

Dec. 24, 1957

F. H. McCORMICK  
DOMESTIC APPLIANCE

2,817,157

Filed July 16, 1954

4 Sheets-Sheet 1

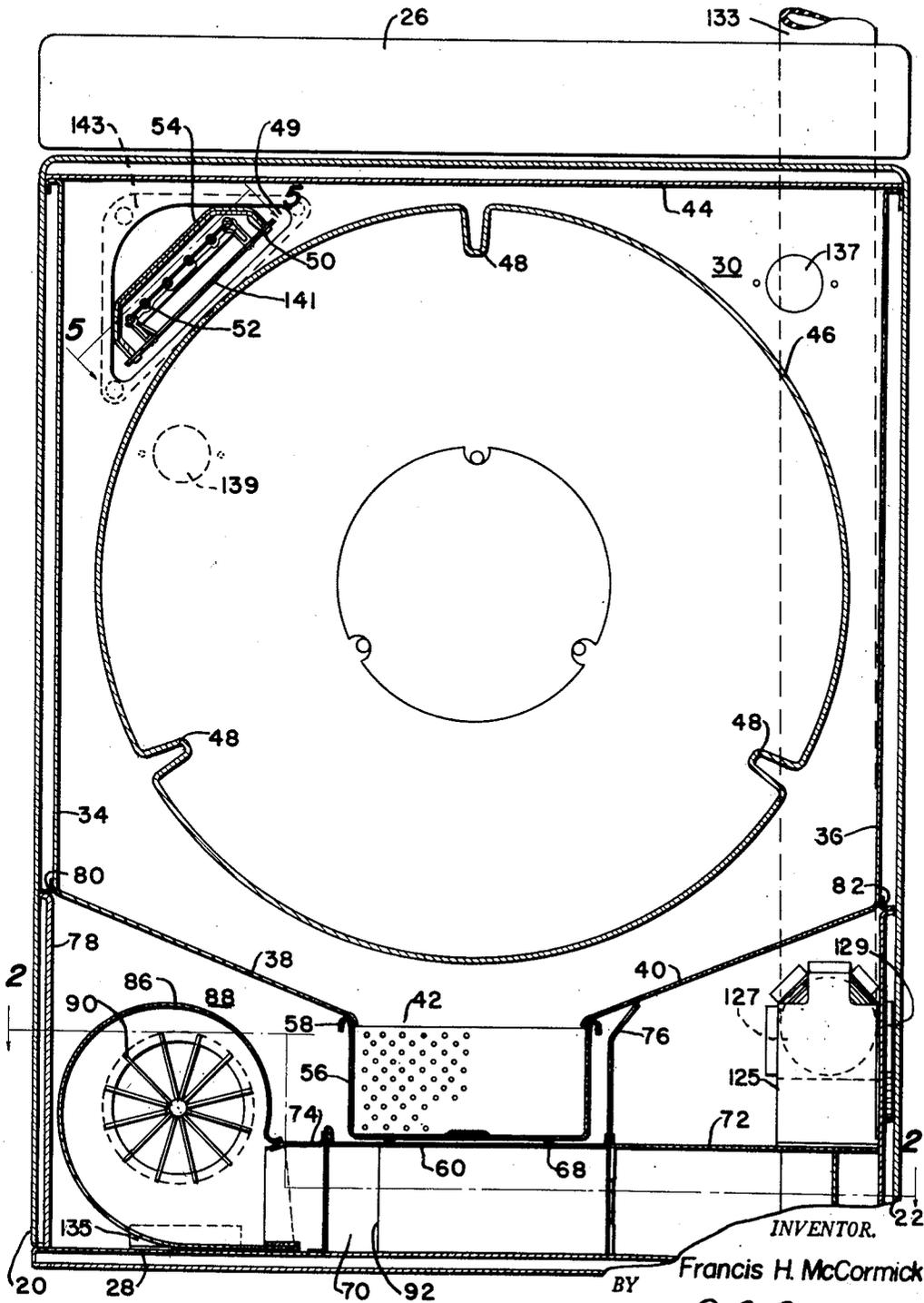


Fig. 1

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4 Sheets-Sheet 2

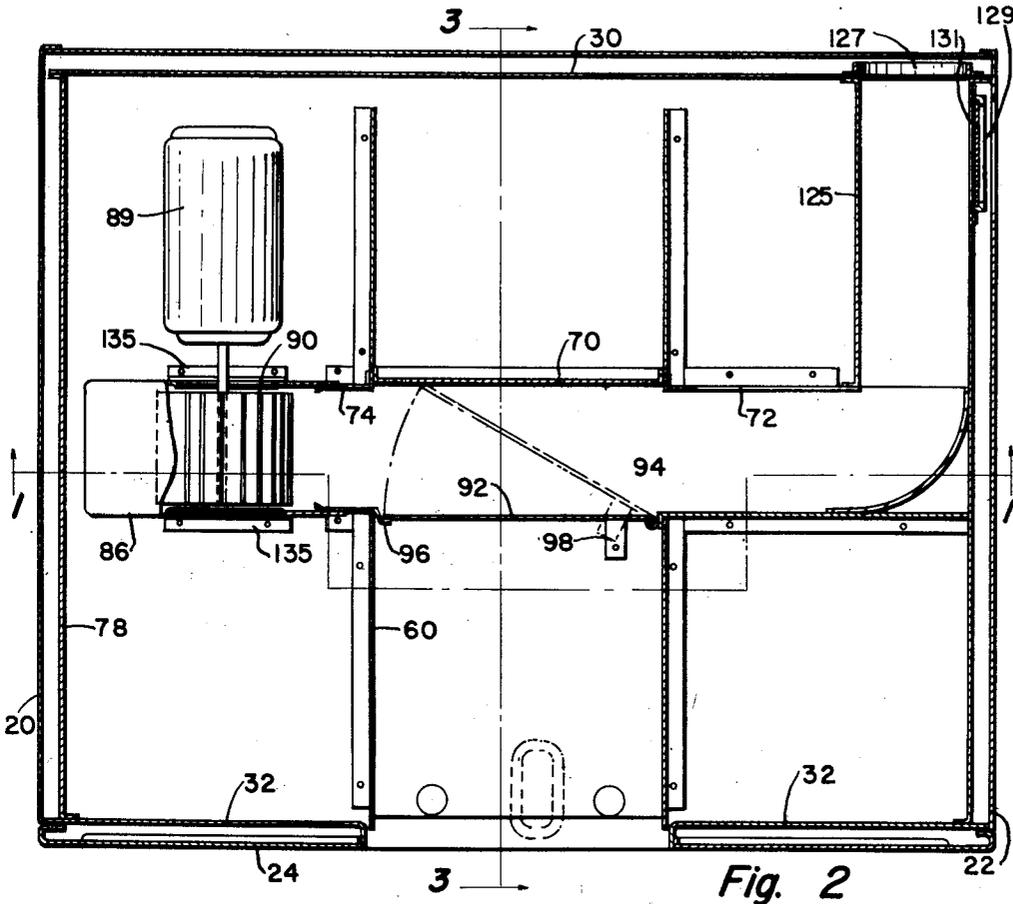


Fig. 2

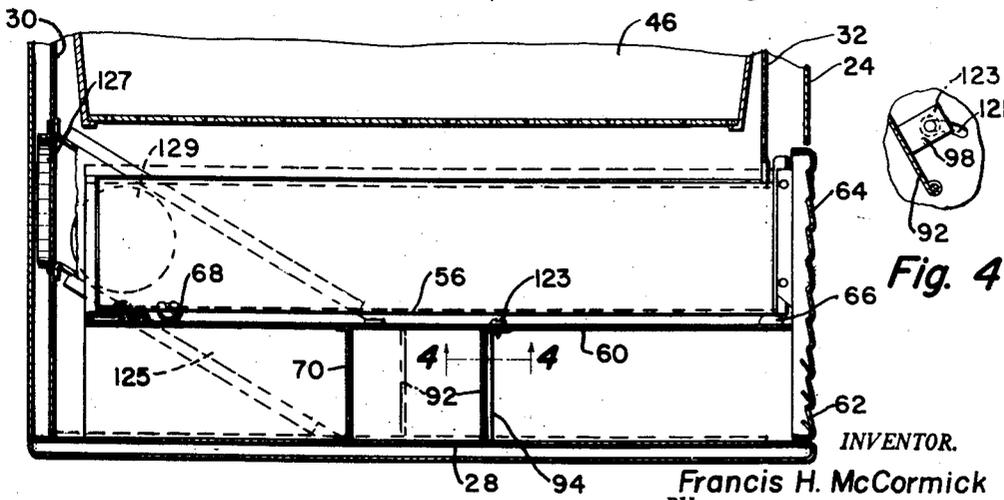


Fig. 3

Fig. 4

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4 Sheets-Sheet 3

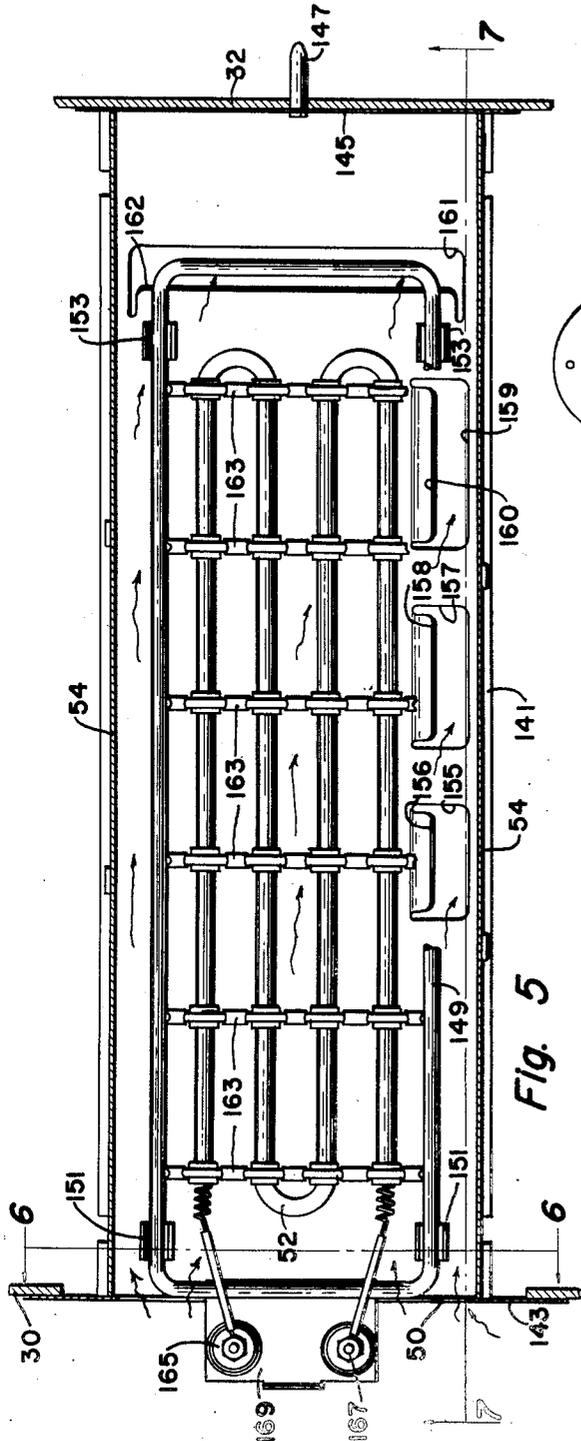


Fig. 5

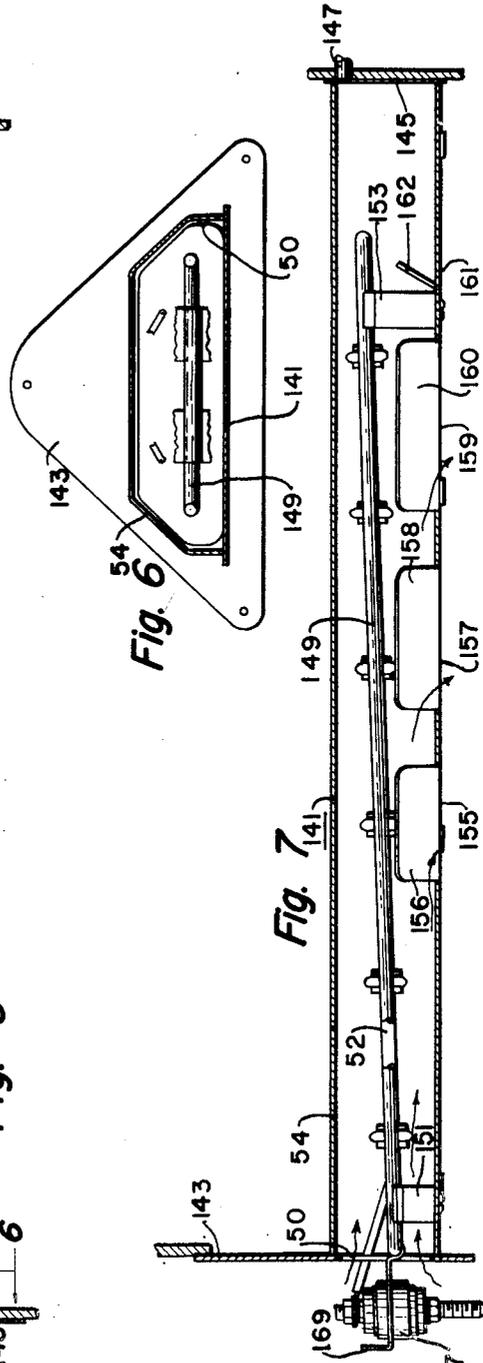


Fig. 6

Fig. 7

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4 Sheets-Sheet 4

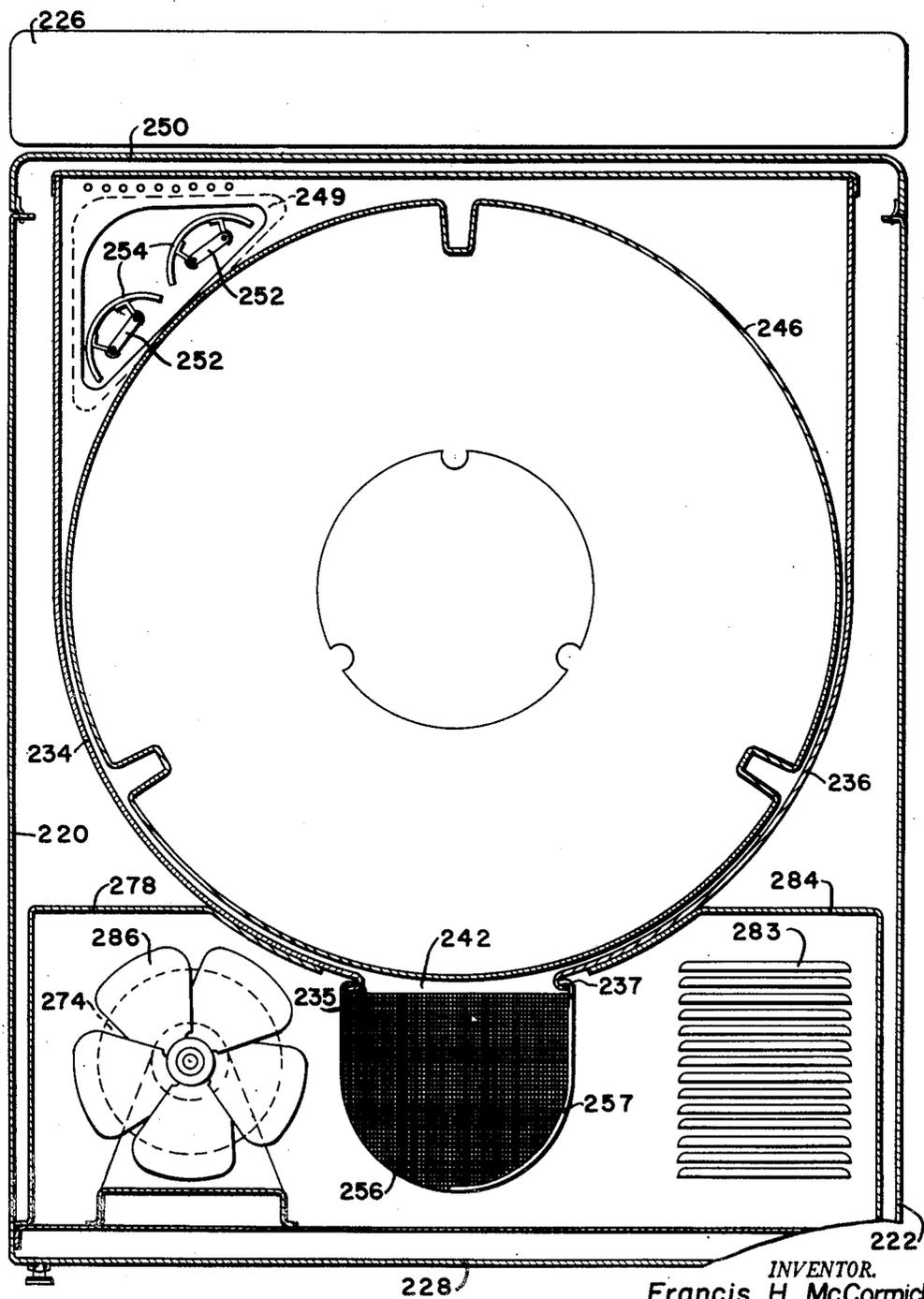


Fig. 8

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2,817,157

## DOMESTIC APPLIANCE

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Application July 16, 1954, Serial No. 443,797

4 Claims. (Cl. 34—82)

This invention relates to a domestic appliance and more particularly to laundry dryers.

In laundry dryers, the moisture is readily removed from the clothes by heat and circulating air. The disposal of lint and the moist air is a much more difficult problem. The moist air is most easily disposed of by discharging it into the outside atmosphere. However sometimes the location of the dryer and the structure of the building makes this impractical.

It is an object of my invention to provide a simple inexpensive laundry dryer arranged to selectively discharge moist air either outside the building or into the room.

It is another object of my invention to provide a simple inexpensive laundry dryer in which the lint is conveniently removed and disposed of.

It is another object of my invention to provide a simple inexpensive laundry dryer arranged so that the removal of the filter makes accessible the selector control by which the dryer is arranged to discharge the circulating air either outside the building or into the room.

It is another object of my invention to provide a laundry dryer with an improved inexpensive radiant heater cooled by the external air entering the drum chamber.

These and other objects are attained in the form shown by providing a filter drawer connected directly to the bottom outlet of the drum chamber. A centrifugal fan located at the side of the drawer draws air through the heater, the drum and drum chamber and the filter and discharges the air into a duct work having a branch extending to the front of the dryer to an outlet and a second branch extending rearwardly to outlets at the rear and also at the side adjacent the rear for connection to a discharge tube extending outside the building. A two-way valve is provided to direct the air discharged from the fan or blower into either the forward or rearwardly extending branches of the duct work.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the invention is clearly shown.

In the drawings:

Figure 1 is a vertical sectional view through a laundry dryer embodying one form of my invention taken substantially along the lines 1—1 of Figure 2;

Figure 2 is a horizontal sectional view taken substantially along the lines 2—2 of Figure 1;

Figure 3 is a fragmentary vertical sectional view taken substantially along the lines 3—3 of Figure 2;

Figure 4 is a fragmentary sectional view taken along the lines 4—4 of Figure 3 showing the adjustment and clamping arrangement for the two-way air directing valve;

Figure 5 is a fragmentary sectional view taken substantially along the line 5—5 of Figure 1;

Figure 6 is a fragmentary sectional view taken substantially along the line 6—6 of Figure 5;

Figure 7 is a fragmentary sectional view taken substantially along the line 7—7 of Figure 5; and

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Figure 8 is a vertical sectional view through a modified form of the invention.

Referring now to the drawings there is shown a laundry dryer provided with outer ornamental vertical side walls 20 and 22, an outer vertical front wall 24, a top wall 26 and a base 28. Within this outer ornamental structure is a drum casing formed of the rear wall 30, an inner front wall 32 and the inner side walls 34 and 36 which have sloping converging portions 38 and 40 between which there is provided a centrally located rectangular bottom opening 42. The drum casing also includes an inner top wall 44. Within the drum casing is a perforated rotatable drum 46 having inwardly extending ribs 48 for tumbling the clothes to be dried within the drum during the drying cycle. The drum is preferably driven by an electric motor 89 through pulley and belt means.

The upper left-hand portion of the rear wall 30 is provided with a large triangular shaped opening 49. A heater assembly 141 has its major portion extending through this opening 49 into the drum chamber. This heater assembly 141 includes a triangular shaped mounting plate 143 mounted upon the outside surface of the rear wall 30.

Fastened to this mounting plate 143 is an elongated metal box 54 which is relatively wide and thin and which extends substantially the entire distance across the drum chamber. This box includes an end wall 145 at the end opposite the mounting plate 143. This end wall is provided with a projecting supporting pin 147 received within an appropriately located aperture in the front wall 32 as shown in Figure 5. This box 54 includes an inlet opening 50 provided within the mounting plate 143 through which enters all of the air which is circulated through the drum 46 and the drum chamber.

An open coil heater 52 is mounted within the box 54. It includes a rectangular wire frame 149 mounted upon rear supports 151 and front supports 153. The front supports 153 are longer than the rear supports 151 so that the heater 52 and its perimeter bar 149 will skew within the box 54 as shown in Figure 7. The supports 153 and 151 extend between the perimeter bar or wire frame 149 and the bottom of the box 54. The heater 52 is a high capacity open coil heater which must be cooled by the air flowing through the box to prevent it from burning out. To secure even distribution of the flow of air within the box 54 the bottom of the box is provided with the openings 155, 157 and 159 along the lower edge. Each of these openings is provided with an inwardly turned deflector (156, 158 and 160) on its uppermost edge to improve the distribution of air flow. These openings and deflectors increase in size progressively in proportion to their distance from the opening 50. An additional larger transverse opening 161 with a large transverse deflector 162 is located in the bottom of the box 54 beyond the front end of the heater 52 as shown in Figures 5 and 7.

The heater 52 is formed into a plurality of serpentine loops held by insulators supported by cross members 163 extending between the sides of the wire frame 149. The terminals of the heater 52 are connected to the insulated binding posts 165 and 167 upon the bracket 169 welded to the rear end of the wire frame 149. The air flowing in through the opening 50 as shown by the wavy arrows is distributed within the box 54 and cools the heater 52 and thus becomes heated. It then passes around the deflectors out through the openings 155 to 161 into the drum chamber where it removes moisture from the clothes. The tumbling of the clothes within the drum frees the clothes from lint which is deposited on the clothes during washing. This lint has a tendency to collect within the drum chamber. This is substantially avoided in the present design by providing a high rate

of air circulation through the drum and drum chamber to a removable filter drawer 56 directly beneath the bottom rectangular opening having its curled rim 58 in substantial sealing engagement with the edges of the bottom opening 42.

The filter drawer 56 is supported upon a wide rectangular duct 60 extending substantially from the front to the rear. The front of the outer ornamental wall 24 is provided with suitable discharge louvers 62 directly in front of the duct 60 for discharge of air into the room. Directly above the louvers 62 is a drawer front 64 for the perforated filter drawer 56. The rectangular duct 60 at the front is provided with a pair of nylon buttons 66 and the rear of the filter drawer 56 is also provided with a pair of nylon buttons 68 to make the filter drawer 56 slide readily into and out of the space immediately beneath the opening 42 above the duct 60.

The rear portion of the duct 60 is blocked by a vertical wall 70. This forms part of a transverse rectangular duct 72 which is extended to form a branch outlet duct from the duct 60. Directly opposite the duct 72 is an inlet duct 74 which connects into the side of the rectangular duct 60 directly opposite the branch duct 72. An envelope surrounds the outside of the filter drawer 56 forming a chamber 88. This envelope includes a wall 76 extending above the right side wall of the rectangular duct 60 upwardly into contact with the inclined portion 40 and the drum chamber, the top and left side wall of the rectangular duct 60 together with the base 28 and an additional vertical wall 78 extending between the rear wall 30 and the inner front wall 32 and between the base 28 and the junction between the vertical portion and the inclined portion 38 of the drum chamber wall 34. An adhesive type seal 80 is provided at this junction for completing the seal of the envelope. A similar seal 82 and a similar wall 84 are provided upon the opposite side.

A motor driven centrifugal fan or blower 86 open on both sides is supported upon brackets 135 resting upon the base 28 within this envelope or chamber 88. Its motor 89 may be used to drive the bladed rotor 90 as well as the drum 46 in a customary manner such as is shown in the Ferris Patent 2,406,494 issued August 27, 1946. The blower 46, by creating a lower pressure within the chamber 88, draws air into the drum chamber through the inlet aperture 50 over the open coil heaters 52 in the heater box 54 through the drum 46 and drum chamber 30 to the rectangular opening 42 in the bottom of the drum chamber into the interior of the filter drawer 56 and through all sides of the filter drawer 56 into the chamber 88. The air is drawn into the sides of the blower and discharged through its outlet directly into the inlet connection 74.

At the junction of the rectangular duct 60 and the branch duct 72 there is provided a two-way valve 92 provided with a pivot 94 located adjacent the junction of the front wall of the duct 72 and the adjacent right side wall of the duct 60. This valve 92 is preferably substantially in the form of a rectangular sheet metal blade sufficiently long to extend substantially across the duct 60 to make a sealing engagement with a vertical ledge 96 provided upon the opposite side of the duct 60. The valve 92 is also sufficiently high to span the distance between the bottom and top of the duct 60. The top of the valve 92 is also provided with a forwardly extending ear 98 (Figures 2, 4) provided with a threaded aperture. Above this ear 98, as shown in Figure 4, there is cut an arcuate slot 121 in the top wall of the duct 60. A clamping screw 123 extends from the chamber for the filter drawer 56 through the slot 121 and threads into the ear 98. The screw 123 is made accessible by the removal of the filter drawer 56.

When the filter drawer is removed, after loosening the screw 123, it may be pushed or pulled within the limits of the arcuate slot 121 to move the valve 92 to its rearward position into contact with the wall 70 to cause the

discharge from the fan 86 to be directed forwardly through the duct 60 and out through the louvers 62 into the room. This shuts off the duct 72 from the discharge of the fan 86. By pulling forwardly on the screw 123, the valve 92 may be moved to its forward position against the ledge 96 to block off the forward portion of the duct 60 from the discharge of the fan 86. This causes the fan 86 to discharge transversely beneath the filter drawer through the duct portions 74, the duct portion formed between the wall 70 and the valve 92 and the duct portion 72.

A rearwardly extending upwardly inclined duct portion 125 joins the end of the duct portion 72 and is provided with a rear discharge outlet 127 and a side discharge outlet 129. These are both round outlets and either is adapted to be closed by a suitable disc 131 shown blocking the outlet 129. Where possible, it is preferable to connect a flexible rubber or plastic tube 133 about four inches in diameter to either of the discharge outlets, preferably the outlet 127. This tube 133 should extend outside the room or building in which the dryer is located. In this way all of the hot moist air is carried directly to the outside atmosphere and does not heat up or increase the humidity within the room in which the dryer is located.

Any lint passing through the openings in the filter drawer 56 will likewise be discharged outside the room. The remainder of the lint will be collected in the filter drawer 56 which may be readily removed by pulling it out like an ordinary drawer and cleaning and disposing of the lint within the filter drawer. Substantially all of air is drawn through the drum and drum chamber so that there is an adequate amount available to carry the lint to the filter to avoid the collection of lint within the drum chamber.

The energization of the heaters 52 may be controlled by a thermostat 137 provided in the upper right hand corner of the rear wall 30. A safety fuse or thermostat 139 is also provided in the rear wall behind the drum 46 directly beneath the heater 52. The thermostat 137 controls the normal cycling of the heater 52 to prevent the drum chamber from becoming too hot and particularly to prevent the scorching of clothes within the drum 46. The fuse or thermostat 139 acts to stop the energization of the heater 52 in the event that temperatures rise above the temperatures which normally prevail within the drum chamber under proper operation conditions and proper control by the thermostat 137.

In Figure 8 there is shown a modified form of the invention which includes outer walls 220 similar to the outer walls of the first modification. It also includes similar inlet apertures 250, heaters 252 and reflectors 254. The drum 246 is also similar but the drum chamber includes side walls 234 and 236 which are slightly different in shape from the walls 34 and 36. These walls 234 and 236 have outwardly curled bottom edges 235 and 237 which support the curled in edges of a filter drawer 256. Between these curled edges 235 and 237 is a bottom rectangular opening 242 directly over the filter drawer 256. The filter drawer 256 has its right side provided with a shield 257 which may either take the place of some of the screen or perforated sheet metal or it may be spaced from the screen or perforated sheet metal of the drawer.

Together with the base 228, the walls 278 and 284 form a chamber beneath the drum casing 234—236 which is divided by the filter drawer 256. A louvered inlet 283 is provided on the right side of the filter drawer while on the left side a five blade motor driven fan 286 is provided for blowing air through a front or rear discharge outlet 274. In this arrangement the major portion of the air is drawn in through the inlet 283 and passes beneath the filter drawer 256 and is discharged outside of the dryer by the fan 286. However the fan 286 also creates a suction on the outside of the filter drawer 256 which draws air into the drum chamber and drum 246 through the inlets 250 where the air is heated by the heaters 252. The heated air, after picking up

moisture and lint in the drum 246, passes through the filter drawer 256 and is mixed with the air drawn in through the inlet 283 and discharged by the fan 286. This dryer may be made so as to either discharge into the outer atmosphere or into the room. Any lint collect-

ing in the filter drawer 256 may be disposed of by removing the drawer and dumping it at a suitable place of disposal. In accordance with the provisions of Rule 78a, reference is made to the following prior filed applications: S. N. 298,566 filed July 12, 1952, now Patent No. 2,742,708, which is a continuation-in-part of S. N. 217,618 filed March 26, 1951, now abandoned.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. A laundry dryer including a cabinet provided with a drum casing containing a perforated rotatable drum, the bottom of said drum casing being provided with an opening, the front of said cabinet being provided with a horizontally movable filter drawer extending directly beneath said opening, the sides of said filter drawer being connected in substantial sealing relationship with the bottom of said drum casing surrounding said opening, an envelope surrounding the bottom portion of said filter drawer, discharge duct means having an intersection with a first branch extending forwardly beneath said envelope and being provided with a discharge outlet at the front of the cabinet and with a second branch extending rearwardly provided with a discharge outlet at its extremity, a blower having its inlet communicating with the interior of said envelope and having its outlet communicating with said duct means, and a two way valve means in said duct means located at the intersection of said branches for alternately directing the flow of air into either branch of said duct means.

2. A laundry dryer including a cabinet provided with a drum casing containing a perforated rotatable drum, the bottom of said drum casing being provided with an opening, the front of said cabinet being provided with a horizontally movable filter drawer extending directly beneath said opening, the sides of said filter drawer being connected in substantial sealing relationship with the bottom of said drum casing surrounding said opening, a rectangular duct extending beneath said filter drawer and provided with a discharge outlet at the front of the cabinet, said duct having an opening on one side and a branch duct connected on the side opposite said duct opening, said branch duct being provided with a discharge outlet adapted to be connected for outside discharge, a wall connecting the side of said duct opposite said opening and extending along the adjacent side of said filter drawer to the adjacent portion of said drum casing, a blower located beneath the drum casing on the side of said filter drawer opposite said wall having its outlet connected to said opening in the side of said rectangular duct, said cabinet together with the adjacent walls of said duct and drum chamber forming a sealed envelope enclosing said blower and communicating with said filter drawer, and a two-way valve in said rectangular duct having an operating means accessible from the space provided for the filter drawer and having means for directing the flow of air to either discharge outlet.

3. A laundry dryer including a cabinet provided with a drum casing containing a perforated rotatable drum, the bottom of said drum casing being provided with an opening, the front of said cabinet being provided with a horizontally movable filter drawer extending directly beneath said opening, the sides of said filter drawer being connected in substantial sealing relationship with the bottom of said drum casing surrounding said opening, said cabinet having a base provided with a wide flat T-shaped horizontal duct thereon with the stem portion of the duct extending directly beneath said filter drawer forwardly to the front of the cabinet, said cabinet having a front provided with an opening for the front of said filter drawer, and communicating directly with the stem portion of said duct, said stem portion having a shield extending upwardly alongside said filter drawer into substantial sealing contact with the bottom of said drum casing adjacent one side of the opening therein, a blower located upon the opposite side of said filter drawer from said shield and having its inlet communicating with the outside of said filter drawer and having its outlet communicating with the adjacent end of the transverse portion of said T-shaped duct, the opposite end of said transverse portion extending to a wall of said cabinet.

4. A laundry dryer including a cabinet provided with a drum casing containing a perforated rotatable drum, the bottom of said drum casing being provided with an opening, the front of said cabinet being provided with a horizontally movable filter drawer extending directly beneath said opening, the sides of said filter drawer being connected in substantial sealing relationship with the bottom of said drum casing surrounding said opening, said cabinet having a base provided with a wide flat T-shaped horizontal duct thereon with the stem portion of the duct extending directly beneath said filter drawer forwardly to the front of the cabinet, said cabinet having a front provided with an opening for the front of said filter drawer and communicating directly with the stem portion of said duct, said stem portion having a shield extending upwardly alongside said filter drawer into substantial sealing contact with the bottom of said drum casing adjacent one side of the opening therein, a blower located upon the opposite side of said filter drawer from said shield and having its inlet communicating with the outside of said filter drawer and having its outlet communicating with the adjacent end of the transverse portion of said T-shaped duct, the opposite end of said transverse portion extending to a wall of said cabinet, and a two way valve means located at the intersecting portion of said T-shaped duct for shutting off either said opposite end or said stem portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,996,253	Otis	Apr. 2, 1935
2,424,737	Brogie	July 29, 1947
2,543,579	Kauffman	Feb. 27, 1951
2,547,238	Tremblay	Apr. 3, 1951
2,664,646	Bourner	Jan. 5, 1954
2,675,628	O'Neil	Apr. 20, 1954
2,682,599	Smith	June 29, 1954
2,751,688	Douglas	June 26, 1956