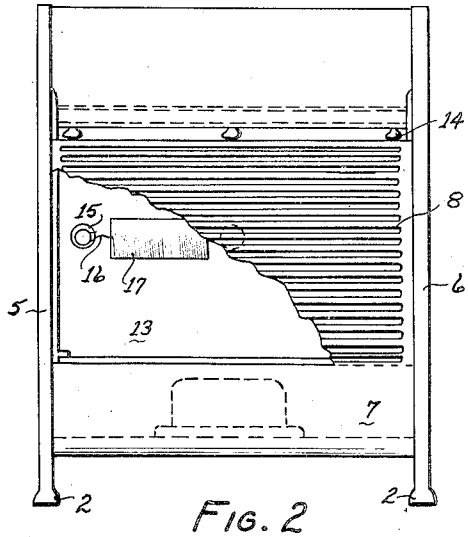


FIG. 2

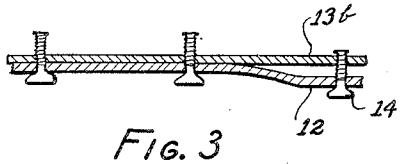


FIG. 3

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DOMESTIC ELECTRIC HEATER

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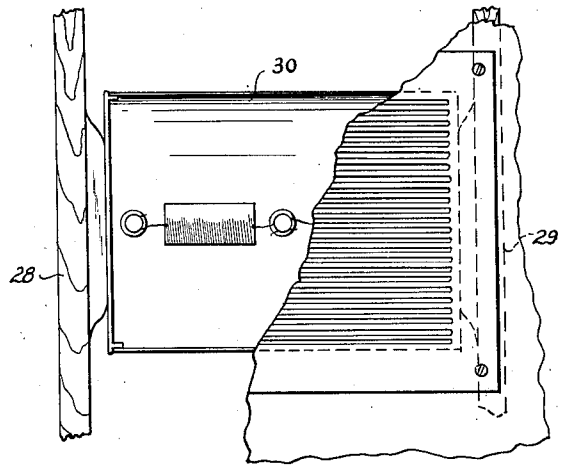


FIG. 6

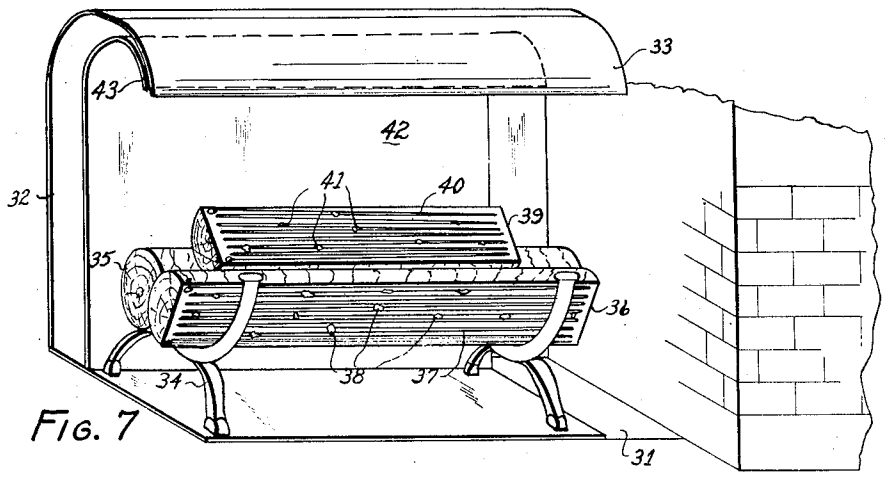


FIG. 7

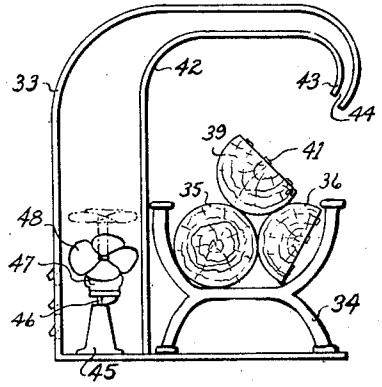


FIG. 8

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Patented June 28, 1949 2,474,472

UNITED STATES PATENT OFFICE

2,474,472

DOMESTIC ELECTRIC HEATER

Charles C. Doyle, Willoughby, Ohio

Application March 20, 1945, Serial No. 583,679

6 Claims. (Cl. 219—34)

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My invention pertains to an electric heater intended and adapted for domestic use as a household appliance.

Throughout the milder regions of the temperate zone where central-furnace heating installations are not universal and even northward when and where the initial cost, operation and maintenance of central heating systems might be excessive or in localities (expectably to increase) where electricity is furnished at a low cost or as auxiliary, fixed or portable units; there has remained a need for a more efficient, more durable and more attractive electric-heater construction and thereby the general object of my origination has been declared. Specific objects have been: to accomplish a more effective circulation by employment of a cooperative, electrically-operated blower or fan on an adjustable or oscillating carrier and in peculiar functionating relationship to infrared-glowing resistance wiring; to partially conceal the utilitarian, induction-heat element in an appropriately ornamental dielectric support, which might simulate natural logs, by the application over the resistance wiring of movably attached particles, for instance mica flakes, and to provide an adjustable baffle positioned to intercept the air current from the fan as an alternative or added control of the direction of air flow in reference to the energized wiring whereby varying sections of the latter and differing groups of the covering particles if of current-conducting material, especially when further swayed by the air current into contact with the energized wiring, will be indiscriminately caused to glow with a scintillating or flickering effect pleasing to observe.

More particularly, my origination comprehends three adaptations, first, as a portable, floor-type stove which might be located in a bathroom; second, as a unit built in the wall of a building which would conserve space, provide safe, permanent wiring and be engineered for most efficient operation and, third, a fireplace type which might likewise be permanently built into a standard hearth or a false hearth because no flue is required.

There have been marketed electric, hot-air-circulating heaters which blew air past the source of heat in such a way that it was first too cold and then too concentratedly hot. I believe that I have improved electric-heat dissemination by attaining the uniform heating of an oven and while retaining the open glow and infrared benefit by achieving a combination of the conducted heat accumulated in a reflector and the convection heat from glowing resistance wiring. Moreover, I have successfully added a dual control of the direction of heat flow (without bodily shift of the heater in its entirety), exemplifiedly, by an oscillatory fan and by an adjustable baffle which are adapted for conjunctive functionating. An incidental object has been the facility of replacement of individual resistance units and their selective energization in various combinations when in gang arrangement. Optionally, the switch for closing the circuit with a high, medium or low "on" or to an "off" position, might simultaneously control similar stages of operation of the fan or blower. Alternatively, the fan might operate at the same speed for all heats. My heater housing is designed to have a conformation comprising a reflector curved partially around the resistance unit or units such that, with or without the additional baffle, the air flow becomes directed around the rear of the resistance wiring instead of having the entire surface of the latter exposed to the former. The air flow has been advantageously directed downwardly behind the resistance wiring to pass underneath the latter, through a protective grille and out into the room. In some installations I contemplate letting the resistance coils function as rheostats for regulating the operating speed of the blower. A further regulation is accomplished by control of the size of the outlet or outlets for the air current to be discharged against the reflector; the baffle if employed cooperating to vary the direction or force or both of the issuing air current.

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The fireplace or false hearth form of my invention, the latter lacking any flue or chimney, has either an air-permeable cover for the resistance units or the resistance wiring is directly carried by coal or wood simulating supports in substitution for the cores of the standard units. Mica flakes or any other translucent functionally equivalent dielectric plastic, as and where used, are intertwisted or mechanically connected in any suitable or feasible manner, for instance, by a non-combustible attachment to the wiring, with edges of the flakes under and over the wiring, whereby certain contacted sections of the wiring are caused more brightly to glow. The action of an induced air current will cause a limited movement or fluttering of the free edging of the flakes and changes in the direction of the air current indeterminedly varies the contactual relationship of the flakes and wiring, whereby doubly to provide shiftingly uneven glow centers as in real embers.

In considering the drawings and the particu-

larizing description of all illustrated details, it is to be realized that the scope of my invention comprehends many equivalent constructions, of which the chosen exemplifications constitute only a few of the equally feasible mechanical embodiments within the scope of the granted claims.

Adverting to the drawings—

Figure 1 is a side elevation of an appliance embodying the features of my origination, with one side wall removed to reveal certain operative units.

Figure 2 is a front elevation except that a portion of a protective grill appears broken away.

Figure 3 is a much simplified modification of a portable, limited-area-heating unit, shown as a side elevation.

Figure 5 is a front elevation of Figure 4, though again with a portion of a grill-guard shown broken away.

Figure 6 is another simplified modification adapted for recession into the confines of a wall structure.

Figure 7 is a final modification, shown as a perspective view (the left side removed) adapting to fireplace installation and to scintillating or flickering performance with an infinite number of constantly varying patterns to simulate the glow and flicker of real wood embers.

Figure 8 is a left end view of Figure 7.

A frame 1, of quadrilateral shape as illustrated, may rest on four corner legs 2 and comprises: a rear wall 3 provided below with air-intake louvres 4, a pair of side walls 5 and 6, a composite front wall 7 fashioned interiorly with a ledge 7*a* and with a protective grill continuation 8 which extends upwardly and terminates at 9 as an inturned flange. A top 10 has a depending forward end 11 which constitutes a nearly complementary part of the front wall consequent to the provision of an inturned lower edge to form a flange 12 which is spacedly appositioned to the flange 9, as is clearly shown in Figure 1.

A semi-cylindrical reflector 13 has one margin 13*a* resting on the ledge 7*a* while its other, upper margin 13*b* is adjustably connected, through the agency of a plurality of alined thumb screws 14, with the flange 12. As will be readily understood, the screws pass through the flange 12 at suitable distances from each other and are in screw-threaded connection with the appropriately tapped and correspondingly spaced number of holes along the "adjustable baffle" margin 13*b* of the reflector whereby substantially equivalent manipulation of the screws may enlarge or reduce the width of the passage between the flange 12 and the upper margin of the reflector. The purpose of such an adjustable free space as a passage for a current of air will be hereinafter explained.

Along the median line of the reflector it carries a number of studs 15 (three in the chosen exemplification) between end pairs of which and by means of suspension-conductors 16 a pair of axially alined resistance units 17 are hung. Suitable connection with a source of electric current, required insulation and other details of construction will require no further description here when it is added that such are shown, described and claimed in my pending application, filed February 15, 1945 and bearing Serial No. 578,102.

Located interiorly of the frame or casing is an electric motor 18 for driving a fan 19 which is arranged and adapted to direct a current of air, replenishing through the louvres 4, toward the top 10 as suggested by the indicating arrows in Figure 1, thence along the forward end 11 and through the adjustable passage toward the rear of the units 17 prior to finding exit through the grill 8. I am to be credited with realizing that it is optional whether to have the motor 18 and fan 19 simultaneously operable during any initiated energization of the resistance units 17 or alternatively subject to separate switch control. The purpose of the induced air current is to produce the pleasing effect attending an indiscriminate cooling or brightening of the glowing resistance wiring of the units 17. Besides the control afforded through variation of size of the passage past the lower side of the upper margin 13*b* of the reflector, the fan 19 might be of the oscillatory type. In either case, the areas or sections of the resistance wiring to be intermittently cooled momentarily as well as the relative locations of the constantly changing cooled portions of the resistance wiring serve gratifiedly to fascinate, the shifting of glowing portions accomplishing the desired flickering.

The modification of Figures 4 and 5 comprises two end standards 20 and 21 across the upper ends of which there is pivoted at 22 so as to be frictionally swingable a heating unit 23. A handle 24 may surmount each of the standards to facilitate portability. Similarly within the reflector proper 23, are the pair of resistance units 25 partially enclosed by a grill 26 and subject to the control of a switch 27. The friction required to be overcome preparatory to setting the angular position of the heating unit as may be desired with relation to the standards, insures that it stays where set until manipulative force again effects a shifting readjustment.

The modification portrayed in Figure 6 is virtually the same in structural arrangement as Figure 5 except for the omission of the standards for which wall-studding 28 and 29 will serve an equivalent supporting function and between any pair of wall studs a reflector 30 may be fastened rearwardly of the chosen number of resistance units and grill. The precise manner of effecting installation as a so-called building "fixture" requires no description, nor the selective relocation of the control switch because the intent in adding Figure 6 is merely to record its feasibility and because modified details are not specifically claimed.

Figure 7 introduces a claimed added feature for promotion of the flickering performance which is calculated more closely to simulate the universal human attraction furnished by real, open-fire, embers. In a fireplace which comprises a hearth 31, is a rear deflector 32 terminating above as a forwardly curved hood 33 adapted to direct artifically created air flow. A metal fire basket 34 supports at its rear a hollow, cylindrical artificial log 35 in which may be concealedly located a motor, fan and a baffle (not shown because together cooperating as an operative equivalent of such a triad arrangement appearing in Figure 1). Also in the basket 34 forwardly of the "log" 35 is a semi-cylindrical "log" 36 serving as a dielectric carrier for resistance wiring 37 which is strung back and forth on its front, flat side. Particles 38 adapted to readily come to a glow or as readily to cool, for instance mica flakes, are indiscriminately scattered upon and suitably affixed to the log 36 so as to resist dislodgement under intense heat. If mica flakes are employed they will contact and/or partially overlap each some particular section of the wiring 37 and preferably be attached at say, only one end whereby the other free end may have limited swinging movement

imparted thereto, consequent to the inherent resiliency of the flakes when subjected to the induced air current. Superimposed on the logs **35** and **36** there is shown another semi-cylindrical log **39** having its flat, front face disposed at an angle with reference to the plane of the flat face of the log **36** and being of shorter length than the log **36**. Resistance wiring **40** is similarly strung on (optionally recessed in grooves in) the log **39** and particles and/or flakes **41** of any incombustible material adapted to glow are scattered upon and secured to it. The electrical connections with a source of current and a switch have not been illustrated in Figure 7 because within the earliest bounds of the experience of any electrician.

After the resistance wirings **37** and **40** have become energized, certain of the particles or flakes will be caused to glow. However, upon operation of the fan, by simultaneous or separately accomplished switch control, the air current downwardly directed by the hood **33** will cause the flakes indiscriminately to sway or wave thereby constantly altering the multitude of points of "on and off" glow to achieve the contemplated effect of dancing high light centers.

It should be understood that the flickering effect may be achieved, though somewhat less realistically, without the superficial adhesion of particles or flakes (asbestos, mica or any suitable equivalent) because the induced air current, while shiftingly applied to the open-glow resistance wiring, will cause sections of it alternately to cool and to again glow.

Alternatively, another wall **42** is erected behind the metal basket **34** and is spaced forwardly of the deflector **32** while approaching somewhat closer to it at the top or directly over the basket **34** to terminate as a downwardly curved flange **43** forming, in conjunction with the depending edge of the hood **33**, an elongated discharge slot **44** directed toward the inclined flat surface of the upper "log" **39**. Supported midway at the bottom of the space between the deflector **33** and reflecting wall **42** is an oscillatory electric blower comprising a standard **45**, shaft **46**, connection **47** adapted to swing through a predetermined arc about a horizontal axis so that its propeller **48** assumes either its full-line or its dot-and-dash-line position, as shown in Figure 8. Details of the commonly used oscillatory mechanism have not been illustrated because not only old, but unclaimed by itself herein. Suffice it to add that, at its two extreme positions of swinging movement, the propeller blows so as to establish a major current of air either toward one end (side wall of the fire-place) or the other whereby the flickering effect shifts longitudinally along the wiring and progressively and varyingly cools sections thereof and differing groups of the myriad of particles or flakes **41** distributed thereon.

I claim:

1. An electric heater comprising the combination of a support, resistance wiring adapted for infrared glowing and secured to said support, flat pieces movably carried by said support and adapted indiscriminately to contact said wiring and blower means for effecting such contacts whereby to achieve a flickering effect.

2. The combination in an electric heater, of a support, resistance wiring adapted to glow and carried by said support, particles movably carried in scattered arrangement on said support, a fan for moving said particles into contact with said wiring and a baffle adjustably mounted on said support and arranged to intercept the air current from said fan.

3. The combination, in an electric heater, of a dielectric support, resistance wiring on said support and adapted to glow and particles overlying said wiring and adapted in response to an air current for dimited movement relative thereto and for chilling-contact with said wiring.

4. In an electric heater, the combination of a core, resistance wiring recessed in said core and adapted to glow, incombustible flickering particles movably overlying said wiring and a blower for actuating said pieces into contact with said wiring.

5. In an electric heater, the combination of a dielectric core fashioned with a convoluted groove, resistance wiring occupying said groove and adapted for infrared glow, mica particles movably attached to said core and extending across said wiring, a blower, and adjustable means for variously directing the air current from said blower whereby different ones of said particles intermittently contact said wiring.

6. An electric, fire-place heater comprising the combination of a log-simulating support, resistance wiring adapted to glow and carried upon said support, flat pieces of light weight and each having an end attached to said support whereby their free ends are adapted indiscriminately to sway into and out of contact with said wiring in response to any current of air about said support.

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