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[54] **RAPID-ACTING WATER VAPOR CONDENSER**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **62/272,** 62/55.5, 62/93, 62/317, 62/424, 62/459, 62/464
[51] **Int. Cl.** **F25d 21/00**
[50] **Field of Search** 62/424, 93, 317, 318, 459, 464, 55.5

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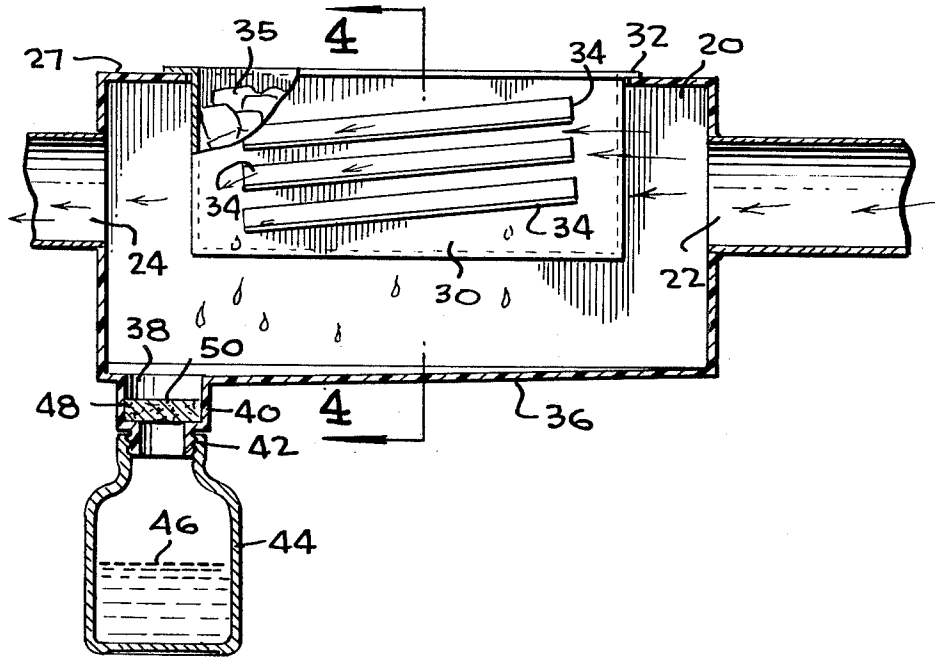
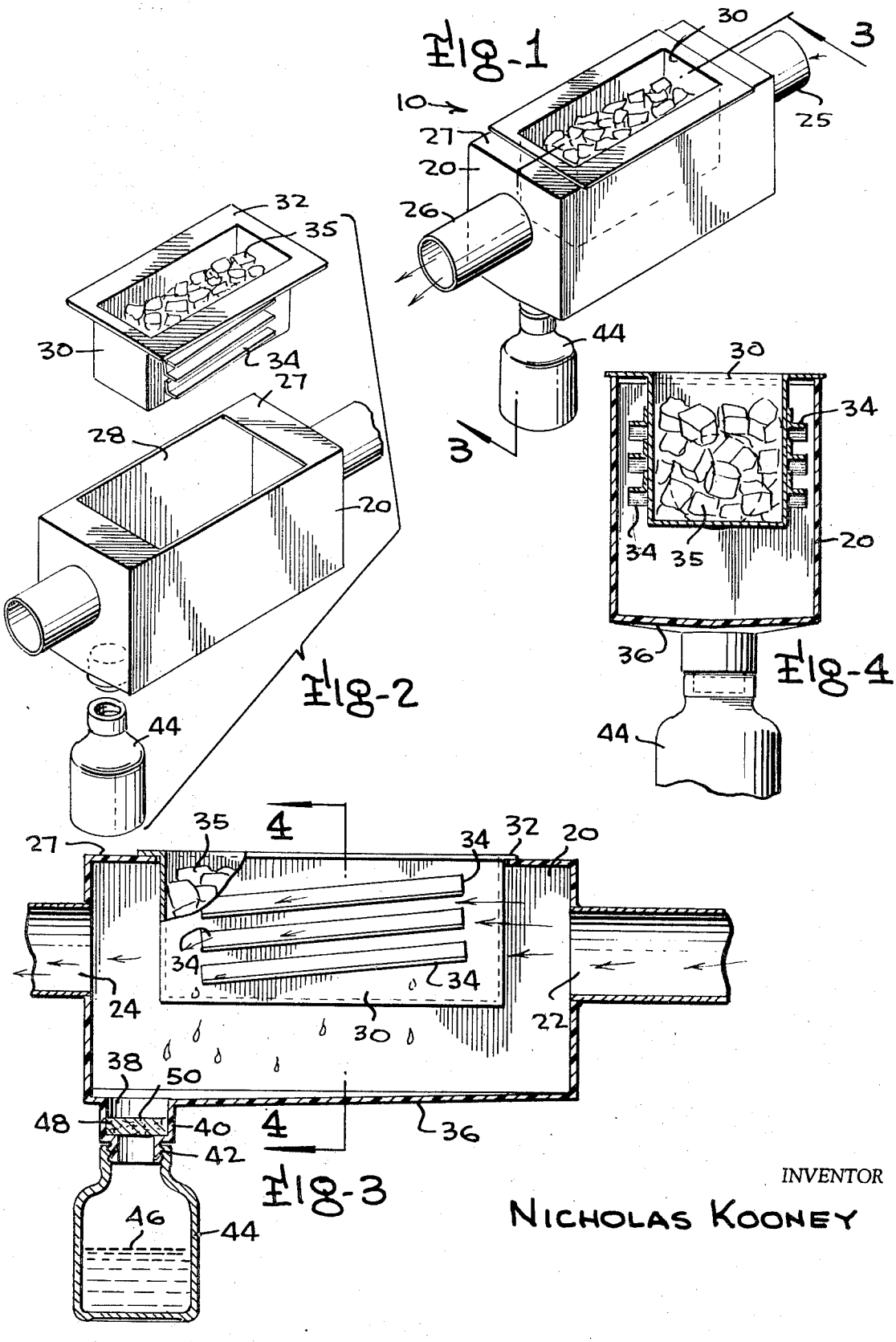
ABSTRACT: A water vapor condenser for use with a home laundry clothes dryer including means providing a hollow primary chamber receiving the exhaust flow from the dryer and having a thin-walled chilling unit insertable in the chamber for condensing water vapor with the chill unit including a hollow interior for retaining a quantity of ice or other cooling medium and with a filter being provided in a drain from the primary chamber for filtering lint or other particles from the condensed water vapor as it is drained into a receptacle attachable to the drain.





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RAPID-ACTING WATER VAPOR CONDENSER

BACKGROUND OF THE INVENTION

This invention is in the field of home laundry equipment and is specifically directed to a water vapor condensing means for condensing water vapor from the outlet of a clothes dryer for subsequent use in steam irons or for any other purpose requiring pure water.

While condensers have long been associated with clothes dryers for condensing either cleaning fluid or water from the exhaust as clothes are being dried, such devices have, in the past, been directed to commercial-type operations for the most part and have not been readily adaptable for use in the laundry facilities of the type normally found in private dwellings. This is true because of the complexity of many of the units of this type which are, in and of themselves, complex in nature and integrated into the other components of the system. Moreover, many of the prior known devices of this sort have required the addition of waterlines and drain lines for providing a flow of cooling fluid to and through the system.

However, a number of the prior known devices have not employed any flow of cooling medium in order to avoid the complexities and costs of the plumbing required for such and have relied solely upon the cooling effect of the environmental air surrounding the condenser means for condensing vapor from the exhaust. While devices of this sort have been cheaper to install and maintain than the condensers employing a separate cooling liquid flowing through the condenser, they have suffered from inadequate efficiency due to the fact that the environmental air is oftentimes at a high temperature and there is consequently only a limited temperature differential between the environmental air and the exhaust from the dryer. This being the case, much of the water vapor in the exhaust is not condensed and is consequently discharged to the atmosphere.

The discharge of water-laden air into the closed surroundings of a laundry room or basement in which the dryer is located can create high humidity conditions resulting in consequential damage to other items in the room. For this reason, it has been the normal practice in most instances to connect such dryers to an exhaust outlet exhausting exteriorly of the building in which the dryer is located. However, the provision of such exterior exhaust outlets can be quite expensive particularly in situations in which the dryer cannot be located closely adjacent the exhaust outlet. In such cases it is necessary to provide extensive and expensive conduits for providing such an exhaust; not only are such systems expensive in and of themselves, they also create a certain amount of back pressure in the dryer to consequently result in a loss of efficiency in exhausting the air and water vapor mixture from the dryer.

None of the prior known condensers means have provided condensed liquid of sufficient purity to enable usage of such in a steam iron. This is true because the distillate from the prior devices has always included the lint, threads, and other particles inherently carried by the exhaust from the dryer and none of the prior known devices have provided any means for removal of the lint from the condensed vapor.

SUMMARY OF THE INVENTION

Therefore, it is the primary object of this invention to provide a new and improved rapidly operating water vapor condensing means for use with a home laundry clothes dryer.

Obtainment of the object of this invention is enabled through the provision of a condenser means in which a hollow primary chamber is provided and which has an inlet opening and an outlet opening through which exhaust from a clothes dryer is directed. A chill unit in the form of a hollow member containing ice or other chilling medium on its interior is insertable through a wall in the primary chamber so that the exhaust air flowing against and engaging the chill unit is rapidly cooled to condense the water vapor from the exhaust air. The chill unit is additionally provided with a plurality of exterior fins which provide additional cooling of the exhaust gas flowing past the unit. Ice cubes or a mixture of ice and water are contained in the chilling unit and constitute the cooling medium. The chilling unit is formed of thin walls for optimum heat flow and is easily removable from the primary chamber simply by lifting the unit upwardly therefrom.

The primary chamber is slanted downwardly toward one end and has an outlet in its floor to which a drain is connected. The drain is in the form of a threaded nipple which contains a disc-type filter on its interior and which receives a bottle threaded to its external end. Consequently, water vapor condensed from the exhaust air drains through the filter to remove the lint and other solid particle content thereof and is then drained in pure form into the storage bottle.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the preferred embodiment of the invention illustrating the manner of operation thereof;

FIG. 2 is an exploded perspective view illustrating the respective primary components of the preferred embodiment;

FIG. 3 is a sectional view taken along line 3–3 of FIG. 1; and

FIG. 4 is a sectional view taken along lines 4–4 of FIG. 3 with portions removed for clarity.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Attention is initially invited to FIG. 1 of the drawings which illustrates a preferred embodiment which is generally designated 10 and which is illustrated alone without association with the dryer with which it is to be connected. The drying connection is not shown since such could be in a variety of locations depending upon the environmental circumstances in which the nature of the particular dryer and the device is being used. For example, in some circumstances it might be desirable to attach the preferred embodiment to the rear of the clothes dryer while, in other circumstances, such attachment might be impossible and it might be necessary to attach the device to a conduit connected to the clothes dryer.

In any event, the preferred embodiment 10 consists of three primary components. The main component 20 defines a hollow primary exhaust flow through chamber which is in the form of a rectangular boxlike container formed of metal, plastic or other suitable material. An inlet opening 22 is provided in the chamber for connection to the exhaust from a clothes dryer and an exhaust opening 24 is provided on the other end wall of the flow through chamber so that the exhaust from the clothes dryer enters the chamber by means of inlet opening 22 from an input duct 25 and flows through the chamber to exhaust outwardly through the exhaust opening 24 and an output duct 26.

The top of the hollow primary member 20 includes an upper surface 27 having an opening 28 for receiving a removable thin-walled chill unit container 30 insertable through opening 28 so as to be substantially completely inserted within the interior of the chamber defined by member 20. The thin-walled chill unit container 30 is formed of thin plastic or metal which has a high thermal conductivity. It should be noted that the container 30 is in the form of an elongated rectangular open-topped container and is provided with a transversely extending peripheral flange 32 extending entirely about its top opening.

Additionally, inclined cooling fins 34 extend outwardly from each of the sidewalls of the thin-walled container 30 for providing additional cooling surface upon which the exhaust from the clothes dryer impinges. A cooling medium in the form of ice cubes 35 or other suitable liquid or solid substances is contained within the interior of container 30 so that the moisture laden exhaust impinging on the exterior of container 30 is rapidly cooled. Consequently, water vapor within the exhaust is condensed from the exhaust and deposited upon the base or floor 36 of the primary chamber defining member 20.

It should be noted that the base of the floor 36 is inclined downwardly from right to left as illustrated in FIG. 3 so that

the water condensed from the exhaust tends to flow through the lowermost portion of the floor portion **36**. An outlet drain opening **38** is provided on the lower end of the floor **36** for enabling removal of the condensed water.

A drain tube in the form of a nipple **40** extends outwardly from opening **38** and is provided with threads **42** on its exterior end over which a plastic or other suitable bottle or container **44** is connected for receiving the water **46** drained from the primary member **20** as shown in FIG. **3**. It should be noted that the nipple **40** includes a peripheral shoulder **48** which provides support for a disc **50** of filtering material. The disc **50** serves to filter lint from the condensed water so that the water received within the container **44** is immediately usable in steam irons or for any other purpose requiring pure uncontaminated water.

While the preferred embodiment of this invention has been shown in the form of generally rectangular members **20** and **30**, it should be understood that the invention could be practiced by the employment of members shaped in a different manner, such as, for example, circular or oblong elements. Moreover, it should also be understood that while the container **44** is illustrated with threads on the interior of its neck portion, for engagement with the threads **42** on the end of the nipple **40**, the position of the threads could be reversed with the threads on the bottle being on the exterior and the threads on the nipple being on the interior. These and other modifications will be apparent to those skilled in the art.

I claim:

1. A condenser for rapidly condensing water vapor from the exhaust from a clothes dryer, said condenser comprising means providing an exhaust flow through chamber having an inlet and an outlet for said exhaust and an upper wall with an aperture into which a removable thin-walled container with a chilling medium within its interior is matingly insertable into said flow through chamber and having condensing fins extending from its exterior for providing additional vapor condensing surface so that said exhaust passing through said chamber impinges on the exterior of said container and said fins and water vapor in said exhaust is condensed to liquid form and means for enabling removal of said condensed water vapor including filtering means for removing lint from said condensed water prior to its removal wherein said thin-walled container is open at the top for enabling easy replacement of said chilling medium therein and includes a peripheral flange extending outwardly from the top of said container for engaging the top wall of said flow through chamber for supporting said container within said flow through chamber and wherein said flow through chamber includes an inclined floor portion and said means for enabling removal of said condensed water comprises a hollow tubular nipple extending from the lowermost end of said floor portion and having an inwardly extending radial flange on its interior with said filtering means comprising a water of porous material received within the upper end of said nipple and resting on said inwardly extending radial flange.

2. The invention of claim **1** wherein said flow through chamber is a generally rectangular boxlike construction with said inlet and outlet being in opposite end walls thereof.

3. The invention of claim **2** wherein said nipple is threaded on its outer end for enabling attachment of a bottle container thereto and said thin-walled container is a generally rectangular boxlike container.