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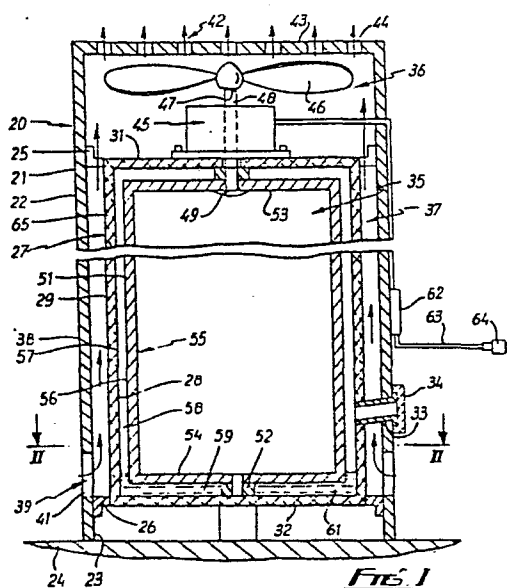
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⑤④ **Friction heat generator and method of generating heat in the same.**

⑤⑦ A furnace or space heater (20) is operable at low cost by a small electric motor (45) which rotates an elongated cylindrical drum (51), on a vertical axis, within an elongated cylindrical casing (27) at a clearance of about one eighth of an inch to form an annular chamber (58) therebetween. A supply of light lubricant normally occupies the lower portion of the annular chamber (58) but rises to fill the chamber (58) during rotation of the drum (51). The casing (27) is enclosed in a housing (21), having a fan chamber (36) containing the electric motor (45) and fan or blower (46). The motor shaft (48) may rotate both the fan and the drum (51).



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(EP11737)
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- 1 -

FRICTION HEAT GENERATOR

TITLE MODIFIED
see front page

The invention concerns a friction heat generator.

5. According to the present invention there is proposed a friction heat generator comprising inner and outer hollow drums arranged in telescoped disposition for relative rotation about a vertical axis, the said drums having opposed circumferential faces spaced apart by a
10. fixed clearance of small dimension to define an upstanding, annular liquid receptacle and further having bottom walls arranged in spaced apart disposition to form a shallow liquid receptacle to receive a supply of oil which normally occupies only said shallow liquid recept-
15. acle but which, on relative rotation between the drums, rises into the annular liquid receptacle to transfer frictional heat to the drums, and electric motor means operatively connected to one said drum to rotate the same on a vertical axis relative to the other said drum at
20. substantial speed.

- The invention also includes the method of generating heat by means of an outer, stationary, member and an inner member, rotatably mounted within said outer member, there
25. being a supply of oil within said outer member, said method comprising the steps of forming said members as hollow drums, one telescoped within the other, and both

(EP11737)
(19.2.79)

- 2 -

- upstanding vertically so that the inner drum rotates on a central vertical axis relative to the outer drum and so that there is a clearance space between drums of only small dimension limiting the supply of oil within said
5. outer drum to a predetermined quantity so that it normally occupies only the bottom of the said clearance space and then rotating said inner drum at substantial speed within said outer drum to heat said oil, cause it to rise up into said clearance space and transfer heat to said outer drum.
- 10.
- Friction heat is generated not by two metal, or other, surfaces contacting each other, but by the contact of the opposing surfaces with the oil which not only lubricates but generates heat.
- 15.
- The invention will now be described further, by way of example only, with reference to the accompanying drawings in which:-
- Fig. 1 is a front elevational view of the portable
20. space heater of the invention, in half section;
- Fig. 2 is a top plan view in section on line 2-2 of Fig. 1; and
- Fig. 3 is a view similar to Fig. 1 of the device of the invention in an alternative form.
- 25.
- Referring now to the drawings, Figs. 1 and 2 illustrate an embodiment of the friction heat heater 20 of the invention which includes an upstanding, hollow, cylindrical housing 21 formed of imperforate sheet metal 22 and having
30. legs 23 for supporting it on a floor 24 of a building.
- The space heater 20 is portable and in the portable embodiment illustrated in Figs. 1 and 2 the housing 21 is of predetermined diameter of about twelve inches and of predetermined height of about thirty-two inches.

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(19.2.79)

- 3 -

- Fixed within housing 21 by suitable brackets 25 and 26 is a hollow cylindrical casing 27 which is of predetermined diameter less than the diameter of the housing, such as ten inches, and is formed of aluminium sheeting 28 for efficient transfer of heat. The cylindrical side wall 29, top wall 31 and bottom wall 32 of casing 27 are impermeate to form a sealed enclosure except for the filter tube 33, which is closed by a removable threaded cap 34.
10. The casing 27 divides housing 21 into the lower air heating chamber 35 which occupies such casing, and an upper fan chamber 36, there being an annular air chamber 37 formed between the cylindrical side wall 29 of the casing and the coaxial, concentric cylindrical side wall 15. 38 of the housing 21.

- Air inlet means 39 is provided in the lower portion of the housing 21 in the form of spaced apertures 41 extending around the cylindrical side wall 38 and air outlet means 42 is provided in the top 43 of the housing in the form of apertures 44. The annular air chamber 37 connects the air inlet means to the air outlet means of the fan chamber 36.

25. A reversible electric motor 45 is mounted in the fan chamber 36 with an eight-bladed fan 46 fast on one end 47 of the motor shaft 48, each blade being of about 25° pitch and the motor being about one horse power for rotating the shaft 48 at between 1800-3600 R.P.M..

30.

The other end 49 of motor shaft 48 extends into the air heating chamber 35 to rotate the hollow, cylindrical drum 51 which is supported in suitable bearings 52 for rotating around the central, vertical axis of the casing

(EP11737)
(19.2.79)

- 4 -

27 and housing 21.

The drum 51 is sealed and hollow and includes the top wall 53, bottom wall 54 and cylindrical side wall 55, 5. the walls being of stainless steel. The exterior cylindrical surface 56 of the cylindrical side wall 55 is smooth as is the interior, cylindrical surface 57 of the aluminium of the cylindrical side wall 29 of the casing 27 and the surfaces 56 and 57 are at about one- 10. eighth inch clearance from each other to form a narrow, annular liquid chamber 58 therebetween.

It should be noted that the annular liquid chamber 58 is not a passage through which liquid to be heated is 15. continually flowed, as in the prior art. Instead it is a sealed chamber and is provided with a supply of liquid lubricant 59, such as a quart of No. 10 oil, which normally rests in the horizontal space 61 between the bottom wall 54 of the drum 51 and the bottom wall 32 20. of the casing 27.

It has been found that the best results are obtained when the lubricant 59 is Quaker State F-L-M-A-T Fluid, Ford Motor Company Qualifications No. 2P-670306 M 2633F. 25. Unlike prior Patents, no water is in contact with the oil.

The motor 45 is connected to a thermostat 62, of any well-known type by cord 63 and to a source of electricity by male plug 64 so that it is energized under 30. the control of ambient temperature by the signals of the thermostat.

In operation the motor 45 drives the drum 51 at a substantial speed, which causes the oil 59 to rise up

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- 5 -

into the annular liquid chamber 58 to substantially fill the same. The heat of friction between the drum and casing is transferred by the oil while it prevents wear on the surfaces 56 and 57 so that the exterior aluminium surface 65 of the fixed casing 27 becomes heated. Meanwhile the large diameter, multi-bladed fan 46 is drawing ambient air through the air inlet means 39, thence up through the annular air chamber 37 and past the elongated heated surface 65 for discharge through the air outlet means 42 back into the room.

It is preferable, as in the embodiment of Fig. 3, to provide a separate electric motor 70, usually about 1/8 H.P. for driving an air blower 71, the motor and air blower being mounted in a lower chamber 72 for driving ambient air upwardly in an annular flow path in chamber 37 from the air inlet means 73 to the air outlet means 74. The air outlet means is the intake duct 75 of a hot air heating system 76, so that the heater 20 becomes a furnace rather than a space heater, the separate electric motor 70 enabling the thermostat 62 to initiate rotation of the drum until a predetermined temperature is reached in the aluminium casing 27, whereupon the thermostat automatically de-energizes the drum motor 45 while continuing to rotate the separate fan, or blower motor 70, to furnish hot air to the room or heating system 76 until the casing 27 cools to a predetermined temperature.

(EP11737)
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- 1 -

Claims:

1. A friction heat generator comprising inner and outer hollow drums arranged in telescoped disposition for relative rotation about a vertical axis, the said
5. drums having opposed circumferential faces spaced apart by a fixed clearance of small dimension to define an upstanding, annular liquid receptacle and further having bottom walls arranged in spaced apart disposition to form a shallow liquid receptacle to receive a supply of oil
10. which normally occupies only said shallow liquid receptacle but which, on relative rotation between the drums, rises into the annular liquid receptacle to transfer frictional heat to the drums, and electric motor means operatively connected to one said drum to rotate the
15. same on a vertical axis relative to the other said drum at substantial speed.
2. A friction heat generator as claimed in claim 1, wherein the inner and outer drums are both of cylindrical
20. configuration.
3. A friction heat generator as claimed in claim 1 or 2, wherein said inner drum is journaled in said outer drum for rotation about said vertical axis.
- 25.
4. A friction heat generator as claimed in any one of claims 1 to 3, wherein the electric motor means is operatively connected to the said inner drum to rotate the same relative to the outer drum.
- 30.
5. A friction heat generator as claimed in any one of claims 1 to 4, wherein said inner drum is sealed and said outer drum is sealed except for an oil conduit connecting said annular liquid receptacle and said shallow receptacle

(EP11737)
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- 2 -

to outside said outer drum.

6. A friction heat generator as claimed in any one of claims 1 to 5, wherein the said opposed circumferential faces are spaced apart by a constant distance of approximately three millimetres.
7. A friction heat generator as claimed in any one of claims 1 to 6, further including a supply of oil within the shallow liquid receptacle.
8. A friction heat generator as claimed in claim 7, wherein said oil is a light oil and is present in a quantity sufficient, in the absence of relative rotation between the drums, to contact both of the opposed bottom walls of the drums.
9. A friction heat generator as claimed in any one of claims 1 to 8, further including a housing extending around said telescoped drums and electric motor operated fan means in said housing for drawing ambient air into said housing around said drums and discharging the same from the housing.
10. The method of generating heat in a flameless manner by means of an outer, stationary, member and an inner member, rotatably mounted within said outer member, there being a supply of oil within said outer member, said method comprising the steps of forming said members as hollow drums, one telescoped within the other, and both upstanding vertically so that the inner drum rotates on a central vertical axis relative to the outer drum and so that there is a clearance space between drums of only small dimension limiting the supply of oil within said

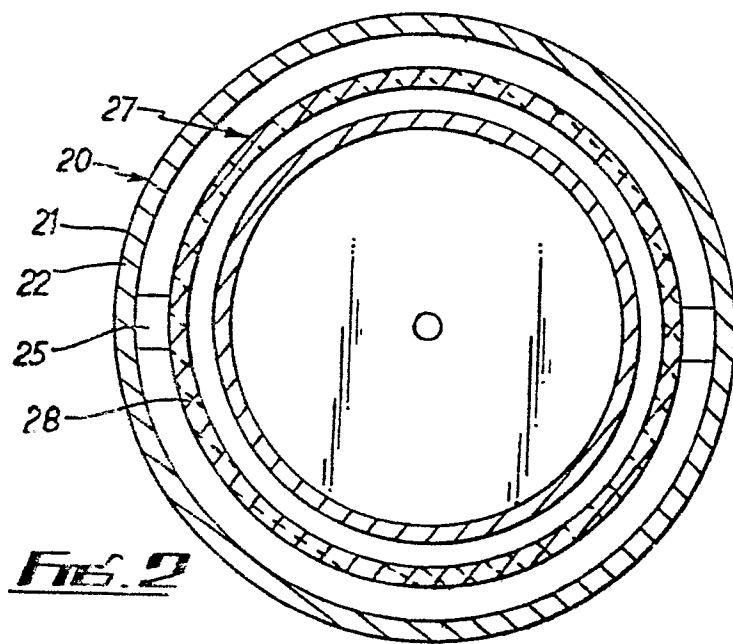
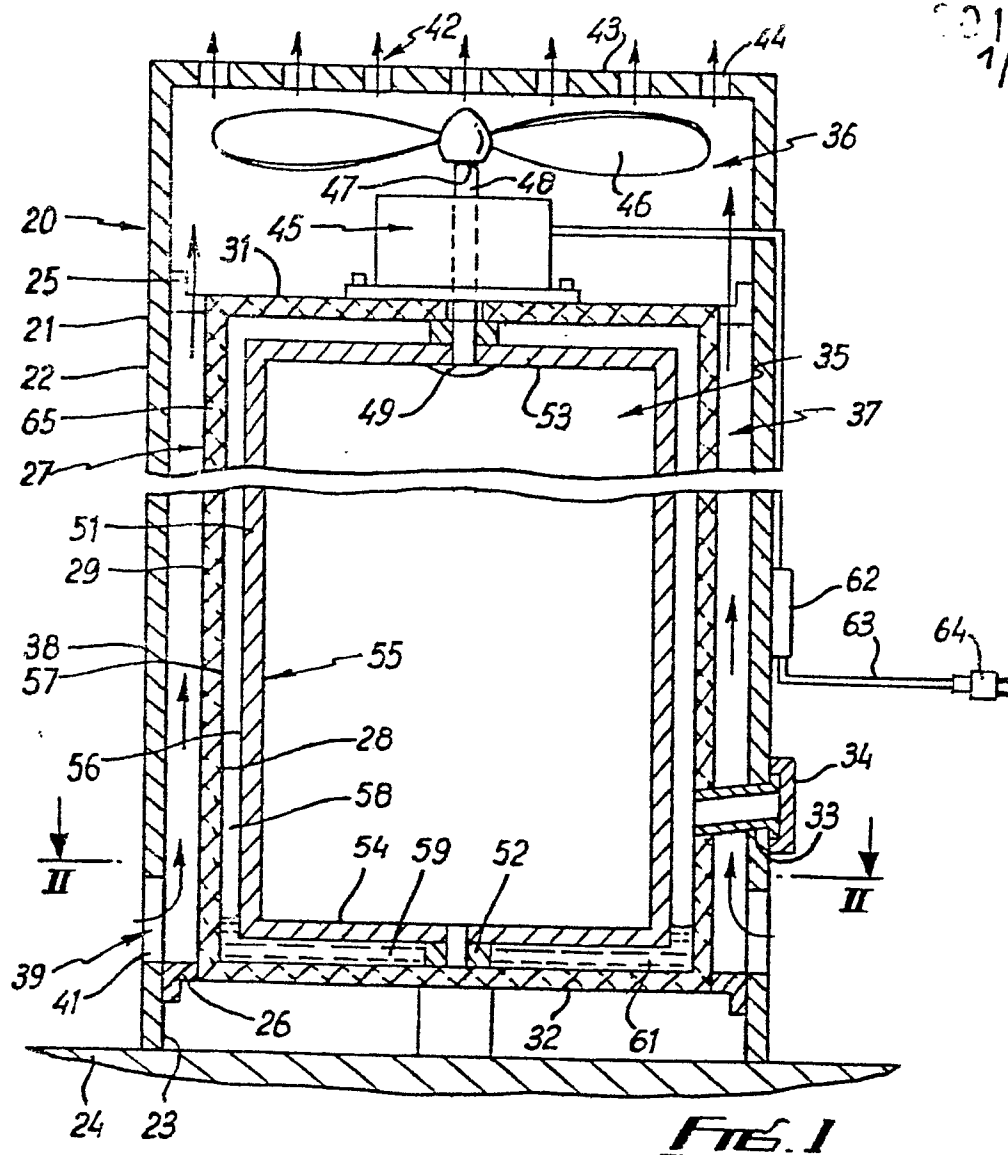
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- outer drum to a predetermined quantity so that it normally occupies only the bottom of the said clearance space and then rotating said inner drum at substantial speed within said outer drum to heat said oil, cause
5. it to rise up into said clearance space and transfer heat to said outer drum.
11. The method as claimed in claim 10, wherein the clearance space between the hollow drums is approximately
10. three millimetres.
12. A friction heat generator substantially as hereinbefore described with reference to and as illustrated in Figs. 1 and 2 or Fig. 3 of the accompanying drawings.
- 15.
13. A flame-free heater including a friction heat generator as claimed in any one of the preceding claims.
14. The method of generating heat in a flame-free
20. manner substantially as hereinbefore described with reference to and as illustrated in Figs. 1 and 2 or Fig. 3 of the accompanying drawings.



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2/2

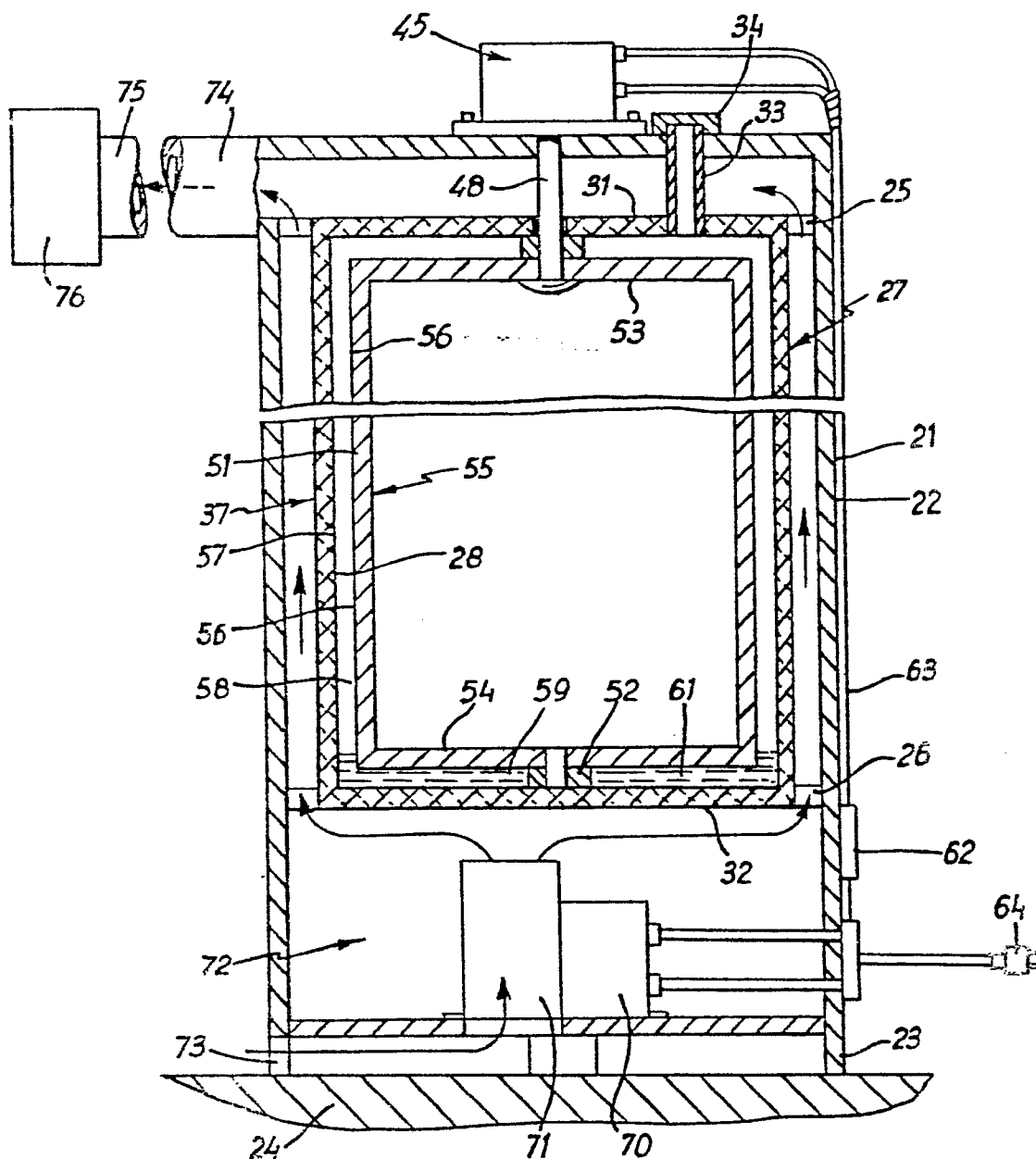


FIG. 3



DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>DE - A1 - 2 452 415</u> (KITTLAUS) * complete document *	1-4, 9,10	F 24 J 3/04
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	<u>CH - A - 217 580</u> (BELDIMANO et al.) * fig. 2; fig. 1, position 3; fig. 2, position 15; page 2, lines 27 to 29; fig. 2, position 10; page 2, lines 40 to 64 *	1,2, 5,7, 9,10	
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A	<u>GB - A - 1 467 582</u> (ALFA LAVAL) * complete document *		TECHNICAL FIELDS SEARCHED (Int. Cl.)
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A	<u>US - A - 2 251 344</u> (TESCH) * complete document *		F 24 D 5/00 F 24 D 15/00 F 24 D 17/00 F 24 J 3/00
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A	<u>US - A - 2 090 873</u> (LAZARUS) * complete document *		

			CATEGORY OF CITED DOCUMENTS
			X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			& member of the same patent family. corresponding document:
X	The present search report has been drawn up for all claims		
Place of search Berlin		Date of completion of the search 09-10-1979	Examiner PIEPER