

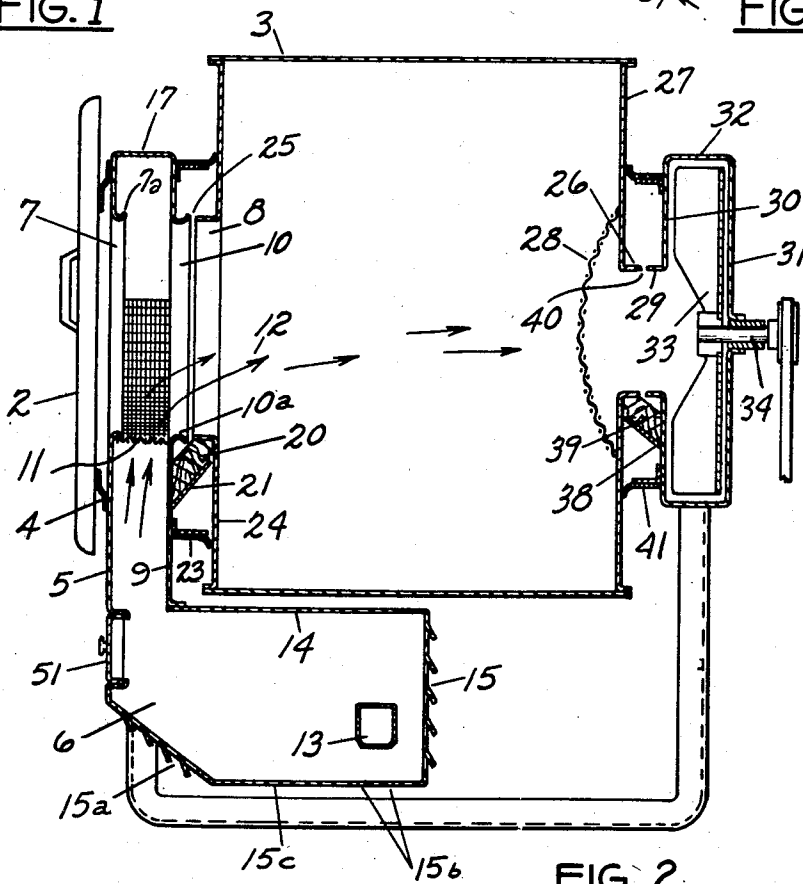
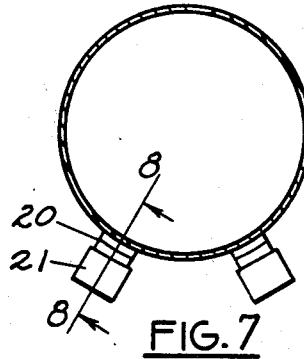
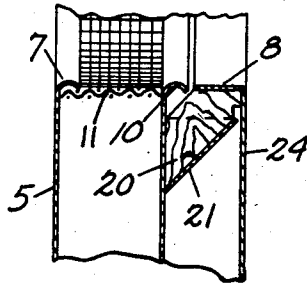
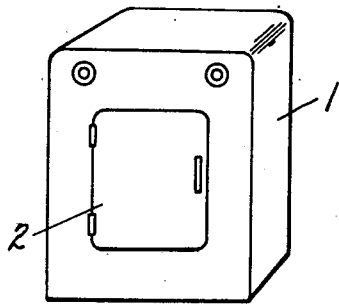
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CLOTHES DRYER

2,830,385

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2 Sheets-Sheet 1



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FIG. 3

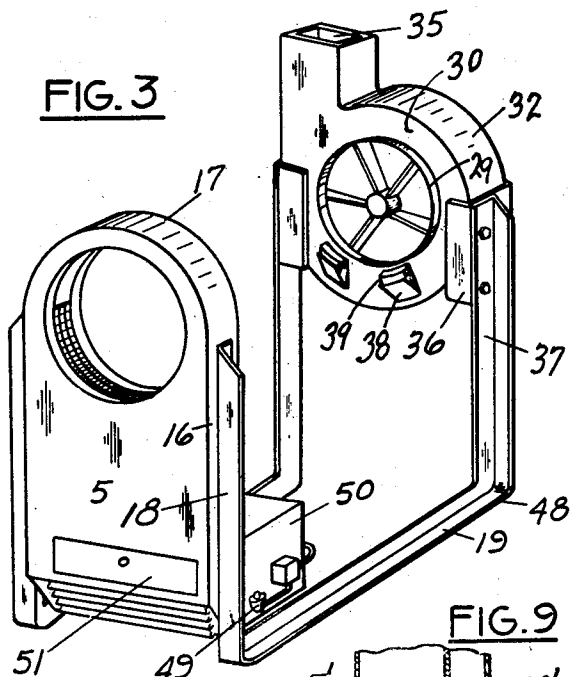


FIG. 9

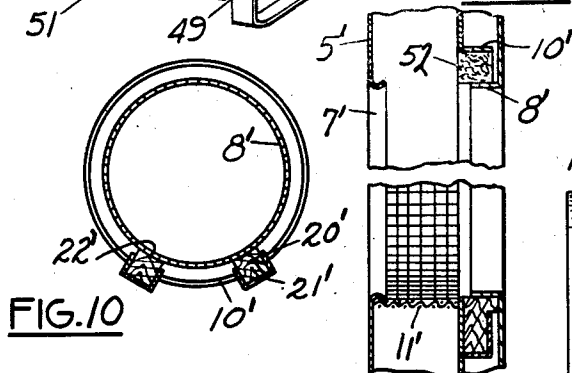


FIG. 10

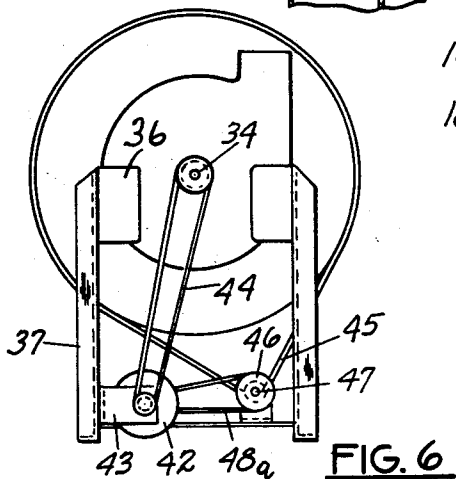


FIG. 6

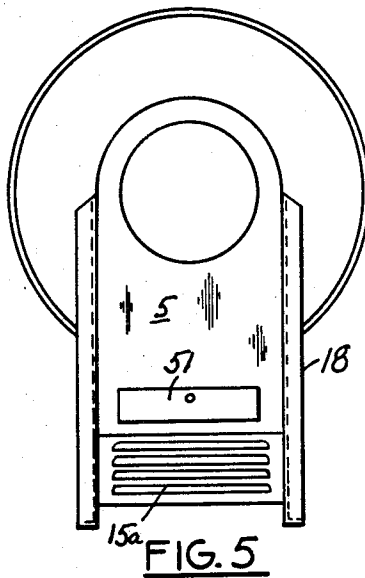


FIG. 5

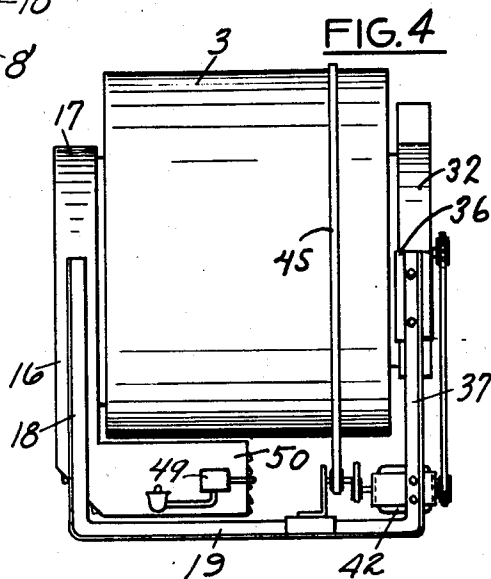


FIG. 4

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2,830,385

CLOTHES DRYER

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4 Claims. (Cl. 34-133)

This invention is intended to improve clothes dryers by utilizing the blower and heater or stove as a structural support for the drum. With such a construction, the drum can be imperforate and the dryer will operate with substantial equal efficiency with or without an enclosing cabinet.

In the accompanying drawing, Fig. 1 is a perspective of a dryer; Fig. 2 is a longitudinal section through the dryer with the cabinet removed; Fig. 3 is a perspective of the supporting structure for the drum; Fig. 4 is a side view of the dryer with the cabinet removed; Figs. 5 and 6 are respectively front and rear views of the structure shown in Fig. 4; Fig. 7 is an end view of the bearing structure for supporting the drum; Fig. 8 is a section on line 8-8 of Fig. 7; Fig. 9 is a section through a modification of the bearing structure; and Fig. 10 is an end view of the modified bearing structure.

In the drawings, 1 indicates the dryer cabinet having on its front face a door 2 through which clothes are loaded and unloaded into an imperforate drum 3. The door has on its inner face a seal 4 which in the closed position of the door butts against the front face 5 of a stove or heater 6. The front face 5 of the stove has a circular flanged opening 7 radially inward of the seal 4 and substantially in axial alignment with a circular flange or neck 8 at the front end of the drum 3. The stove 6 has a back wall 9 which has a flanged opening 10 between and in line with the openings 7 and 8. When the door is open, clothes can be loaded into or unloaded from the drum through the openings 7, 8 and 10. The flanges 7 and 10 have curved edges 7a and 10a so there are no exposed edges on which clothes can catch. The flange 8 in the drum is so close to the curved edge 10a that there is no chance for clothes catching on the flange 8. The front and back walls 5 and 9 of the stove are spaced apart and provide a flue for the heated air which flows upwardly between the walls and is discharged through a semi-circular screen 11 bridging the flanges 7 and 10 and thence flows axially through the flange 8 into the front end of the drum as indicated by the arrows 12. The source of the heat for the stove is not critical. In the particular stove illustrated, the heat comes from a gas burner 13 in a chamber 14 beneath the front part of the drum. The combustion air enters the back of the combustion chamber 14 through louvers 15. The combustion takes place in the part of the chamber 14 which is offset to the rear of the flue between the walls 5 and 9. The products of combustion flow toward the lower end of the flue and directly beneath the lower end of the flue there are louvers 15a through which cooling air enters and mixes with the products of combustion so that the air entering the drum from the upper end of the flue is at a temperature low enough to prevent scorching of the clothes. Other air admission slots or perforations 15b are provided in the bottom wall 15c of the combustion chamber.

In addition to providing the source of heat necessary

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for drying the clothes, the stove 6 also forms the structural support for the front end of the drum. The front and back walls 5 and 9 when connected by vertical side walls 16 and by an arched top wall 17 provide a box frame section of adequate strength for supporting the front end of the drum. The flanges 7 and 10 stiffen the front and back walls in the region opposite the drum flange 8. The vertical side walls 16 are bolted or otherwise suitably secured to the front arms 18 of U-shaped angle iron frame members 19 which extend from front to back on opposite sides of the center of the drum. The actual support of the front end of the drum is from bearing blocks 20 which may, for example, be wood or masonite impregnated with graphite. Two of the bearing blocks 20 are used, one on each side of the center of the drum. The bearing blocks are carried in holders 21 fixed to the wall 9 of the stove beneath the flange 10. The bearing blocks have arcuate surfaces 22 which engage the outer surface of the flange 8 on the drum. A felt seal 23 may be arranged between the walls 9 of the stove and the front end wall 24 of the drum. This felt seal is not necessary because there is only a small space 25 between the adjacent ends of the flanges 8 and 10 and the small amount of air which leaks in through the space 25 has no material effect upon the efficiency of the clothes drying operation. In fact, because the air entering the space 25 is drawn from the interior of the cabinet, the effect would be in the direction of improving the efficiency of drying due to the preheating of the air within the cabinet.

The heated air entering the drum at the front end through the flange 8 flows axially through the drum and out through a cylindrical flange 26 in the back wall 27 of the drum. A screen 28 dished inward from the back wall 27 of the drum and of substantially greater area than the fan inlet 29 prevents blocking of the inlet by clothes held by suction against the screen. Clothes tend to fall on the uppermost surface of the screen but as the drum turns, the clothes fall away from the lower half of the screen so on the average, the air flow is predominantly confined to the lower half of the screen. This increases the contact between the clothes and the heated air. The flange 26 of the drum is presented to and is of the same diameter as the inlet opening 29 in the front wall 30 of a blower housing. The blower housing consists of front and back walls 30 and 31 connected by a scroll shaped wall 32 and forming a scroll casing for an impeller 33 mounted on a shaft 34 journaled in the back wall 31. The blower housing has a discharge 35 which is shown directed vertically upward but which obviously could be directed in any direction. The blower housing serves as the structural support for the back end of the drum. On opposite sides, the blower housing has suitably fixed thereto, brackets 36 which are bolted to vertical arms 37 on the angle iron base 19. On the front wall 30 of the blower housing are bearing brackets 38 holding bearing blocks 39 which engage the underside of the rear drum flange 26. The bearing blocks 39 are of the same construction as the bearing blocks 20. There is a slight space 40 between the adjacent ends of the drum flange 26 and the inlet flange 29 through which there would be a small amount of air leakage which would not materially affect the efficiency of the dryer. If desired, even this small amount of leakage may be prevented by a felt seal 41 carried on the front wall 30 of the blower housing and bearing on the rear wall 27 of the drum.

From one aspect, the end flanges 8 and 26 on the drum are trunnions and the bearing blocks 20 and 39 are trunnion bearings. The diameter of the front trunnion provided by the flange 8 is sufficient to provide adequate access for loading and unloading the clothes. The diam-

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eter of the rear trunnion 26 is sufficient to provide adequate area for withdrawing the moisture laden air from the interior of the drum. That is the reason for the differences in diameter of the trunnions.

The motor 42 for driving the fan and drum is carried in a bracket 43 fixed to one of the rear uprights 37 of the angle iron frame members 19. There is a direct belt drive 44 from the motor to the shaft 34 carrying the impeller 33 so that the impeller rotates at a speed comparable with the shaft speed of the motor. The drum is driven by a belt 45 which rides on the outer periphery of the drum adjacent the rear uprights 37. The belt 45 is driven from an idler pulley 46 on a shaft 47 driven by a belt 48a from the motor.

When the parts so far described are assembled, there is a complete operating dryer which can be used without any cabinet providing the door 2 or an equivalent closure is hinged on the front wall 5 of the stove. The stove 6 and the blower housing 32 in conjunction with the U-shaped angle iron sections 19 provide a complete supporting frame for the dryer. The bases 48 of the U-shaped members 19 can rest upon a floor or upon any other desired supporting structure. The bearing blocks 20 and 39 carried by the stove and blower housing provide trunnion bearings for the hollow trunnions 8 and 26 of the drum. One of the rear uprights 37 provides a support for the driving motor 42 and for the belt drives to the impeller 33 and drum 3. In the case of a gas heated dryer, the usual gas control such as the solenoid valve and safety pilot indicated generally at 49 can be mounted on an outer end wall 50 of the combustion chamber 14. Access to the combustion chamber may be had through an access panel 51 in the lower end of the front wall 5. If an electric heater is used, the controls 49 will not be necessary. With both gas and electric dryers, there will be the usual harness (not shown) containing the usual on, off and timing controls for the drying cycle.

In the use of the dryer, clothes are loaded into the drum through the hollow trunnion 8 and upon closing the door, the dryer is started by the usual control for turning on the heater and motor. Heated air flows in through the hollow trunnion 8 axially through the drum and is sucked out of the drum through the hollow trunnion 26. Since the drum is rotating, the clothes are being continually tumbled diagonally across the drum and intercept the heated air stream flowing through the drum. Intimate contact is obtained with the heated air which keeps the drum temperature low enough even though the temperature of the air entering the drum is quite high. In a typical dryer, the air entering the drum may be at a temperature of 450° while the drum temperature itself will never rise above 140°. At the end of the drying cycle, the heater and motor are turned off and the dried clothes removed through the hollow trunnion 8. There is no lint problem in this dryer. The drum 3 itself is imperforate so that any lint knocked off the tumbling clothes cannot escape through the walls of the drum. The openings 25 and 40 at each end of the drum are under suction so that lint cannot escape through either of these openings. The only place for the lint to go is out through the hollow trunnion 26 into the inlet 29 of the blower housing whence it is discharged through the blower outlet 35. By connecting the outlet 35 to the usual vent piping, any lint entrained in the discharged air can be conducted outdoors or to any desired trap or filter. Within the dryer itself, there is no place for lint to collect or to accumulate.

In Figs. 9 and 10 is shown a modification of the bearing construction in which corresponding parts are indicated by the same reference numeral with a prime. The principal difference in the bearing construction is that the flange 10' surrounds the hollow trunnion flange 8'

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on the drum and there is arranged between the flanges 8' and 10' a circumferentially extending felt strip 52. The felt strip provides a seal between the flanges 8' and 10'. By impregnating the felt with graphite, it can serve as a trunnion bearing as well as a seal. When the felt is impregnated with graphite and used both for a bearing and for a seal, the bearing blocks 20' will, of course, be omitted. The bearing blocks 20' introduce less friction and are preferred to the use of graphite impregnated felt.

What is claimed as new is:

1. In a clothes dryer, a cylindrical drum having front and back end walls provided with hollow trunnions centered on the drum axis, a fan housing having an inlet registering axially with the trunnion in the back end wall of the drum, a heater housing having at the front of the drum spaced front and back walls with openings in the walls registering axially with the trunnion in the front end wall of the drum, trunnion bearings on the fan and heater housings, a pair of U-shaped frame members on opposite sides of the drum axis having bases for resting on a supporting surface, a pair of upright arms connected in supporting relation to opposite sides of the heater housing, and a pair of upright arms connected in supporting relation to the fan housing whereby the drum is supported through the fan and heater housings.

2. In a clothes dryer, a cylindrical drum having front and back end walls provided with hollow trunnions centered on the drum axis, a fan housing having an inlet registering with the trunnion in the back end wall of the drum, a heater housing at the front of the drum having spaced front and back walls providing a flue for heated air having an arcuate discharge in front of and registering with the lower part of the trunnion in the front end wall of the drum, a door cooperating with the flue to direct the flow of heated air from the flue discharge into the trunnion in the front wall of the drum, trunnion bearings on the fan and heater housings, and frame members connected in load carrying relation to the fan and heater housings whereby the drum is supported through the fan and heater housings.

3. In a clothes dryer, a cylindrical drum having front and back end walls provided with hollow trunnions centered on the drum axis, a fan housing having an inlet registering with the trunnion in the back end wall of the drum, a heater housing at the front of the drum having spaced front and back walls providing a flue for heater air, said walls having openings registering with the trunnion in the front end wall of the drum, a door closing against the front wall of the heater housing, trunnion bearings on the fan and heater housings, and frame members connected in load carrying relation to the fan and heater housings whereby the drum is supported through the fan and heater housings.

4. In a clothes dryer, a cylindrical drum having front and back end walls provided with hollow trunnions centered on the drum axis, a fan housing having an inlet registering axially with the trunnion in the back end wall of the drum, a heater housing having at the front of the drum spaced front and back walls with openings in the walls registering axially with the trunnion in the front end wall of the drum, trunnion bearings on the fan and heater housings, and frame members connected in load carrying relation to the fan and heater housings whereby the drum is supported through the fan and heater housings.

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