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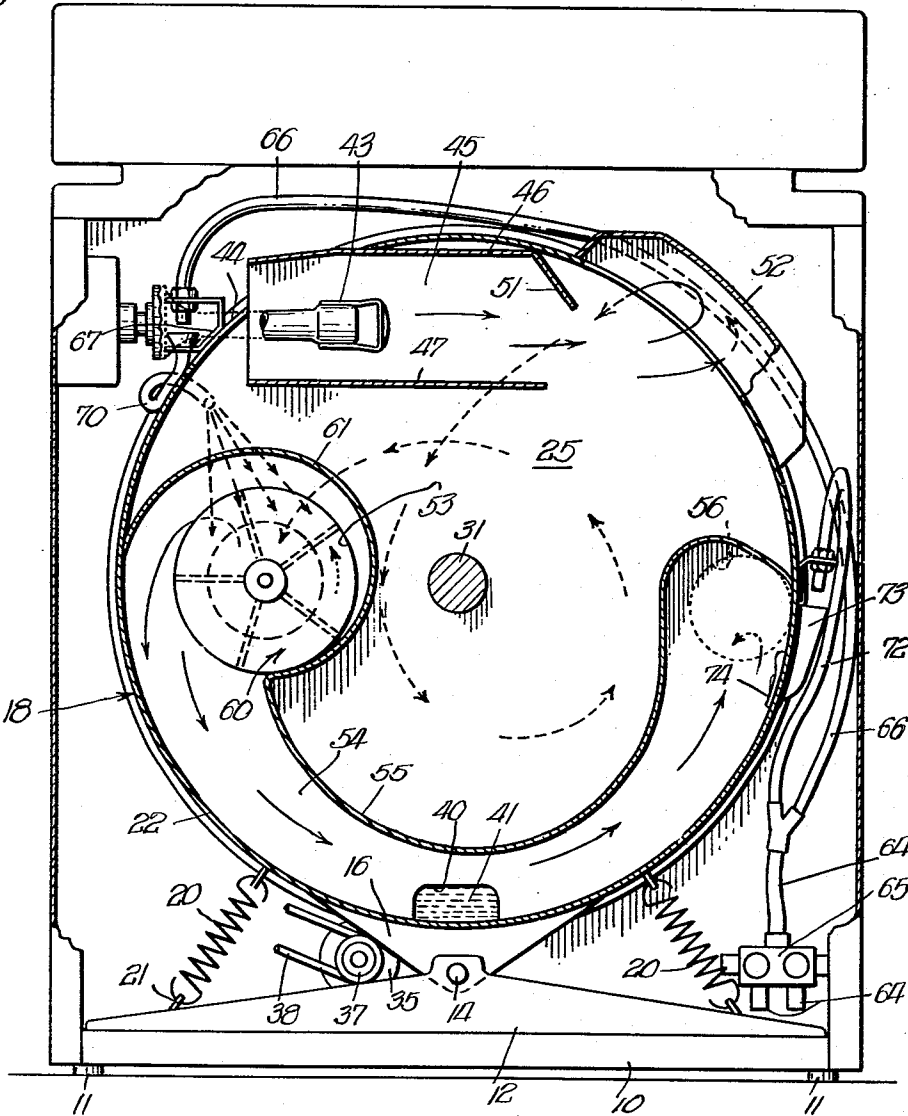
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LINT EXTRACTOR FOR WASHER-DRIER

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3 Sheets-Sheet 2

Fig. 2.



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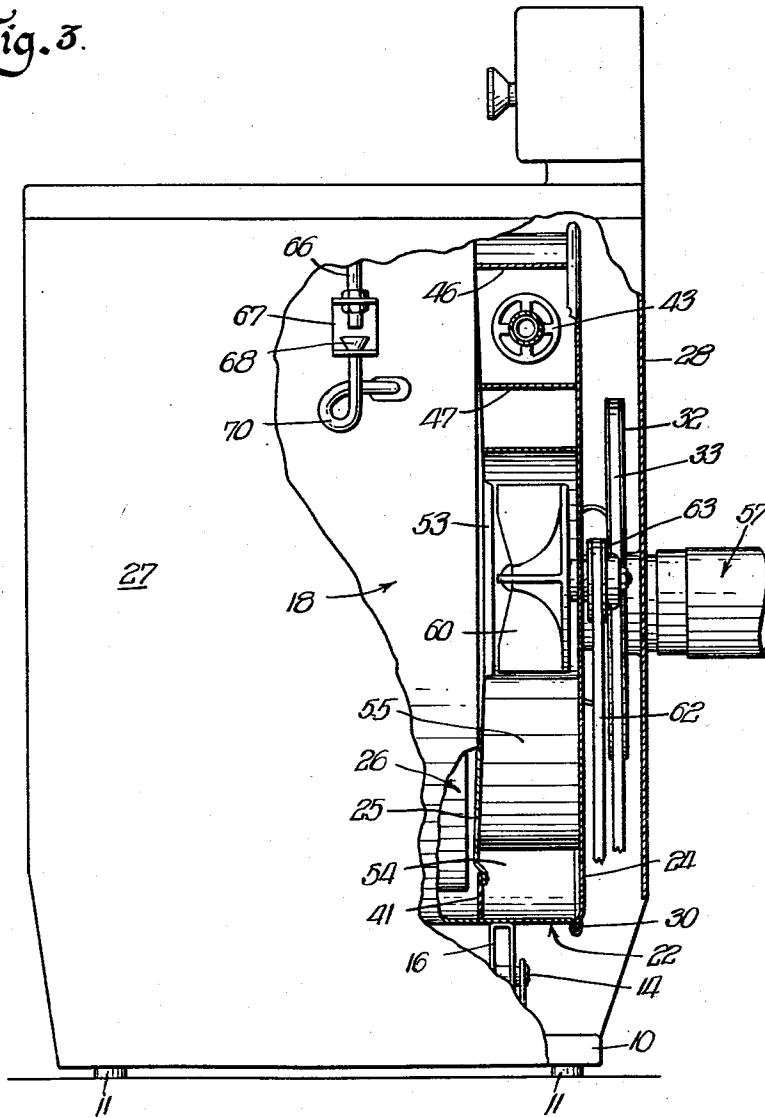
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Fig. 3.



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LINT EXTRACTOR FOR WASHER-DRIER

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 2 Claims. (Cl. 34-79)

The invention relates to a combination clothes washing and drying unit, and has reference in particular to a method and apparatus for extracting lint from the air stream during its travel within the back air flow passage of the unit and before the air is discharged from the exhaust opening.

The improvements of the invention have application to the vent type of washer-drier unit wherein an approximately semi-circular air flow passage is provided between the back walls of the unit and which passage conducts the air withdrawn from the washing and drying chamber to the exhaust opening. The air flow passage is located within the tub and the same is formed by duct work such as may include the cylindrical wall of the tub. During the drying operation moisture laden warm air is withdrawn from the drying chamber and caused to flow through the air flow passage on its way to the exhaust opening and the ambient atmosphere.

The lint particles entrained with the air stream are concentrated somewhat by the cross sectional area of the passage, and which produces an increase in the velocity of flow. Also since the arcuate curvature of the air flow passage accentuates the centrifugal forces in the region of the velocity increase, it is possible to collect and extract the lint particles from the air stream by a wetting of the walls of said passage.

Accordingly the present invention has for its main objective the provision of a method and apparatus for extracting and collecting lint particles from the air stream within the back air flow passage of a combination unit. Thus, when the air is discharged to the atmosphere, not only have some of the moisture vapors been removed, but the air is also substantially clean and free of lint.

Another and more specific object of the invention resides in the removal of lint from the air prior to its discharge from a combination washer-drier and during the drying cycle thereof by a wetting of the walls of the air passage enclosing the air stream. The invention further contemplates that the lint collecting action of the wet surfaces will be facilitated by the centrifugal forces acting on the lint particles which will cause the particles to contact the wet surfaces before reaching the exhaust opening.

A further object of the invention resides in the provision of a flapper valve on the water inlet to the air flow passage for preventing a back flow of the suds, soapy water, and the like into the inlet connection.

With these and various other objects in view the invention may consist of certain novel features of construction and operation, as will be more fully described and particularly pointed out in the specification, drawings and claims appended thereto.

In the drawings which illustrate an embodiment of the device and wherein like reference characters are used to designate like parts—

FIGURE 1 is a left side elevational view of a washer-drier unit of a type such as may incorporate the improvement of the invention, certain walls of the unit being broken away to show the interior elements;

FIGURE 2 is a vertical sectional view taken on line 2—2 of FIGURE 1, illustrating the character of air flow passage for extracting and collecting lint according to the present invention; and

FIGURE 3 is an elevational view of the right hand side

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of the combination washer-drier unit as shown in FIGURE 1, certain walls also being broken away to show the interior structure.

For illustrating the invention a combination washer-drier has been selected of the type having an arcuate air flow passage connecting the air circulating fan with the exhaust opening of the unit. In FIGURE 2 the substantially flat surfaced base 10 mounted on legs 11 has a pair of channel members such as 12 welded or otherwise secured in spaced relation thereto to form two major supports for the tub and for the enclosed clothes drum rotatably supported by the tub. The apex of each channel member mounts a pivot pin 14 and which is journaled by means of the tubular bearing sleeve 15. Accordingly the structure provides a pivotal support for the tub brackets 16, the said brackets being welded or fixed in any suitable manner to the tub which is generally designated by the numeral 13. The pivoting of the tub on the channel members 12 by means of the pivot pins 14 permits the tub to oscillate back and forth in an arcuate movement in response to various forces generated within the tub during operations of the washer-drier unit.

The tub 13 is maintained in an upright position on the pivot pins 14 by the two centering springs 20 connected between the tub 13 and the base 10 by means of anchor brackets such as 21. Also, means may be provided in the form of a damper pad and a damper leaf spring, not shown, for absorbing and dissipating the energy imparted to the tub. For a better understanding of this structure and for a more complete description of a vent type washer-drier unit, reference is made to the copending application of Arthur D. Sexton, Serial No. 84,159, filed January 23, 1961, and entitled "Gas-Fired Combination Washer-Drier."

The tub 13 includes a generally cylindrical side wall 22, a pair of spaced rear walls 24 and 25, and a front wall, not shown, at the front end of the tub which includes an opening by means of which the clothes are deposited in the rotating clothes drum 26 of the unit.

The tub 13 is enclosed within the substantially rectangular cabinet generally designated by the numeral 27 and having a rear wall 28. The front wall of the cabinet is also provided within an opening in alignment with the opening in the tub, and said opening is closed by the conventional door having a glass window.

The rear wall 24 and the front wall of the tub are respectively connected to the cylindrical wall 22 by means of an encompassing flanged loop-like member 30. The intermediate wall 25 is suitably welded to the cylindrical side wall 22, and it will be understood that the spaced walls 24 and 25 support the bearing assembly which journals the drive shaft 31, FIGURE 2. Said shaft extends rearwardly of wall 24 and also forwardly of wall 25. The rear extending portion of the drive shaft 31 has the drive pulley 32 fixed thereto and the endless belt 33 passes around the pulley for rotating the same and the shaft. The forwardly extending end of the drive shaft has the perforated clothes drum 26 suitably fixed thereto and accordingly the drum is adapted to rotate within the tumbler chamber of the tub. For the illustrated embodiment, transmission mechanism of the solenoid operated type is provided, and which when energized produces rotation of the drum at a speed of approximately three hundred revolutions per minute. When deenergized the clothes drum is caused to revolve at a speed of approximately fifty revolutions per minute.

The drum 13 is formed to provide a lower recessed portion 34 which forms a sump for the tub, the same communicating with the drain pump 35. The drain pump is driven by the same electric motor which rotates the clothes drum 26, and for this purpose the pulley 37 and endless belt 38 are provided. It is necessary to provide a

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valve, not shown, for the drain pump 35 in order to retain the water within the tub during the washing and rinsing operations of the combination unit.

It will be observed that the sump 34 is positioned between the intermediate wall 25 and the front wall of the tub. Accordingly a drain aperture 40 is provided in wall 25 to enable the liquids from the air flow passage to pass into the tumbler chamber of the unit for eventual discharge by the drain pump 35. A flapper type of check valve such as 41 may be associated with the aperture 40 for the purpose of preventing back flow of suds, scapy water and the like from the tumbler chamber into the air flow passage. The valve member 41 has opening movement in a direction towards the tumbler chamber so that any liquids accumulating in the air flow passage will be able to flow into the tumbler chamber for discharge as described.

Mounted on the back wall 23 of the cabinet 27 is a gas burner assembly having a part 43 projecting through an opening 44 in the cylindrical wall 22, the said burner extending through said opening and into the combustion chamber designated in its entirety by numeral 45. Said chamber has the general configuration of a rectangular box with top and bottom walls 46 and 47, and with open ends as shown. The baffle 51 located at the right hand end deflects the flame from the tub wall in the event it should traverse the length of the chamber. A conduit 52 mounted on the tub 13 conducts the heated air from the combustion chamber 45 to the rotatable clothes drum 26. The path of air flow in the combination unit as herein disclosed is from the atmosphere through opening 44 in the tub wall 22, to the combustion chamber 45, through the conduit 52, and into the perforated clothes drum 26. After traversing and contacting the clothes within the drum 26, the air is removed through an opening 53 in the intermediate wall 25 and the air is then forced through the air flow passage 54 formed by duct work including the cylindrical wall 22, the spaced walls 24 and 25, and the top arcuate wall 55. From the air flow passage the air is discharged through the exhaust opening 56 located in the rear wall 24. As best shown in FIGURE 1, telescoping pipe structure 57 may be associated with exhaust opening 56 for conducting the warm air from the drying chamber to the atmosphere.

The opening 53 in wall 25 has associated therewith an air circulating fan 60 of the impeller type. The fan is located within the air flow passage 54 and the wall 55 of the duct work is extended to form a housing for the impeller. Accordingly the housing is produced by cooperation of the rear walls 24, 25 and by the imperforate scroll-shaped side wall 61. The impeller housing connecting with the duct work provides a passage from the impeller 60 to the outlet 56. The scroll-shaped housing 61, and the duct work, including wall 55, bridges the space between the rear walls 24 and 25. Since the outer wall 22 of the duct work is circular, wall 55 is also circular, being substantially concentric thereto and thus the passage 54 is approximately semi-circular, having an entrance opening for the air stream at 53 on one side of the drive shaft 31, whereas the outlet opening 56 for the air flow passage is located on the opposite side of the drive shaft. The fan 60 is suitably driven by the continuous belt 62 which passes around the pulley 63 on the journalling shaft of the fan.

Water for the washing and rinsing operations is supplied by one or more flexible conduits which may discharge into the tumbler chamber or into the air flow passage 54. The hot and cold water supply conduits 64 connect with a control valve 65 of the solenoid actuated type. From 64 a hose 66 conducts water to a location on cylindrical wall 22 designated by the numeral 67, FIGURE 3, and from the hose 66 the water is delivered into cup 68. A hose 70 conducts the water from the cup and delivers the same for discharge against impeller 60. This water

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upon discharging against the rotating blades of the impeller 60 is broken up into relatively fine moisture particles which will wash down the entrance side of passage 54. The water directed against cylindrical wall 22 in the vicinity of the impeller 60 will flow downwardly toward the aperture 40 located at a low point in the air flow passage.

The invention also contemplates that the inside surface of cylindrical wall 22 in the vicinity of the exhaust opening 56 shall be maintained in a wet condition for the extraction of lint and the like during the drying operation, and accordingly a second flexible hose 72 is joined to 64 by means of the Y connection and the hose 72 delivers water to the cup 73. The said cup is located on the interior surface of wall 22 in alignment with the air flow passage. Thus water delivered to the cup 73 at a relatively low rate is discharged within the air flow passage to maintain the inside surface of wall 22 and also the side walls 24 and 25 in the vicinity of this said inlet connection in a wet condition during the drying operation. The flow rate is substantially increased at the beginning of the washing cycle when the tumbler chamber is being filled with wash water. This increased rate of flow into cup 73 serves to wash down the walls of the air flow passage free of accumulated lint. In order to prevent back flow of water from the air flow passage into cup 73, the inlet connection is provided with a rubber flapper valve such as 74.

From the foregoing it will be appreciated that the extraction and collection of lint particles as regards a washer-drier unit is effectively accomplished by the present improvement and in a manner which employs the centrifugal forces resulting from the semi-circular contour of the air flow passage. The lint collected within the said passage can be washed off during the washing cycle by either discharging the wash water against the surfaces or by the use of a diverter valve which would allow the pump to flush the surfaces.

The invention is not to be limited to or by details of construction of the particular embodiment thereof illustrated by the drawings, as various other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

What is claimed is:

1. In a machine for washing and drying fabrics during washing and drying operations; a generally cylindrical tub including a cylindrical shell, a front wall and spaced inner and outer rear walls, whereby said tub provides a tumbler chamber between said front wall and said inner rear wall, and provides a back chamber between said rear walls; a rotatable perforate drum positioned in said tumbler chamber for receiving and tumbling fabrics during the washing and drying operations; an impeller member located between said spaced rear walls and having a suction side communicating with said tumbler chamber through an intake opening in said inner rear wall; an exhaust conduit spaced from said intake opening and connecting the ambient atmosphere with said back chamber through an opening in said outer rear wall; duct work including said spaced rear walls and said cylindrical shell of said tub providing a semi-circular air flow passage extending downwardly from the pressure side of said impeller member to the bottom portion of said cylindrical shell and thence upwardly to said exhaust opening to direct the air discharged from said impeller to the ambient temperature; an air inlet opening in said cylindrical shell between said inner and outer rear walls and separated from said intake and exhaust openings by said duct work; heating means extending into said air inlet opening to heat ambient air entering said air inlet opening; heater conduit between said tumbler chamber and said back chamber; heater duct work including said spaced rear walls and said cylindrical shell connecting said air inlet opening

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with said heater conduit; and means for extracting lint particles from the air stream during flow through said semi-circular passage to the ambient atmosphere during said drying operation, said means including water supply means having an inlet connection to said back chamber juxtaposed to said air exhaust opening and operative to discharge water downwardly counter to the exhaust air flow and against the inside surface of said cylindrical wall in said semi-circular air flow passage to maintain the same in a wet condition during a drying operation.

2. Laundry apparatus as defined by claim 1, and said means for extracting lint particles further including means for washing said lint from said cylindrical wall by in-

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creased flow from said water supply means in a subsequent washing operation.

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