

Jan. 18, 1966

C. W. LAMBERT
VACUUM CLOTHES DRYER

3,229,382

Filed Feb. 6, 1964

2 Sheets-Sheet 1

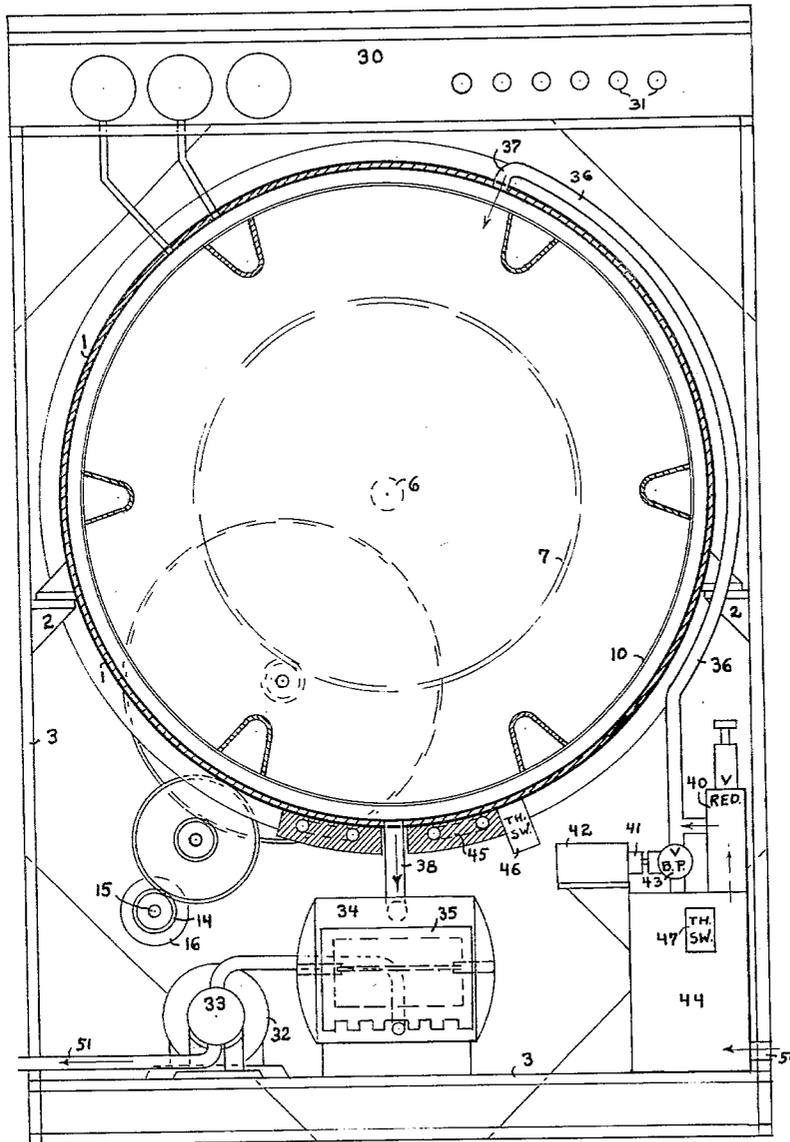


Fig. 1.

C. W. Lambert
INVENTOR.

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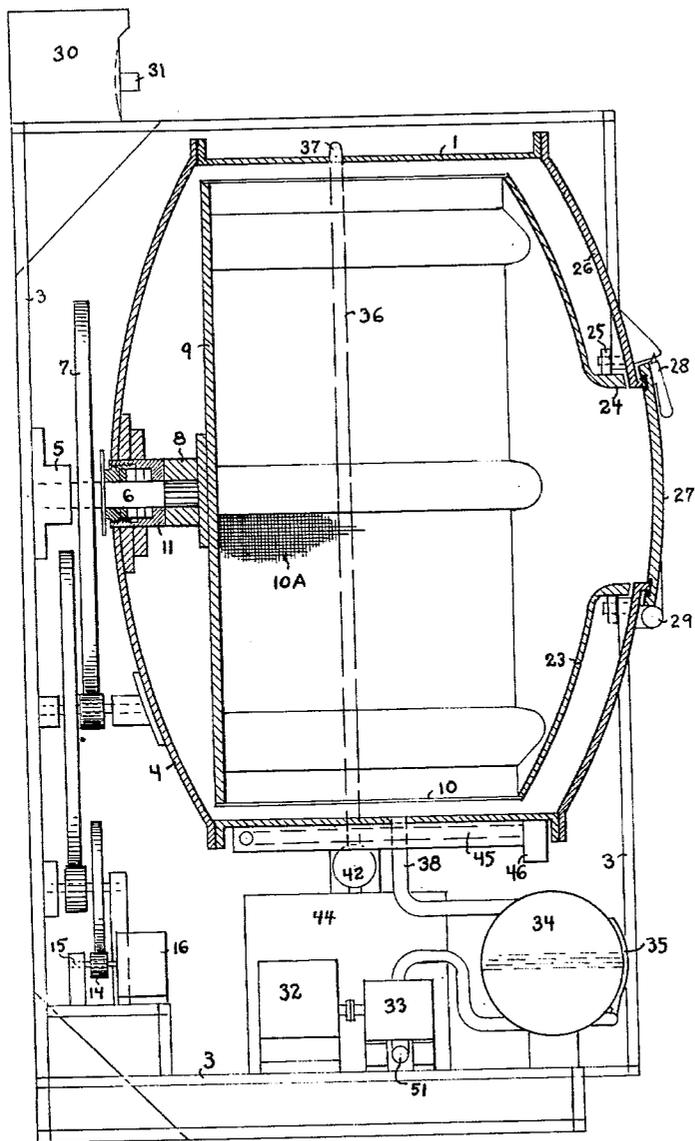


Fig. 2.

C.W. Lambert
INVENTOR.

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VACUUM CLOTHES DRYER

Chandley W. Lambert, Box 56, Lake Dallas, Tex.

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1 Claim. (Cl. 34-46)

The invention relates in general to clothes dryers in which the clothes are dried in a partial vacuum and in particular to Patent No. 3,030,712 issued April 24, 1962.

One form of the invention is shown in the accompanying drawing. FIGS. 1 and 2 are front and side elevations of the dryer, partly in section.

The vacuum drum 1, FIGS. 1 and 2, is secured to frame 3 by brackets 2-2. To curved rear end plate 4 of drum 1, FIG. 2, is secured a pressure tight bearing 11, in which and in end bearing 5 is mounted shaft 6 on the splined forward end of which fits splined hub 8, which is secured to the rear plate 9 of perforated rotatable clothes basket 10, which is partly developed at 10A.

Secured to shaft 6 is gear 7, which is slowly rotated at about 10 r.p.m. by a gear train leading from gear 14 on shaft 15 of motor 16. Any form of speed reduction such as worm gears, belts and pulleys, etc. may be used for the purpose of slowly revolving shaft 6 and clothes basket 10.

Forward plate 23 of basket 10 has a forwardly extending neck 24, which is supported and aligned by spaced rollers 25, which rotate on bearings secured to forward end plate 26 of drum 1. At 27 is the drum door with spring latch 28 and hinge 29.

Within control cabinet 30 are switches, relays and control mechanism. On the forward exterior panel of cabinet 30, FIG. 1, are gauges which indicate conditions of vacuum and temperature within the drum and elapsed time of cycle operation. Push buttons as 31-31 operate switches to "on" and "off" positions and select various drying cycles.

Air enters the air heating unit 44 at 50, FIG. 1, and is let into the interior of drum 1 by a reducing valve 40, which is connected by conduit 36 and fitting 37 to the top of the drum. A valve 43, connected in a conduit by-passing the reducing valve and operable by the movable armature 41 of electromagnetic coil 42, can allow a free flow of air from heater 44 into drum 1.

Vapor laden air leaves drum 1 through conduit 38, FIGS. 1 and 2, to lint filter 34, which has a clean out door 35. From the filter 34 the air passes through a conduit to suction pump 33, driven by motor 32, and passes out at exhaust tube 51.

The dryer operates as follows: after the wet clothes are placed in the basket and the door closed, a drying cycle is selected and the starting switch is closed.

Immediately air heater 44 and radiant heater 45 start to warm up and motors 16 and 32 start.

A partial vacuum is quickly established within drum 1 and in this area of reduced pressure the water in the clothes starts to vaporize making the air in the interior of the drum very humid. The soft water-soaked fibers of the material expand immediately in the reduced pressure.

The motor 32 and pump 33, which run continuously during the drying cycle, continue to evacuate the interior of the drum.

As soon as the pressure within the vacuum drum drops to a predetermined set amount, the pressure actuated

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reducing valve 40 opens and a draft of warm air from heater 44 flows into the interior of vacuum drum 1.

Soon the pressure within the drum rises to a predetermined set limit and the reducing valve 40 closes. In the mean time radiant heater 45 is keeping the internal temperature up to the setting of the thermostatically controlled switch 46.

The interior of the drum is at a high degree of humidity and the vapor laden air is continually exhausted by pump 33.

When the drying process is completed, the starting switch is opened either manually or by the automatic timing device. When the starting switch is opened, the movement of opening also momentarily energizes electromagnetic coil 42, which opens the valve 43, allowing a free flow of air into the drum. This is necessary in order to open the drum door.

The process is a breathing in of drafts of warm air and a continuous exhausting of humid vapor laden air.

The process depends upon the natural evaporation of water at a comparatively low temperature when the pressure is reduced as in a partial vacuum.

Since evaporation is a cooling and refrigerating process, the tendency to reach a balance between pressure and temperature and a consequent reduction in the rate of evaporation is prevented by the radiant heater 45. Heat is radiated through the drum wall to replace that which is dissipated by evaporation.

The beneficial results of vacuum drying are: prevention of fabric roasting, prevention of excessive lint forming, resulting fluffiness of expanded fibers and the saving of time, fabric and energy.

What I claim is:

In a vacuum clothes dryer, the combination of, an external frame; a cylindrical drum secured within said frame; curved removable end plates on said drum; a door in the forward end plate of said drum; a pressure tight bearing in the rear end plate of said drum; a rotatable perforated cylindrical basket within said drum; a forwardly extending neck of said basket supported by rollers mounted on brackets secured within said drum; an opening in said neck in line with said drum door for the insertion and removal of clothes; an internally splined hub secured to the rear end plate of said basket; a horizontal shaft having a splined end which fits into said splined basket hub; said shaft extending rearwardly through said bearing in said drum; an external bearing on said shaft secured to said frame; a train of speed reducing gears connecting said shaft to an electrical motor secured to said external frame; a radiant heater secured to the exterior surface of said drum; said radiant heater controlled by a thermostatic switch responsive to the temperature of said drum; an air heater having an atmospheric air inlet, a pressure reducing valve connected to the air heater and having an outlet connected to the said drum, said pressure reducing valve being set so that heated air is admitted to the drum upon a sufficient lowering of pressure within the drum, a thermostatic switch controlling said air heater and responsive to the air temperature within said air heater, a by-pass conduit around the pressure reducing valve connected to the air heater and the outlet of the pressure reducing valve and an electrically controlled valve in said by-pass line to open the drum to atmospheric air pressure when the drying cycle has been completed.

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5 WILLIAM F. O'DEA, *Primary Examiner.*NORMAN YUDKOFF, ROBERT A. O'LEARY
*Examiners.*J. SOFER, W. E. WAYNER, *Assistant Examiners.*