May 2, 1950 J. M. AUFIERO 2,506,408

PORTABLE SPACE HEATER

Filed May 12, 1948 2 Sheets-Sheet 1

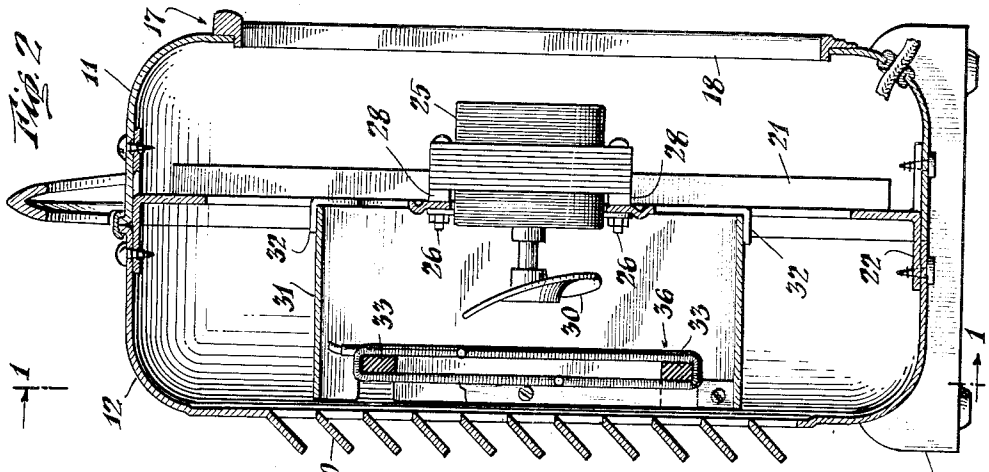


Fig. 2

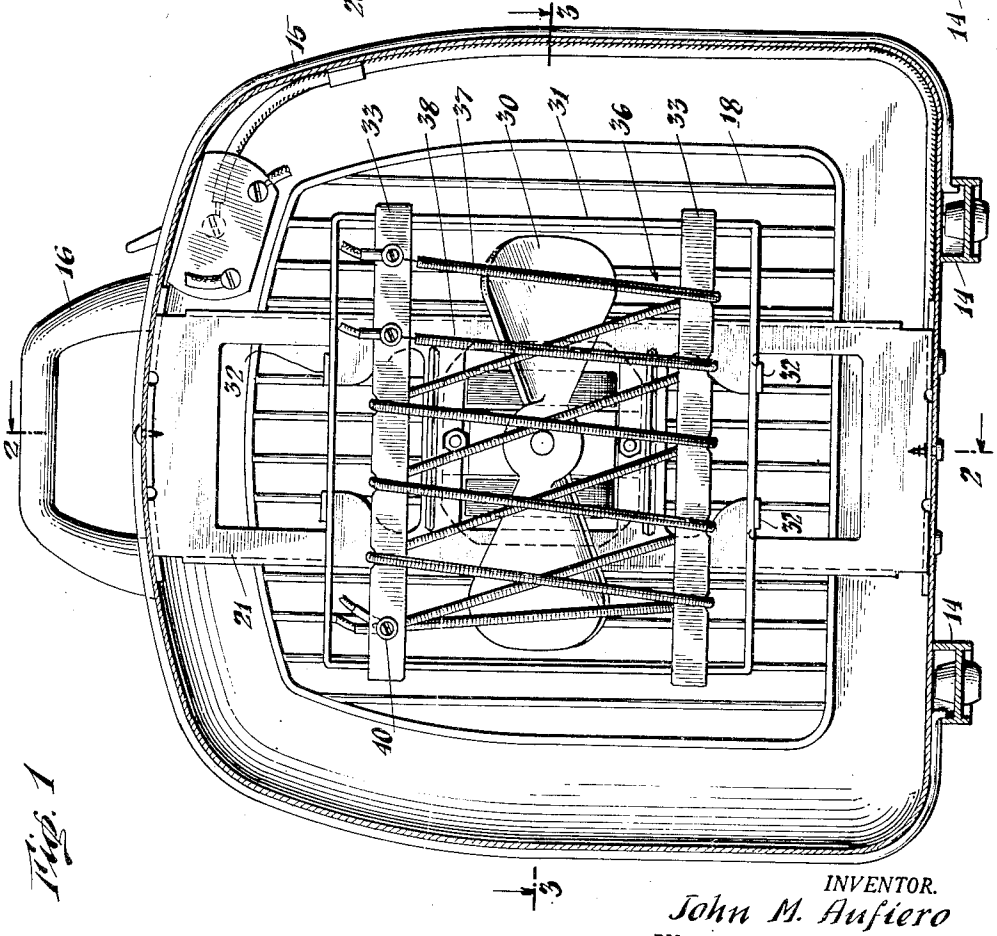


Fig. 1

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May 2, 1950 J. M. AUFIERO 2,506,408

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Filed May 12, 1948 2 Sheets-Sheet 2

Fig. 4

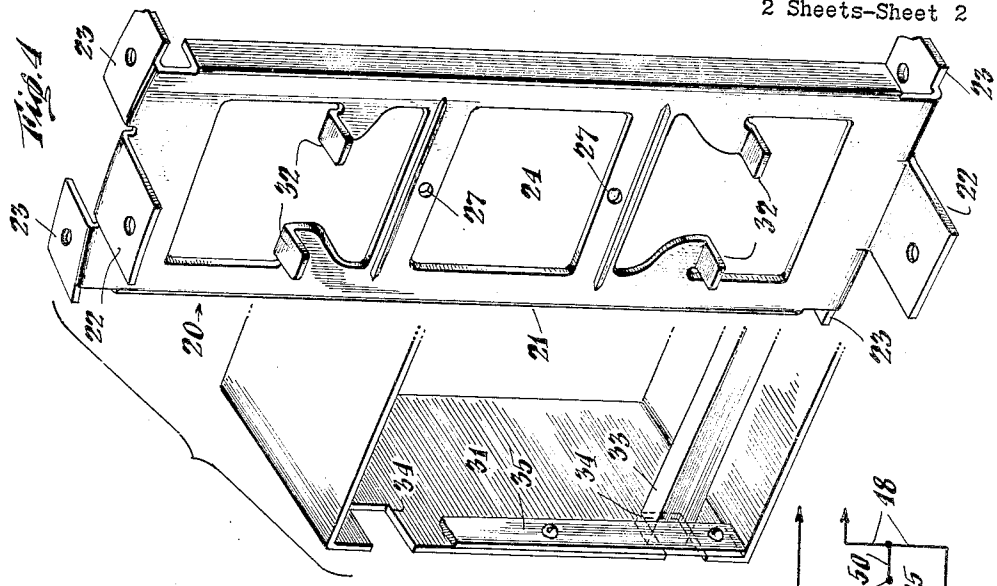


Fig. 6

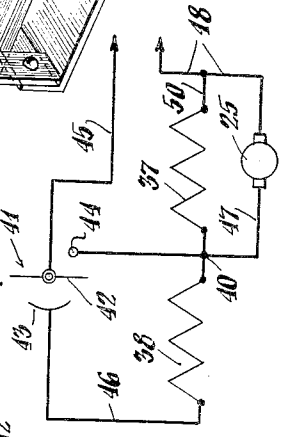


Fig. 3

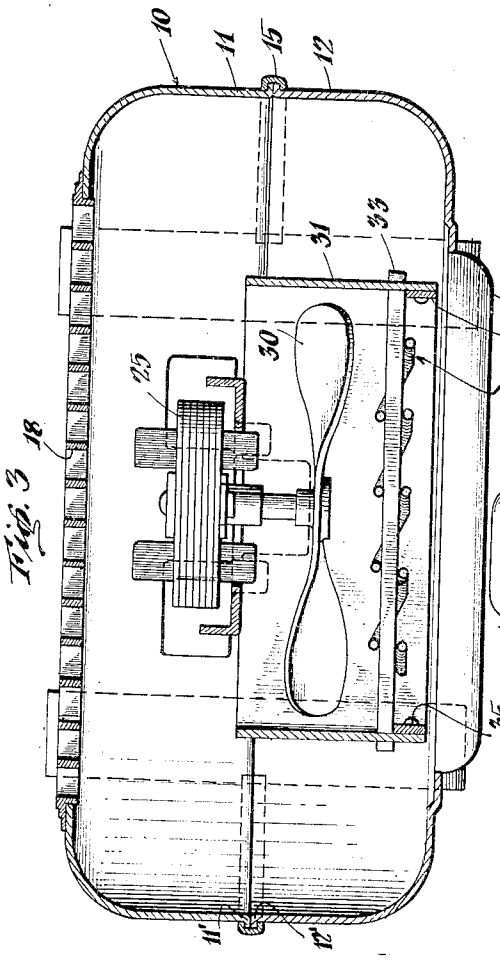
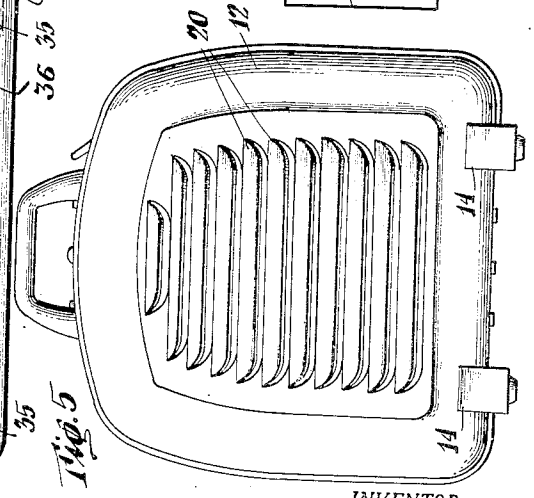


Fig. 5



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PORTABLE SPACE HEATER

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Application May 12, 1948, Serial No. 26,493

3 Claims. (Cl. 219—39)

1

This invention relates to an improved portable electric heater of the air-circulation type.

It is an object of the invention to provide an electric heater having an improved heating unit and motor circuit, by means of which the user may select between two available "heats" and the fan motor will automatically assume an operating speed to pass air over the heating unit in the volume best suited to abstract heat from the unit.

It is another object of the invention to provide a simplified motor and heat control circuit for a portable electric space heater.

It is yet another object of the invention to provide an improved structure for mounting the motor and heating element as a simple, unitary assembly.

A further object of the invention is to provide an improved means for mounting the heating unit in a portable electric space heater.

A still further object of the invention is to provide a simplified portable electric space heater which may be manufactured and assembled at low cost and by relatively unskilled labor.

Other features and advantages will hereinafter be described.

In the accompanying drawings:

Fig. 1 is a front elevation of a portable heater embodying the present invention, the figure being shown in section on lines 1—1 of Fig. 2;

Fig. 2 is a side elevation in section;

Fig. 3 is a plan view taken on lines 3—3 of Fig. 1;

Fig. 4 is an exploded perspective of the motor housing and fan shroud;

Fig. 5 is a front elevation of the device; and

Fig. 6 is a schematic wiring diagram therefor.

In a presently preferred embodiment of the invention a casing 10 comprises sections 11, 12 having abutting flange portions 11', 12'. Transversely extending feet 14 are secured to the respective casing sections, see Fig. 2, and a molding 15 extends about the casing to cover the abutting flanges. The ends of said molding preferably engage within the feet as shown in Fig. 1. Any suitable handle 16 may be affixed to the upper portion of the casing.

I prefer to provide the casing portion 11 with a grille 17 having the relatively closely spaced, vertically extending bars or guards 18. The face of the opposite casing portion is preferably formed with the stamped out louvres 20 which serve suitably to deflect the outwardly flowing heated air and adequately protect against the insertion of the fingers or other articles into the casing. The face of casing portion 11 is sufficiently remote from moving or heated parts as to permit the bars 18 to be relatively widely spaced for maximum air input.

2

The motor mounting and fan shroud is best understood from Fig. 4. It comprises a rigid pressed metal column 21 formed at its upper and lower ends with the flanges 22, 23 which afford means for securing the casing portions 11 and 12 securely together as shown in Fig. 2. It will be noted from said figure that the upper and lower flanges 22 project forwardly into overlapping relationship with the casing 12 which is secured thereto by the illustrated screws or equivalent. The flange members 23 project rearwardly and are secured to the casing portion 11 by equivalent means.

The central portion of the standard 21 is apertured as at 24, to accommodate the motor 25. Said motor is advantageously secured to the standard by the bolts 26 for which the bolt holes 27 are provided in the standard. Suitable resilient or cushioning washers 28 may be employed to minimize the transfer of vibration from the motor to the standard.

The motor shaft carries the fan 30, which is disposed within the suitably shaped shroud 31 projecting forwardly from the support standard. Said shroud, illustratively rectangular, is spot welded or otherwise affixed to the ears 32 which extend from the motor standard. As clearly appears in Fig. 3, the shroud 31 extends both rearwardly and forwardly of the plane of rotation of the fan 30, insuring proper air movement over the resistors which are carried by the upper and lower rigid insulating strips 33. Said insulators are supported within the aligned notches 34 in the side walls of the shroud 31, and are held in position by the clamping strips 35 which are secured to the inner surfaces of the side walls of the shroud as clearly appears in Figs. 2 and 3 and 4. The installation of the resistance unit is greatly simplified by this construction, and its proper alignment is assured.

The resistance unit 36 is preferably two independent resistances 37, 38 wound spirally about the insulating supports 33 and interconnected at a common binding post 40. However, it can comprise a single length of uniform resistance wire having in lieu of the binding post 40 a tap to divide the resistance into two resistance legs. In the present embodiment, for example, the resistance unit 37 or its equivalent resistance leg has a value of 7.8 ohms, and the unit 38 or equivalent resistance leg has a value of 4.4 ohms.

In "two heat" electric heaters now on the mar-

ket, the velocity and volume of air circulation across the resistance coils are not reduced for the lower heat output, with the result that, although a satisfactory quantity of heat units is being discharged from the heater, the heat rise per volume of air is low; the user does not "feel" the warmth, and may complain about faulty operation.

A feature of the present invention is that when the user selects between two "heats"—for example, 1000 or 1,600 watts—the motor speed will automatically reduce for the 1000 watt heat output, and thus provide less air movement across the heating unit. The temperature of the discharging air will be sensibly increased, and in fact will feel to the casual observer as warm as when the full wattage of the heat coils is used.

It should be understood, however, that the air volume across the heat coils under both conditions of operation is sufficient to abstract heat from the coils rapidly enough to prevent a glowing of the coils.

Referring now to the circuit diagram of Fig. 6, it is evident that the resistance units and the motor **25** are interconnected in such fashion that one may select between 1000 watt heat output—assuming 110 volt input—or 1600 watt output. By means of the control circuit illustrated the motor speeds up to provide greater air movement when control switch is set for 1600 watts output. The switch **41** is somewhat schematically shown in Fig. 6 and includes a switch arm **42** capable of assuming two "on" positions relative to an arcuate contact **43** and a button contact **44** so that when the arm **42** is rotated clockwise of Fig. 6, a circuit will be completed through the contact **43** only, whereas a counterclockwise rotation will cause the arm **42** to bridge the respective contacts **43** and **44**.

Assuming that the switch arm has been rotated clockwise of Fig. 6, a circuit will be completed through the power lead **45** and contacts **43**, **43** to conductor **46**, resistance **38** and conductor **47** to the motor **25** and power lead **48**. The resistance **37** is also in the circuit by reason of the common terminal **49** and conductor **50**. The motor **25** therefore draws current in series with the resistance **38** and its voltage is cut to about 90 with a resultant drop in speed. A total of 12.2 ohms represented by the series-connected resistances **37**, **38** makes available 1000 watts for heating purposes.

When the switch arm **47** is rotated counterclockwise it bridges the switch contacts **43**, and **44**, and the resistance unit **38** is shunted out of the circuit. The motor **25** is in parallel with the resistance unit **37**. The motor will operate at the line voltage and the value of the resistance **37** is such as to provide 1600 watts heat output from the unit. The motor is operating at full design speed, with appropriate increase in air movement over the heating unit.

Although the invention has been described by making a fully detailed reference to the certain presently preferred embodiments, such detail of description is to be understood in an instructive rather than a limiting sense, many changes being possible within the scope of the claims hereto appended.

I claim:

1. In a portable electric space heater, the combination of a first heater resistance element, a second resistance element in series with said first resistance element, a fan motor in series with said first resistance element and shunted across said second resistance element, and a switch for optionally applying electrical energy to the resistance elements in series and the motor, or to the second resistance element and the motor shunted across it and thereby to increase the voltage and current in both the second resistance and the motor.

2. In a portable electric space heater, the combination of a resistance element having a first part and a second part in series, a fan motor shunted across said second part and in series with said first part of said resistance element, and a switch for optionally applying electrical energy to both parts of the resistance element and the motor, or to the second part of the resistance element and the motor shunted across it and thereby to increase the voltage and current in both the second part and the motor.

3. In a portable electric space heater, the combination of a motor, a fan driven thereby, a resistance element arranged in open coils in the path of air movement from said fan and having a first and second part in series, and means for applying electrical energy optionally across both parts of said resistance element and said motor in parallel with one part of said resistance element or optionally applying electrical energy across said motor and said one part of said resistance element only so as to increase the voltage and current in both the motor and said part of said resistance element.

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