

May 10, 1949.

L. P. HERRINGTON

2,469,466

HEATER

Filed Jan. 15, 1948

3 Sheets-Sheet 1

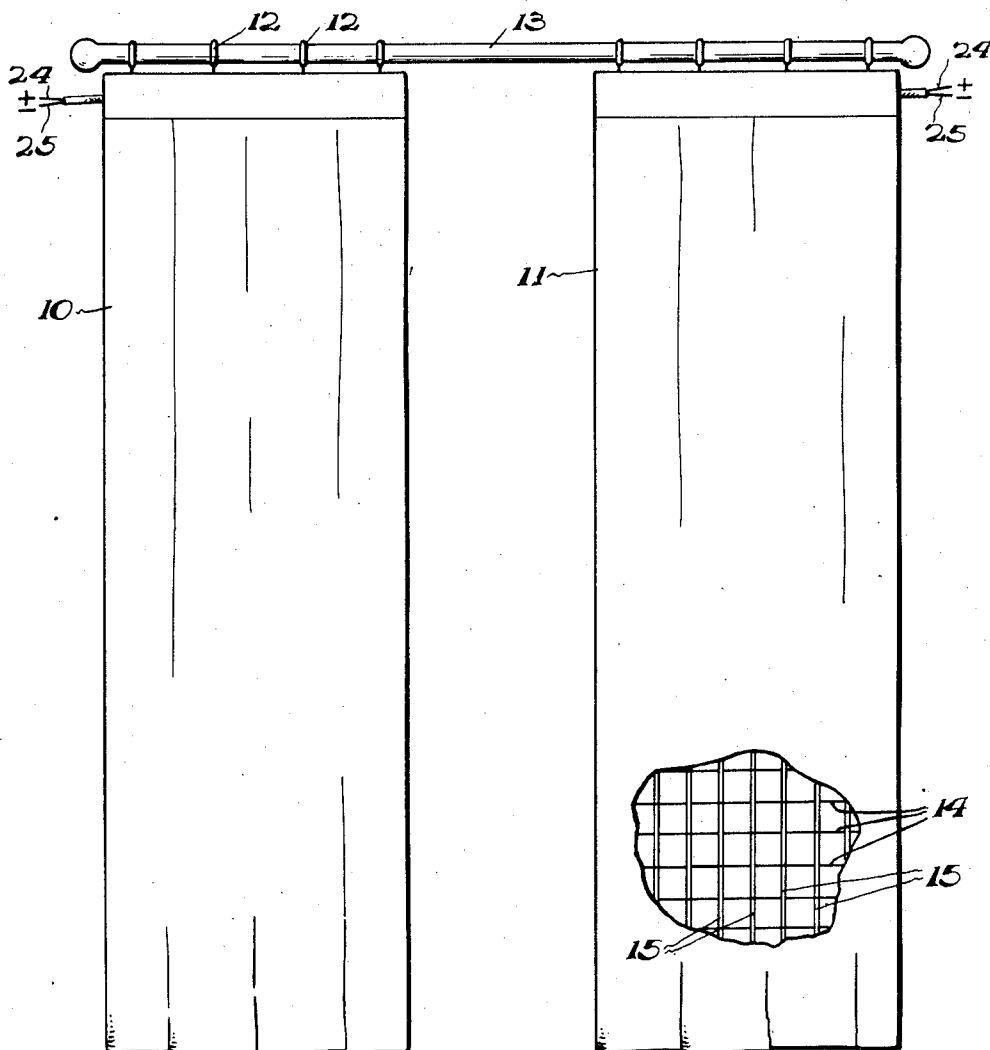


**Fig. 1.**

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3 Sheets-Sheet 2

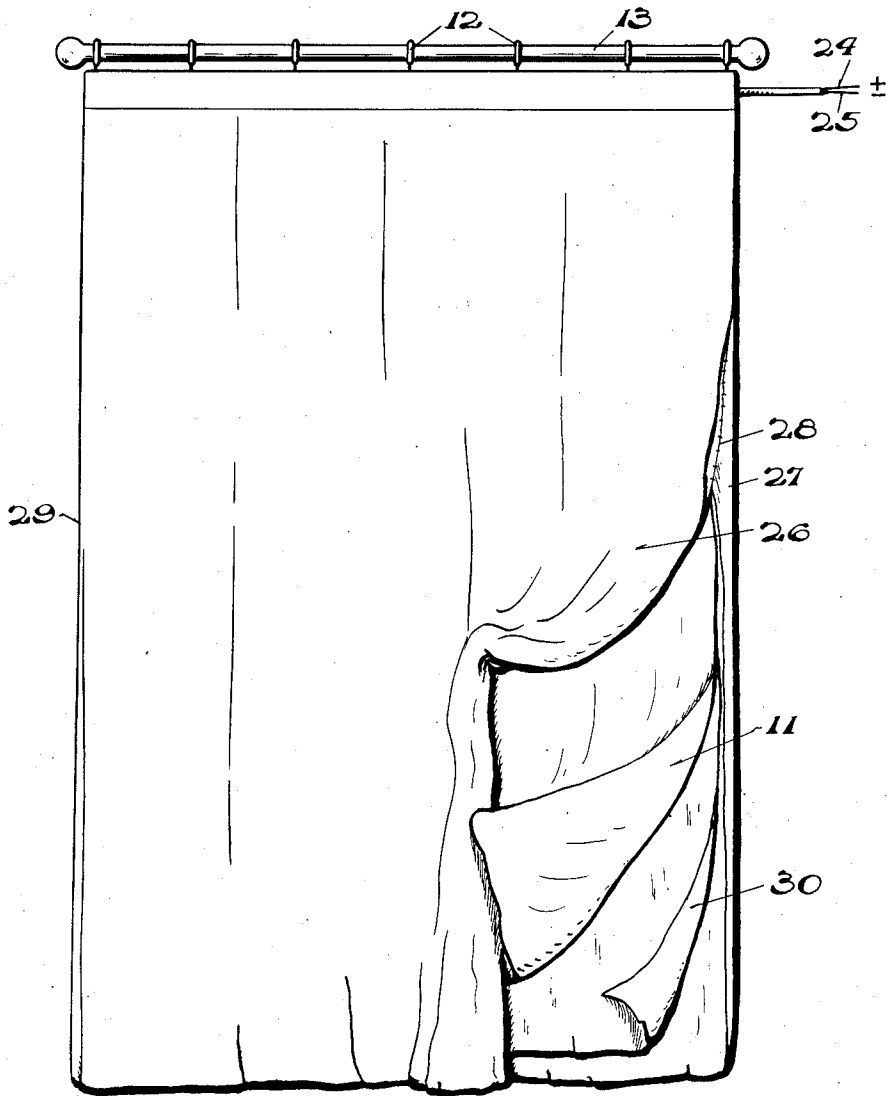


Fig. 2.

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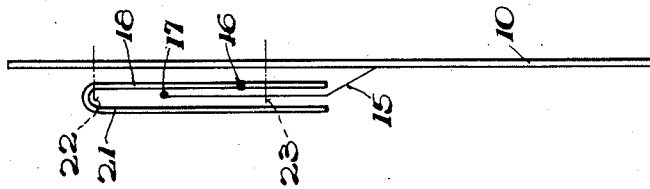


FIG. 5.

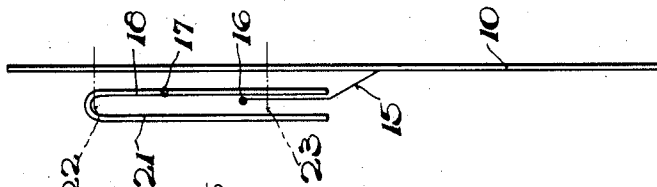


FIG. 4.

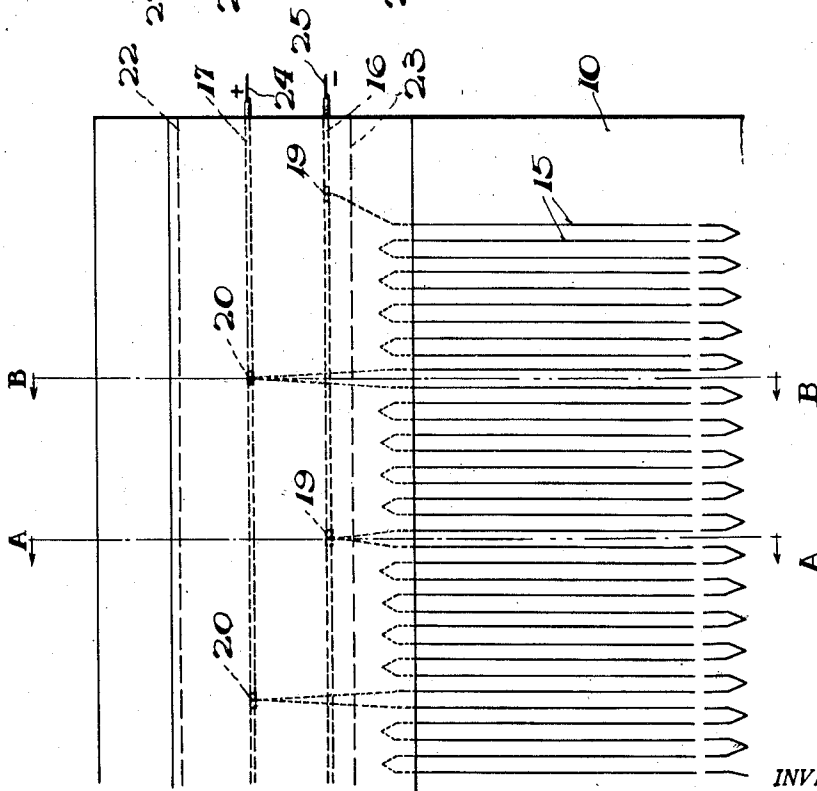


FIG. 3.

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## UNITED STATES PATENT OFFICE

2,469,466

## HEATER

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Application January 15, 1948, Serial No. 2,478

3 Claims. (Cl. 219—46)

1

This invention relates to heaters and more particularly to radiant type heaters applied to drapes for windows and the like.

Heating systems are divided into two general classes, radiant and convective. In convective systems air at temperatures above the temperatures of the enclosure and walls thereof to be heated is admitted to the enclosures. Convective systems have a higher average air movement and average surface temperatures are always below average air temperatures. Radiant systems heat by radiation from a heated surface and in such systems surface temperatures are nearer air temperatures and there is less average air movement. As a result rooms or enclosures heated by radiant systems are warmer for a given thermostat setting than if heated convectively.

Heretofore the advantages of radiant type heating have been conventionally obtained by employing metallic radiators, or heating panels with active elements set in the wall, ceiling, or floor or applied to the surface of the wall, ceiling or floor. I have found that all the advantages of radiant heating can be had with many additional advantages from the point of view of comfort, savings in cost and flexibility of use if drapes for windows or the like are used as radiant heating elements.

It is accordingly an object of my invention to provide novel radiant heaters applied to window drapes and the like.

Another object of my invention is to provide such heaters which permit extended surface low temperature radiant heating with a minimum of structural alteration to the enclosure being heated and with maximum accessibility for servicing.

Another object is to provide such heaters which permit direct blocking of the cold radiation from window surfaces and the like in a more efficient and positive manner than heretofore possible.

Another object is to provide such heaters which will block cold radiation from window surfaces and the like with minimum heat loss to the cold surface.

Another object is to provide such heaters having maximum flexibility in wattage output and surface temperature.

Another object is to provide such heaters whose radiation-convection ratio in heat output may be varied by the type of covering material used in the drape and by the type of weave used in the heater supporting material of the drape.

Another object is to provide such drapes whose

2

heating characteristics may be controlled by conventional means.

Another object is to provide such heaters having low initial cost with high decorative value.

Another object is to provide such heaters which allow individual room control of temperature.

Other and further objects will appear as the description of this invention proceeds.

My invention is capable of many mechanical embodiments one of which is shown in the accompanying drawings and is described hereinafter to illustrate my invention. This should in no way be construed as defining or limiting my invention and reference should be had to the appended claims for this purpose.

In the drawings, in which like reference characters designate like parts,

Fig. 1 shows one embodiment of the heater element of my invention applied to a pair of window drapes without decorative covering or reflector;

Fig. 2 is a showing of the embodiment of Fig. 1 applied to a window drape including decorative covering and reflector;

Fig. 3 is a schematic detail of suitable wiring connections for the heating elements of the embodiment of Fig. 1;

Fig. 4 is a cross sectional view of Fig. 3 on the line A—A; and

Fig. 5 is a cross sectional view of Fig. 3 on the line B—B.

Referring to the drawings and more particularly to Fig. 1 a pair of drapery heater elements 10 and 11 are shown supported by conventional rings 12 on pole 13. Each heater element 10 and 11 comprises a supporting backing of suitable noninflammable material such as asbestos cloth into which is woven a plurality of resistance wire heating elements. Threads of the asbestos cloth supporting the resistance wires are shown at 14 and the resistance wires at 15. For a conventional single window each heater element 10 and 11 may be 74" x 15½" (7.96 sq. ft.) which provides approximately 16 square feet of radiant drape surface for such a window. Any suitable manner of resistance wires 15 may be woven into each heater element 10 and 11. I have secured desirable results with 120 resistance wires spaced at approximately .125". Resistance wires 15 may be of any suitable type and I have used three strand fine copper wire with a vinyl resin coating with success.

As seen in Fig. 3, resistance wires 15 may be divided into a plurality of circuits made up of any suitable number of wires, here shown as ten,

connected in series; and the several circuits are connected in parallel at 19 and 20 to bus bars 16 and 17 woven into a header 18. Header 18 may be folded over bars 16 and 17 as at 21 to provide additional electrical insulation and the folded header may be sewed to elements 10 and 11 along lines 22 and 23. Bars 16 and 17 may be connected to any suitable source of electrical energy, such as conventional domestic electric outlets, by wires 24 and 25.

A completely assembled drape is shown in Fig. 2 and comprises the heater element of Fig. 1 encased in any desirable noninflammable decorative cloth covering 26 having a suitable noninflammable backing 27 stitched thereto along seams 28 and 29. A bright foil flexible reflector 30 is mounted behind element 11 with its reflecting surface adjacent thereto to reflect heat rays through covering 26 and to prevent heat losses by radiation to the cold surface of the window or other surface.

In domestic use the heat input can be controlled by an air thermostat of the conventional pilot relay type on-off operation of which controls the operation of a power switching relay capable of handling 3000-4000 watts for the elements 10 and 11. Conventional house circuit voltages of 110-220 volts may be used and wires 24 and 25 may be connected into conventional room outlets.

The radiation-convection ratio in heat output of the assembled drape may be varied by the type and weave of covering 26 and particularly by the variation in the size of the interstices thereof. The larger these interstices the more open the covering and the more directly exposed are wires 15.

In a three window test room provided with three pairs of window drapes assembled as above described the following thermal performance was obtained:

1. Outside temperature, 10° F.
2. Wall heat loss coefficient, 0.29 B. t. u./sq. ft./hr./°F.
3. Ceiling surface, 77.5° F.
4. Floor temperature, 65.5° F.
5. Drapery temperature at covering 26, 95.0° F.  
Drapery temperature at back 27, 83.5° F.
6. Weighted average temperature of all room surfaces (floor, ceiling, walls and drapes) 68.0° F.
7. Equilibrium wattage requirement, 1938 watts.
8. Pick-up time from a room temperature of 55.5° F., 7 hours.

It will now be apparent that by the present invention I have provided a novel radiant type drape heater which permits extended surface low temperature radiant heating with a minimum of structural alteration to the enclosure being heated with a maximum of servicing accessibility; which directly blocks cold radiation from window or other surfaces with a minimum heat loss thereto; which has a maximum flexibility in wattage output and surface temperature; which has an easily adjustable radiation-convection ratio; which may be controlled by conventional thermostatic means; and which has low initial cost,

high decorative value and permits individual room control of temperature.

Changes to or modifications of the above described illustrative embodiment of my invention may now be suggested to those skilled in the art without departing from my inventive concept. Reference should therefore be had to the appended claims to determine the scope of my invention.

10 What is claimed is:

1. In a window drape, an electrical heating element comprising a noninflammable flexible sheet and resistance type heating elements supported by said sheet, a flexible reflecting element mounted behind said heating element, a covering encasing said sheet and said reflecting element and window drape hanging means supporting the window drape assembly from above and adjacent to the window.

20 2. In a window drape, an electrical heating element including a plurality of resistance type heating wires spaced and insulated from each other in a noninflammable flexible supporting sheet and bus bars mounted on said sheet for supplying electric current to said heating wires, a flexible reflecting element mounted behind said supporting sheet, a decorative flexible covering encasing said supporting sheet and said reflecting element and window drape hanging means supporting said sheet, said reflecting element and said decorative covering from above and adjacent to the window.

3. In a window drape, a sheet of noninflammable cloth, a second sheet of noninflammable cloth folded upon itself and secured to said first named sheet, bus bars spaced from each other and insulated and supported by said second sheet, a plurality of wire resistance heating elements spaced from each other and woven into said first named sheet and connected in series in groups with the groups connected in parallel to said bus bars, a decorative flexible covering encasing said sheet, means for supplying electric current to said bus bars and window drape hanging means supporting said sheet and said covering from above and adjacent to the window.

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