Nov. 16, 1948. M. L. PUGH 2,453,859

CLOTHES DRIER

Filed Dec. 13, 1944

2 Sheets-Sheet 1

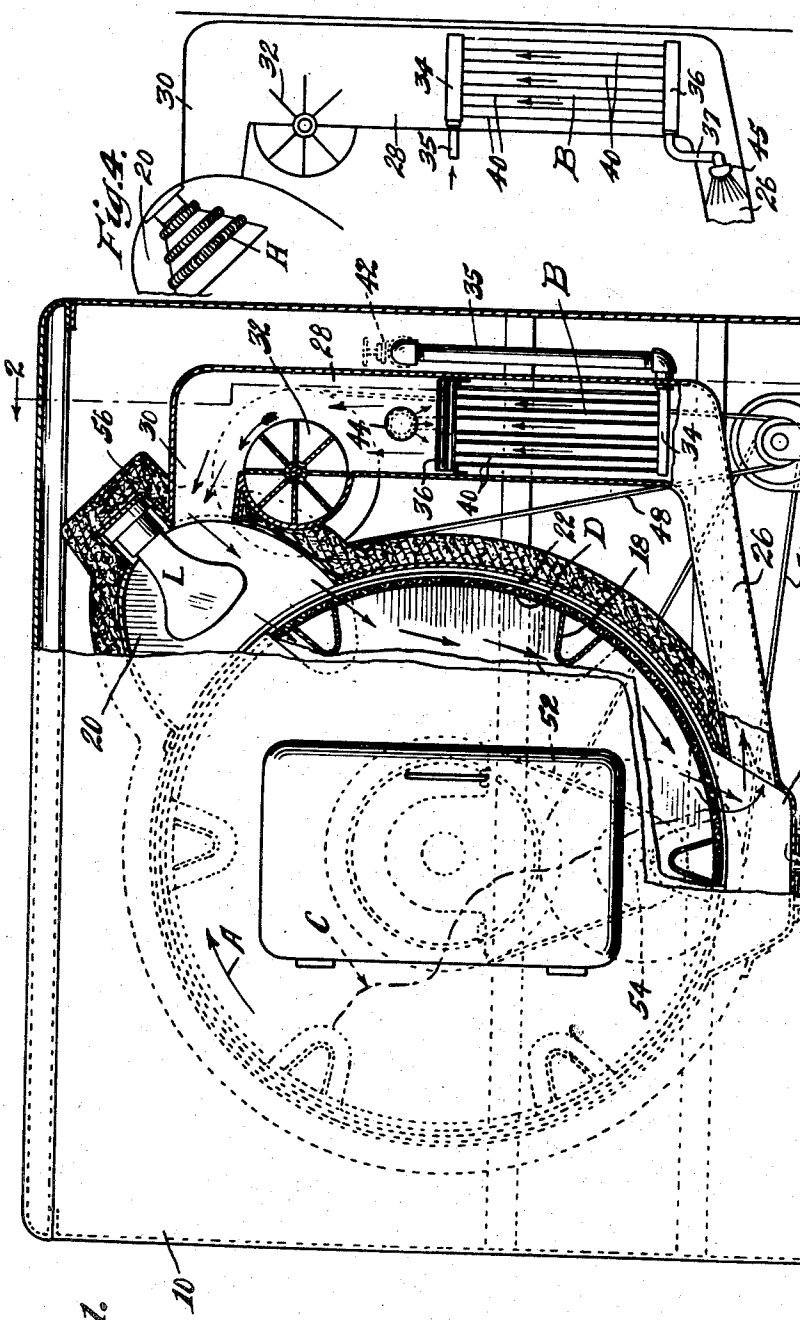


Fig. 1.

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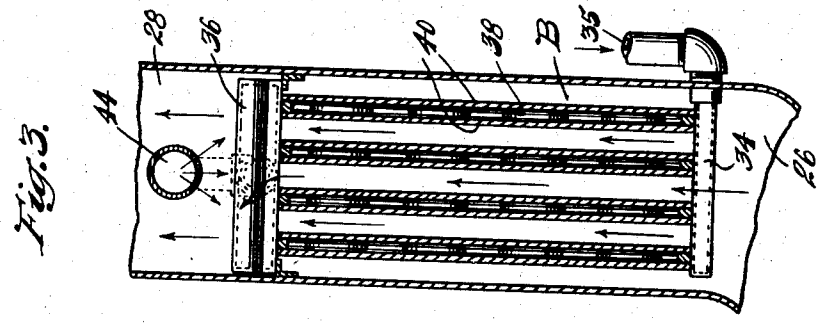


Fig. 3.

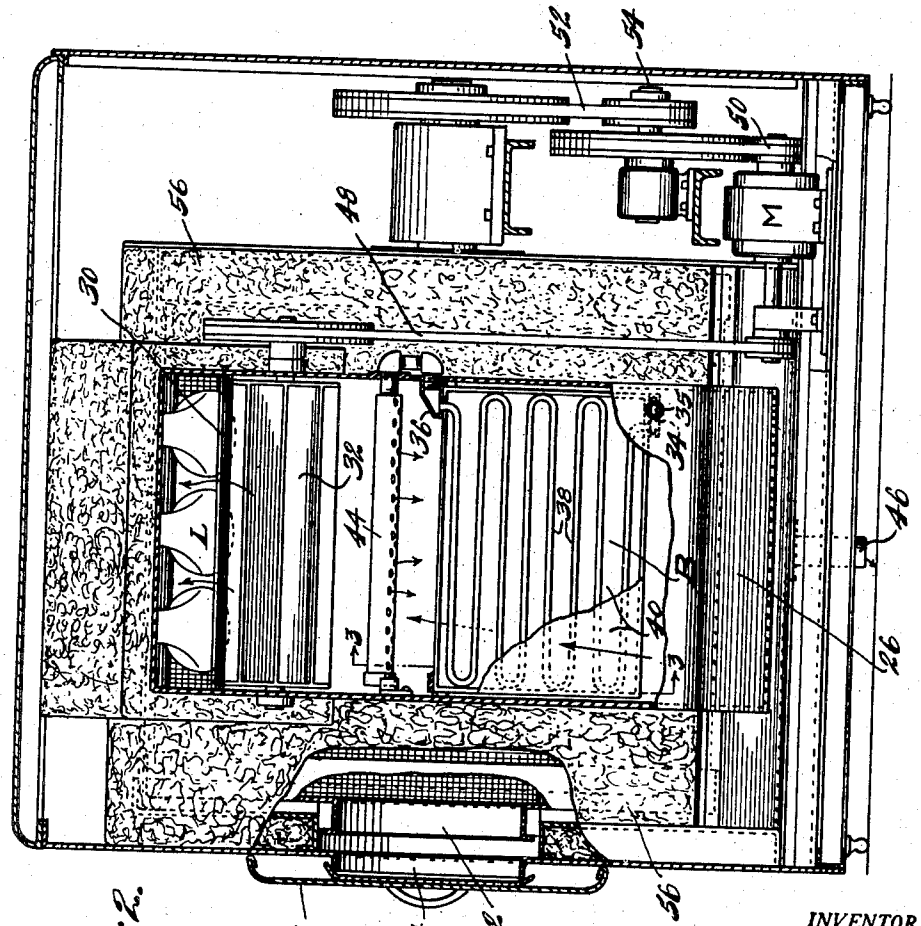


Fig. 2.

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CLOTHES DRIER

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Application December 13, 1944, Serial No. 567,923

1 Claim. (Cl. 34—60)

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My present invention relates to a clothes drier which uses radiant heat such as that furnished by near infra-red ray lamps as a means to evaporate moisture quickly from the clothes being dried therein, and contemplates the circulation of the air in the housing of the clothes drier with its passage across cooled plates for removing the moisture from the air, the plates being sprayed with water so that any lint from the air will collect thereon and be washed from the plates by the spray of water.

One object of the invention is to provide a clothes drier of this character which is inexpensive to manufacture and economical to operate, yet which dries clothes fast enough that successive batches from a domestic washing machine can be introduced and removed therefrom as fast as the machine will wash them with assurance that the clothes are thoroughly dried without wrinkles and that the moisture from the air is not discharged into the room, thereby making it uncomfortably humid.

Another object is to provide a clothes drier in which the air is recirculated and its moisture content reduced, so that it can effectively dry the clothing, by means of cold water coils for condensing the water out of the air and causing it to collect as on plates in the air stream from which the moisture drips and finds its way to a drain, and on which plates lint may collect and be washed therefrom by a spray of water at the discharge from the coils.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my clothes drier whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawings, wherein:

Figure 1 is a front elevation partly in section of a clothes drier embodying my present invention.

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1 with a portion of the left side broken away and sectioned at the center of the drying drum.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 2 showing details of the cold plate assembly in the air circulating duct; and

Figure 4 is a diagrammatic view of a modified form of my invention.

On the accompanying drawings I have used the reference numeral 10 to indicate an outer housing within which my clothes drier mechanism is located. The drying mechanism includes a drum

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D having a perforate cylindrical wall and a collar-like opening 12 at one end thereof. This collar registers with a stationary collar 14 on the housing 10 which is normally closed as by a door 16. The door may be opened for introducing clothes into the drum D through the collars 14 and 12.

The drum D has a series of axially extending ribs 18 for the purpose of tumbling the clothing within the drum as it rotates in the direction of the arrow A in Figure 1. This positions the clothes approximately at the dotted line indicated at C opposite a reflector 20. Within the reflector 20 several so-called "infra-red ray" lamps L are positioned and the radiant rays therefrom dry out the clothing C.

The foregoing construction is substantially similar to that shown in my Patent No. 2,434,886, issued January 20, 1948. In addition to the disclosure in that application I provide the following described mechanism for recirculating the air within the housing 10 and removing moisture and lint therefrom, whereas in said co-pending application the moist air was discharged to atmosphere.

The drum D is enclosed within a housing 22 communicating with the reflector 20 and having a depressed portion 24. An upwardly inclined passageway 26 leads from the depressed portion 24 to a vertical conduit 28 which conduit at its upper end has a discharge portion 30 into the reflector 20. The air may be circulated through the drum D and its casing 22 and the elements 24, 26, 28, 30 and 20 by any suitable means such as a blower illustrated at 32. The direction of air circulating is such that the hot moisture-laden air dropping into the depression 24 passes upwardly through the conduit 28.

The conduit 28 has therein a cooling plate assembly B consisting of a lower manifold 34, an upper manifold 36, a plurality of coils 38 connecting the two together and plates 40 on opposite surfaces of the coils 38. Cold water such as that supplied from a city water supply system is introduced into the manifold 34 under control of a suitable valve 42 and flows upwardly through the coils thereby chilling the plates 40 and enters the manifold 36. Connected with the manifold 36 is a spray pipe 44 located above the plates 40 for spraying them with the water after it passes through the coils, thus keeping them wet for the purpose of washing any moisture therefrom which condenses thereon from the air passing upwardly between the plates and for collecting any lint which is then washed down by the spray of water dropping off the lower ends of the plates

and passing down the passageway **26** into the depression **24** and from there through a spout **46** to a drain point such as a sewer.

For operating the blower **32** as well as the drum D, a motor M is provided which may be directly belted to the blower by a belt **48**, see Figure 2, and connected with the drum D by a pair of belts **50** and **52** through a counter-shaft **54** for slowing down the rotation of the drum.

The foregoing described clothes drier removes moisture from the circulating air, using the principle of reducing the moisture carrying capacity of saturated air at high temperature by reducing the air temperature. The relatively cool plates **40** effect a condensation of the moisture out of the air and at the same time cool the air so that it issues from the tops of the plates with its moisture content substantially reduced and then passes over the lamps L to both cool them and collect heat from them to be used in assisting in the drying of the clothes C. The air is further heated by the clothing itself as it is heated by the radiant heat from the lamps and the radiant heat effects a relatively quick evaporation of the moisture from the clothing, which moisture is taken up by the circulating air and carried to the plates **40** where the operating cycle begins to repeat.

The air passing the moist plates will deposit any lint on the plates that is carried by the air, and the lint is immediately washed down by the sprayed water from the spray pipe **44** and is disposed of through the drain. The re-circulating air eliminates the necessity for discharging the humid air into the room or providing some sort of connection to a chimney or flue.

The extraction of the moisture is economically accomplished by the use of the cooling coils **38** and spray pipe **44** which need not use a prohibitive amount of water to accomplish the desired results. The apparatus produces dry clothing in a relatively short time and eliminates the operations of hanging up the clothing to dry otherwise and then taking it down again after it is dry. At the same time the apparatus occupies a minimum of space and eliminates the necessity of having to provide a drying room or hanging the clothes outdoors.

The housing **22** and the reflector **20** are preferably surrounded by insulating material indicated generally at **56** so as to secure maximum efficiency by preventing the loss of heat from the apparatus that, when retained, can be used for more quickly drying the clothing. I have also found that the use of infra-red ray lamps is much more economical than electrical heaters for the purpose of drying the clothing.

The modified form of my invention shown in Figure 4 differs from the form already described in that a separate nozzle **45** is mounted upstream from the condenser B rather than downstream therefrom. Thus the air is washed and the lint removed therefrom before it passes through the condenser, serving to further cool the air and precipitate the lint out in the mist. This prevents the lint from contacting the condenser as the spray checks the flow of lint and returns it to the drain **24** before the air passes to the condenser.

The modification also shows a heater bulb H of the type having a cone or other shape of ceramic

core around which a resistance wire is wound. This provides a source of radiated heat, with the reflector **20** reflecting the radiated heat in place of the infra-red type of lamp L shown in Figure 1.

A change of the kind disclosed in Figure 4 and others, as well, may be made, and the arrangement of the parts of my clothes drier may be changed without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claim any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope without sacrificing any of the advantages thereof.

I claim as my invention:

In a clothes drier, a casing having a clothes-receiving opening in the front thereof, a drum rotatable in said casing and having a clothes-receiving opening registering with the clothes-receiving opening of said casing, means for rotating said drum and for effecting circulation of air within said casing, said drum being perforated to permit such circulation of air, a source of radiant heat comprising infra-red ray lamps within said casing and in such position outside said drum that rays therefrom pass into the drum to dry clothes being tumbled therein to evaporate the moisture therefrom, means for directing said circulating air over said source of radiant heat, cooling surfaces in the path of said circulating air exteriorly of said drum, means for cooling said surfaces to remove moisture from said circulating air and means for wetting said surfaces to remove lint from said circulating air and for washing the lint so removed from said surfaces.

MERLIN L. PUGH.

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