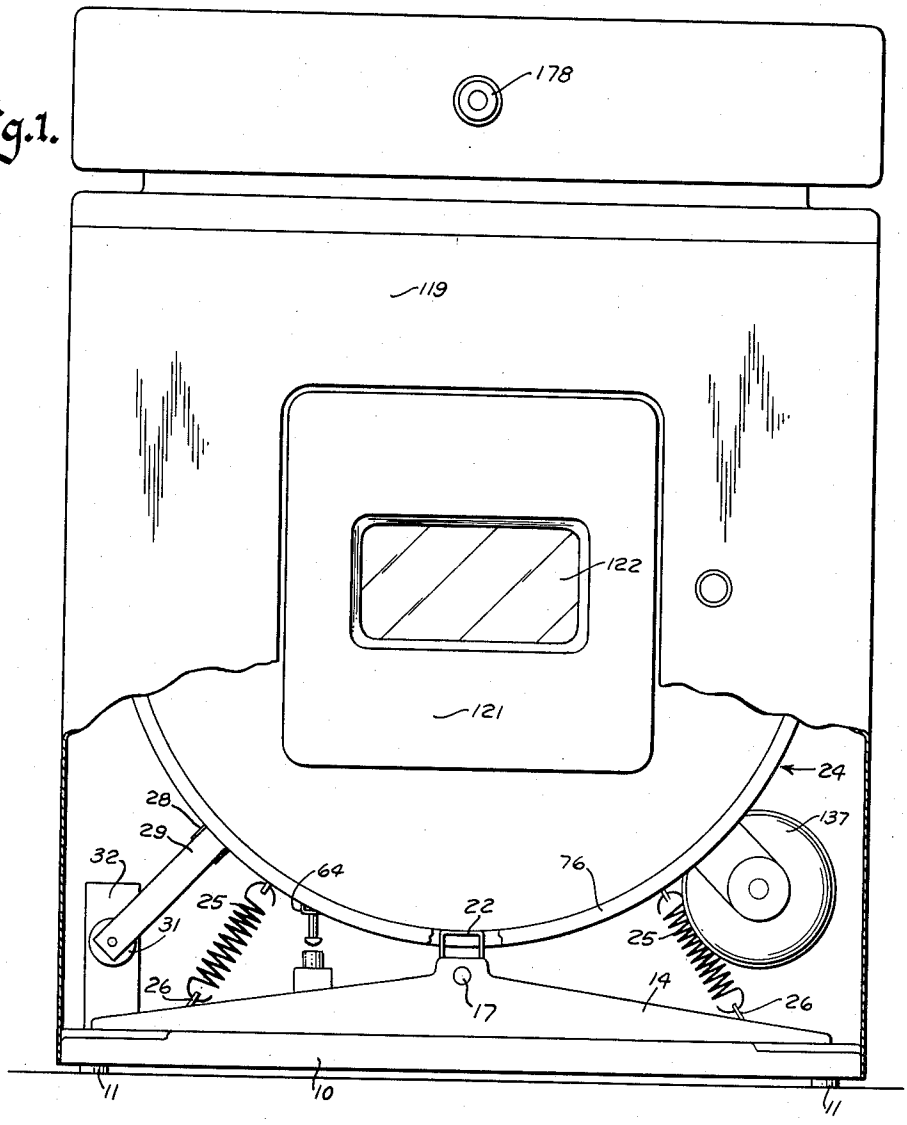
June 26, 1962 J. C. MELLINGER ET AL 3,040,440

WASHER-DRIER CONDENSER SYSTEM

Filed Dec. 6, 1957

4 Sheets-Sheet 1

Fig. 1.



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WASHER-DRIER CONDENSER SYSTEM

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Fig. 3.

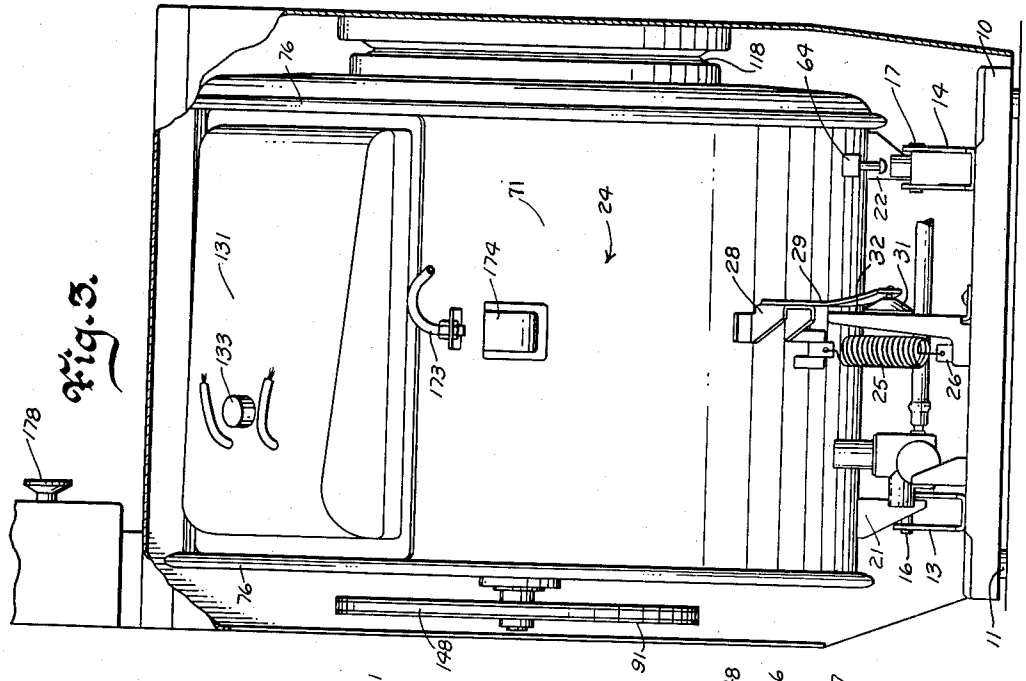
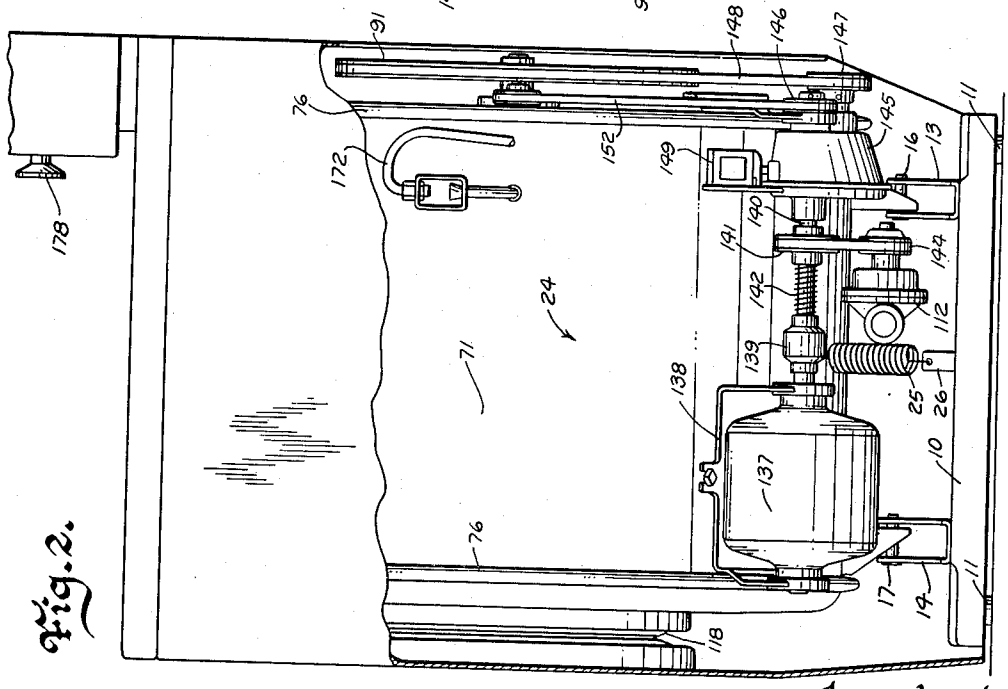


Fig. 2.



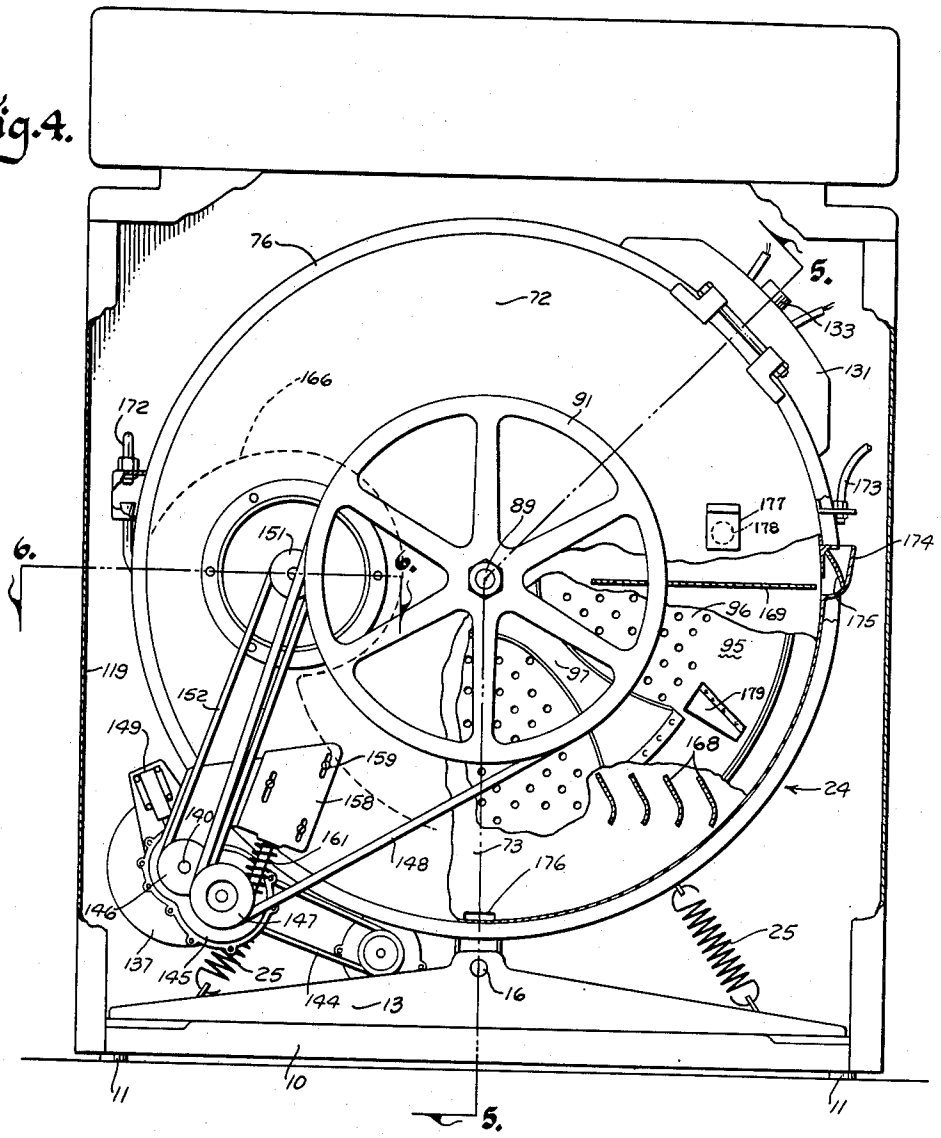
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WASHER-DRIER CONDENSER SYSTEM

Filed Dec. 6, 1957 4 Sheets-Sheet 3

Fig. 4.



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June 26, 1962 J. C. MELLINGER ET AL 3,040,440

WASHER-DRIER CONDENSER SYSTEM

Filed Dec. 6, 1957 4 Sheets-Sheet 4

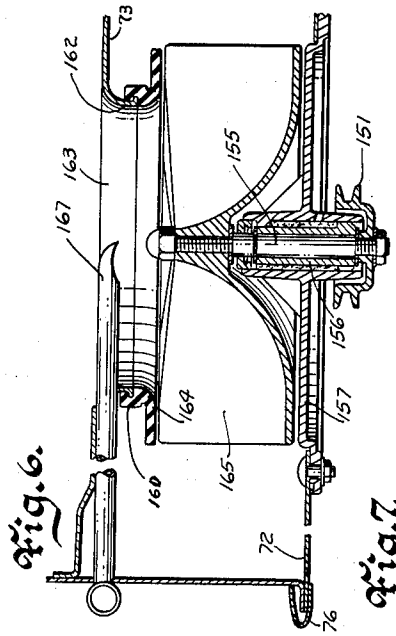


Fig. 6.

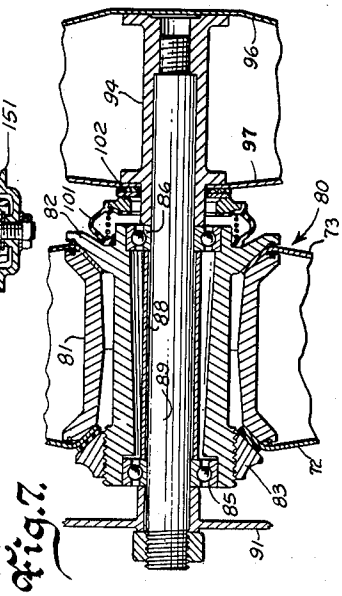


Fig. 7.

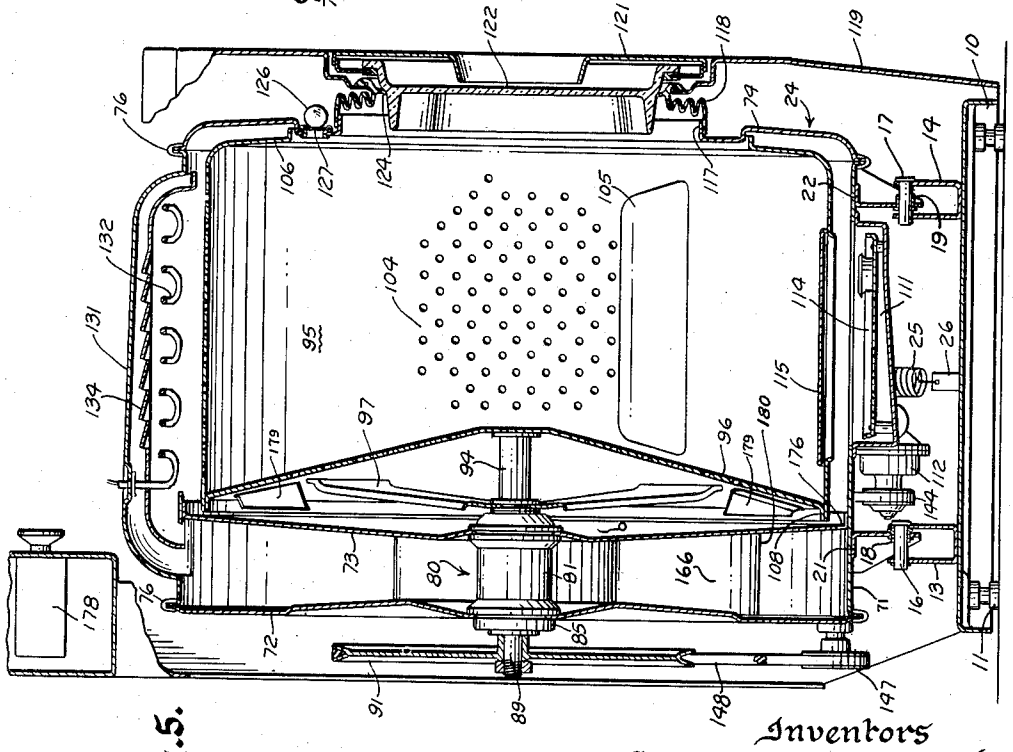


Fig. 5.

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United States Patent Office 3,040,440 Patented June 26, 1962

3,040,440

WASHER-DRIER CONDENSER SYSTEM

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Filed Dec. 6, 1957, Ser. No. 701,131
18 Claims. (Cl. 34—75)

This invention relates to a washer-drier capable of washing and drying fabrics and incorporating structure for circulating air through a revoluble clothes drum as well as removing the lint from and condensing out entrained moisture carried in the air circulated in this combination unit during its drying operations.

In the accompanying illustrative drawings, this is accomplished by providing a tubular casing with a false back spaced from the rear wall of the casing and journaling a drum shaft in a bearing carried by these spaced wall members. A revoluble drum including perforate side and rear walls is connected to this drum shaft and is positioned between the front casing wall and its false back to provide a means for tumbling the fabrics during both the washing and drying operations.

During the drying operations for this combination unit a heating unit, positioned adjacent the drum and enclosed by a heater housing hood formed as an enlargement in the casing side wall so as to span the false back of the casing, evaporates moisture retained within fabrics placed within the clothes drum. The evaporated moisture is withdrawn through the perforate rear wall of the drum and through an opening in the false casing back by means of a revoluble impeller member mounted between these spaced rear casing walls where its entrained moisture is condensed by contact with a misty fog produced by the impinging of cooling fluid against the revolving blades of the impeller which is partially enclosed by a scroll-shaped member spanning these spaced rear walls and cooperating with them to form a blower housing for this impeller member.

All of the condensing of the moisture vapors contacting this misty fog takes place within this blower housing while the fluid separation from the air discharged from this blower housing is achieved by moving this air through a series of curved baffle plates so sharply reverse its direction of travel to effect a centrifugal separation of moisture droplets carried in this air prior to its recirculation through the heater housing and perforate drum side wall for the evaporation of additional moisture from fabrics carried within the clothes drum.

The lint produced by tumbling of the fabrics within the drum and carried into the blower housing during this air circulation is scrubbed from this air by the misty spray produced by the impingement of the cooling fluid against the blades of the revoluble impeller member within the blower housing. The lint scrubbed from the air in this manner is flushed from the blower housing and drains to a lower portion of the casing together with the condensing fluid and its resulting condensate to be discharged to an external drain. It is possible, therefore, to utilize this invention in a combination washer-drier having a closed path air flow system requiring no venting of either air or moisture vapors from the combination unit.

In the accompanying drawings:

FIGURE 1 is a front elevation of a combination washer-drier, partially broken away, incorporating our invention;

FIGURE 2 is a side elevation, partially broken away, showing the right side of the combination washer-drier illustrated in FIGURE 1;

FIGURE 3 is a side elevation, partially broken away, showing the left side of the combination washer-drier shown in FIGURE 1;

FIGURE 4 is a rear elevation, partially broken away, of the combination washer-drier unit shown in FIGURE 1;

FIGURE 5 is a cross-sectional view taken on line 5—5 of FIGURE 4;

FIGURE 6 is an enlarged cross-sectional view taken on line 6—6 of FIGURE 4 showing the vapor condenser and air fan assembly of the combination washer-drier shown in FIGURES 1–4; and,

FIGURE 7 is an enlarged cross-sectional view of the supporting hub structure shown in FIGURE 5.

Referring now to the accompanying drawings in detail, it will be seen that the combination washer-drier unit shown in these drawings includes a substantially flat surfaced base frame **10** mounted on legs **11**. Mounted upon base frame **10** are the channel members **13** and **14** which are welded or securely affixed in some suitable manner to the base frame **10** to form the two major supports for the washer-drier unit illustrated in the accompanying figures.

As apparent from an inspection of FIGURES 1 and 4 channel members **13** and **14** are substantially triangular in elevational configuration with the apex of these members receiving pivot pins **16** and **17**. These pivot pins **16** and **17** are journaled in the flanged bearing sleeves **18** and **19**, respectively, which form a two-point support for the tub brackets **21** and **22**, respectively. This allows the tub or casing which is generally indicated by the arrow **24**, and which is fastened to the brackets **21** and **22**, to oscillate back and forth on pins **16** and **17** in an arcuate movement in response to various forces generated within that tub.

Tub **24** is maintained in an upright position on pins **16** and **17** by the two centering springs **25** connected between tub **24** and base **10** through the spring anchor brackets **26** fastened to the latter member. FIGURES 1 and 3 show the tub **24** as being provided with a tub damper bracket **28** which forms the support for the damper leaf spring **29** carrying the damper pad **31** in a ball and socket joint at the end of damper spring **29**. Base frame **10** is provided with an upstanding damper plate **32** which is engaged by the damper pad **31** to absorb and dissipate the energy imparted to tub **24** causing it to oscillate on the supporting pivot pins **16** and **17**.

Tub or casing **24** includes a generally cylindrical side wall **71**, a pair of spaced rear walls **72** and **73** and a front wall **74**. The front and outer rear walls **74** and **72**, respectively, are connected to the cylindrical side wall **71** by means of the encompassing flanged hoop-like members **76** while the partition wall or false tub back **73** positioned between walls **72** and **74** is welded to side wall **71**. It will be seen from an inspection of FIGURE 5 that the spaced rear walls **72** and **73** support the tub bearing assembly generally indicated by the reference numeral **80** and shown in detail in FIGURE 7.

The tub bearing assembly **80** includes a spacer hub **81** which is located between and which abuts the rear walls **72** and **73**, and the threaded clamp member **82** receiving the spanner clamp nut **83** which, when tightened on member **82**, produces a rigid support for the bearings **85** and **86** adjacent walls **72** and **73**, respectively. A spacer sleeve **88** loosely encircling the drum drive shaft **89** regulates the spacing between these bearings which journal drum drive shaft **89**.

The rear end of the drum drive shaft **89** is rigidly connected to the large drive pulley **91** whereas its front end is threaded into the hub **94** of the drum or clothes receptacle **95**. Drum **95** includes a perforate rear wall **96** which is rigidly affixed to and cooperates with the spider-like member **97** to form a double cone support connected to the hub **94** and providing a rigid support for the clothes basket **95** on drum drive shaft **89**. A sealing member

101 including a carbon nose ring 102 pressed against the rear surface of this revoluble hub structure by coil spring 103 prevents water from the washing action carried on within tub 24 from damaging bearings 85 and 86.

As apparent from an inspection of FIGURE 5, the clothes drum 95 also includes a perforate cylindrical side wall 104 carrying clothes elevating vanes 105. Side wall 104 merges into the short front wall 106 and joins the flanged rear wall 96 in an overlapping relationship to form a protruding flange 108 which, while not touching wall 73, cooperates with that wall 73 to form an effective air seal to prevent heated air entering tub 24 through cylindrical side wall 71 during the drying operations from being short circuited around the rear peripheral edge of drum 95.

Tub 24 includes a lower recessed portion 111 which forms the sump for tub 24. Sump 111 communicates with the drain pump 112 and includes a perforate tray 114 for preventing foreign particles passing through the perforate drum 95 into tub 24 from entering and damaging pump 112. Tray 114 is removable from its positions shown in FIGURE 5 through the drum access door 115 provided in the side wall 104.

Tub 24 also includes the circular loading opening 117 which is encircled by the bellows seal 118 having its opposite end fastened to a similar opening formed in the cabinet 119 enclosing this combination unit. Sealing member 118 includes a number of convolutions permitting arcuate movement of tub 24 relative to cabinet 119. A rectangular door 121 hinged on cabinet 119 carries a transparent door glass 122 having a cylindrical portion extending rearwardly through the bellows seal 118 which is provided with a flexible annular sealing lip 124 engageable with the periphery of the glass door 122. This seals the unit while enabling the operator of the machine to observe the operations taking place within tub 24 during the washing and drying processes. The lamp 126 fastened to the exterior of tub 24 shines through a transparent member 127 carried in tub 24 for illuminating the interior of that member during the loading operations of this machine.

Tub 24 also includes a heater housing 131 which may be formed separately or as a part of the casing side wall and which supports a heating element 132 capable of radiating heat energy through an opening located in the cylindrical tub wall 71 and covered by the heater housing 131. Heater housing 131 also mounts the thermostat 133 which is connected in series with heater 132. A louvered shielding member 134 carried by tub 24 and positioned between heater housing 131 and the heating element 132 creates a divided air flow into tub 24. This maintains housing 131 in a relatively cool condition and directs a major portion of the heat from heating element 132 into the clothes drum 95 by way of the perforate side wall 104.

The power necessary to rotate drum 95 through the large pulley 91 is applied by the single speed motor 137 mounted on bracket 138 carried on a lower portion of tub 24. The output shaft of motor 137 is connected to a flexible universal coupling 139 which is connected in turn to the transmission input shaft 140 constituting an extension of the motor shaft.

A split pulley 141 having a pair of axially separable sheaves splined to each other is rigidly connected to shaft 140 through one of its sheaves. The other sheave is constantly biased toward the shaft connected sheave by means of the compression spring 142 which encircles the shaft extension 140. This arrangement automatically regulates the tension in the small belt 144 which regulates the drain pump 112 whenever motor 137 is energized.

Shaft extension 140 also drives the two-speed transmission unit 145 and the pulley 146 affixed to the end of that portion of shaft 140 extending completely through transmission 145. Transmission 145 is provided with an output pulley 147 which is connected to the large drum shaft pulley 91 through belt 148. In the illustrative embodiment shown in the accompanying drawings, an energization of the solenoid 149, which controls the output speed of pulley 147, causes the clothes receptacle 95 to be rotated at a speed of approximately 300 revolutions per minute while the deenergization of that solenoid causes receptacle 95 to tumble its contents at approximately 50 revolutions per minute.

The pulley 146 affixed to the end of shaft 140 is connected to the fan pulley 151 through the belt 152 so as to drive pulley 151 at a speed approximately equal to that of motor 137. As shown in FIGURE 6, pulley 151 is rigidly connected to an impeller shaft 155 which is journaled in a bearing 156 supported by the removable circular plate 157 bolted to the rear walls 72 of tub 24.

A combination transmission support and belt tensioning device is provided by the slotted bracket 158 which is connected to the rear wall 72 through the adjustable machine screws 159. Bracket 158 journals shaft 140 allowing the transmission unit 145 to pivot freely around the bearing receiving that latter shaft. By moving the transmission unit 145 and its mounting bracket 158 away from the fan pulley 151, the slack may be taken out of belt 152. The slack is automatically taken out of the tumbler drive belt 148 by means of the compression spring 161 mounted between bracket 158 and the transmission unit 145 and tending to pivot the transmission 145 downwardly around shaft 140. The tension in the drain pump belt 144 is automatically maintained during these adjustments by means of the spring biased split pulley 141.

A combination blower-condenser unit capable of moving air through tub 24, scrubbing lint from this air and condensing out the moisture from hot vapors produced within casing 24 during its drying operations is positioned in the compartment formed by and between portions of the spaced walls 72 and 73. As shown in FIGURE 6, the partition wall 73 is provided with a flanged opening 163 which receives a rubber annular extension ring 164 terminating just short of the blades of an impeller member 165 fixed to the impeller shaft 155. Ring 164 is provided with a resilient lip 160 encompassing the flange 162 formed on opening 163 and cooperates with that latter opening to define an orifice having a streamlined cross section for reducing air turbulence and consequently cooling fluid splashback through opening 163.

A housing for the impeller 165 is produced by the cooperation of walls 72 and 73 with an imperforate scroll-shaped side wall 166 shown on dotted lines in FIGURE 4, which bridges the space between walls 72 and 73 to enclose the separate vapor condenser and blower unit formed between these walls. A condenser water pipe 167 directed toward the hub of impeller 165 allows the latter member to break up the stream of condensing fluid discharged from the condenser pipe 167 and thereby produces a cool mist, spray and fog for condensing out hot moisture vapors entering this blower condenser unit through opening 163 during the drying operations of this combination machine. Parts within this blower housing may be cleaned, adjusted or easily replaced in some cases by removing plate 157.

A series of small curved moisture entraining baffle plates 168 and a horizontal baffle plate 169, shown in the broken away portion of FIGURE 4 also bridge walls 72 and 73 to centrifugally separate out the droplets of moisture carried in the air leaving the blower condenser unit and entering the heater housing unit 131 for reheating and recirculation through tub 24 and clothes drum 95. These plates 168 and 169 are not concerned with any vapor condensing function as that function is completely accomplished within the confines of members 71, 72, 73 and 166. Members 168 and 169 do, however, prevent excess moisture in fluid form from being carried into heater housing 131.

The water for the vapor condensing operation is supplied through the external conduit 172 while water for

the washing operation is supplied through the conduit 173 which empties into the cup 174 provided with a flapper check valve 175 and draining into tub 24 between walls 73 and 74. Flapper valve 175 not only prevents suds from escaping from cup 174 during the washing operation but also prevents steamy vapors from escaping from within the front washing and drying chamber of tub 24 and condensing on the cooler interior surfaces of cabinet 119. Since there is a tendency to compress air within the front chamber due to the expansion of heated air and due to the pumping action of the tumbling fabrics within drum 95, the flapper check valve 177 covering the vapor breathing hole 178 in rear wall 72 is provided. This allows air to escape from tub 24 in a unidirectional breathing action through these two flapper check valves 175 and 177 without producing condensation on the cabinet surfaces since the air escaping through breather hole 178 is cooled by the blower-condenser unit within scroll 166 before being discharged through aperture 178.

Since sump 111 which receives the washing and condensing fluids discharged into casing 24 is positioned between walls 73 and 74, a small drain aperture 176 is provided in wall 73 to enable the condensing fluid, its resulting condensate and the lint scrubbed from the air entering the combination blower-condenser unit to pass into sump 111 and into the drain pump 112 for discharge to an external drain. While not shown in detail in the accompanying drawings, a valve is provided between sump 111 and the drain pump 112 in order to retain the washing fluids within casing 24 during the washing operations of this machine.

It should be noted that since the function of drain aperture 176 is to drain fluids from the space between walls 72 and 73, its size and shape is dictated by the quantity of liquid flowing through it and the possible effects of lint accumulation in this area. A conduit leading from a drain port in the lowest portion of side wall 71 to sump 111 or directly to a valve communicating with an external drain would accomplish a similar function. An oversize aperture or conduit in, through or around wall 73 would have the undesirable effect of short circuiting unheated air into the clothes receptacle 95 during the drying operations.

In operation, during the washing operation warm water is fed into casing 24 to the desired fluid level through conduit 173. Drum 95 and its load of fabrics is then rotated at a tumbling speed in this body of fluid to effect a conventional tumbling and cleansing action which is followed by a series of rinses and centrifuging operations to leave the fabrics in a damp dry condition at the start of the drying operation. This washing operation will tend to wash the lower portion of casing 24, including that portion between walls 72 and 73, free of any lint which may have remained in this casing after a previous drying operation.

In order to aid in this lint flushing operation, the rear wall 96 of drum 95 is provided with four water scoops 179 located adjacent each of the legs of spider member 97 so that each revolution of drum 95 will cause each scoop 179 to carry a small charge of fluid from the lower portion of casing 24 around and up to the opening 163 in wall 73 where the suction of the continuously operating impeller 165 will draw the small fluid charges draining from these scoops 179 into the opening 163 and into the rotating impeller 165. These fluid charges are broken up into a spray by impeller 165 to provide a complete flushing action during each washing operation for the wall surfaces within scroll 166 as well as the additional areas between walls 72 and 73 normally traversed by condensing fluid during the drying operations.

During the drying operation when heat is applied to the fabrics within drum 95 by the energization of heater 132, an evaporation of moisture from these fabrics takes place. Since the impeller 165 rotates whenever drive motor 137 is energized, the resulting moisture vapors are drawn through opening 163 in the false back 73 and are carried into the blower housing formed by the cooperation of scrool 166 with walls 71, 72 and 73. The moisture vapors entering this blower housing which partially encompasses impeller 165, is cooled and condensed due to its intimate contact with the misty spray produced by the impingement of cooling fluid flowing through tube 167 onto the hub of the rotating impeller 165 which is also driven by motor 137. It will be apparent from FIGURE 6 that the impingement of this cooling fluid against the hub of impeller 165 rather than against the blades themselves will reduce the amount of splashback through opening 163.

While the efficiency of this condenser unit is dependent upon many design factors, tests have shown that units built in accordance with the illustrative drawings condense out all of the moisture removed from the air during its circulation between walls 72 and 73 by the time that the air leaves the effluent opening 180 formed by the cooperation of the lower end of scroll 166 with its adjacent casing walls.

Since the air leaving drum 95 and entering the housing formed within scroll 166 encounters a violent misty spray which thoroughly scrubs the air entering that blower housing free of any suspended particles, all air-borne lint entering opening 163 is thoroughly scrubbed from the air and saturated with cooling fluid prior to the time that the air leaves effluent port 180.

While most of the cooling fluid, condensate and lint discharged from the blower housing formed between walls 72 and 73 is discharged through opening 176 and sump 111 to drain, the air flow through this combination unit which is approximately 150 cubic feet per minute has a tendency, due to the restricted area of effluent opening 180 of that blower housing, to produce some carry-over of the smaller moisture particles past opening 176.

In order to separate these smaller moisture particles and any lint carried by them from the air stream prior to its re-entry into heater housing 131, that air stream is passed through a series of small curved moisture entraining baffle plate 168 which causes a sharp reversal of the air flow to take place after it is discharged from the blower housing between walls 72 and 73. This reversal of air flow, which is directed approximately towards the rotational axis of drum 95 causes these moisture particles to become centrifugally separated from the air stream with the result that they are caught on these baffles 168 to reduce the total moisture content of the air as it travels upwardly between walls 72 and 73.

The positioning of baffle 169 between walls 72 and 73 represents an additional means for preventing the air leaving baffles 168 from progressing directly toward heater housing 131. Baffle 169 requires the air passing from the blower housing and baffle members 168 to progress upwardly between scroll 166 and the end of baffle 169 as it passes around the tub bearing assembly 80.

Air progressing upwardly in this diagonal direction must again reverse its direction of travel prior to entry into heater housing 131 thereby presenting an additional opportunity for residual droplets to be separated from the air stream prior to its entry into housing 131. Since these particles tend to gravitate toward scroll 166, this latter member has in actual practice been slightly spaced from side wall 71 to allow these droplets to drain to the bottom of casing 24 and pass through opening 176. It should also be stated at this point that in actual practice, scroll 166 and baffles 168 and 169 have been rigidly affixed to the rear wall 72 and have extended toward but have not contacted the false back 73 at all apparent junction points between these members because of manufacturing tolerances even though for all practical purposes these members 166, 168 and 169 do span or bridge the space between walls 72 and 73.

While not shown in the accompanying drawings, it is within the scope of this invention to vary the shape and positioning of the various moisture entraining baffles between walls 72 and 73. This would include the addition

of baffles similar to but in the reverse of baffles 168 to be placed above hub assembly 80 diagonally of baffles 168 in order to more directly deflect the air flow toward heater housing 131. It is recognized, however, that the positioning of such additional baffles between walls 72 and 73 must be done with caution to prevent unnecessary moisture carry-over into heater housing 131.

While this invention is primarily directed to closed air circuit drying apparatus, its teaching may also be applied to those vented machines in which either or both vapor condensing or lint removal functions are desired.

This application relates to subject matter disclosed but not claimed in the copending John C. Mellinger application Serial No. 686,450, filed September 26, 1957 and assigned to the same assignee as that for the instant invention.

We claim:

1. Clothes drying apparatus comprising, a casing including a side wall and spaced front and rear walls, a partition wall connected to said casing between said front and rear walls, a revoluble perforate clothes drum positioned within said casing between said front and partition walls, heating means for evaporating moisture from damp fabrics placed within said drum, a heater housing enclosing said heating means to provide a means of communication between said perforate drum and the space between said rear casing wall and said partition wall, an opening in said partition wall, a revoluble impeller positioned adjacent said opening between said rear casing wall and said partition wall for moving moisture vapors from said drum through said perforate drum and said opening, conduit means for impinging cooling fluid against said impeller to disperse said cooling fluid into a mist to condense out moisture vapors passing from said drum through said opening, a drain port spaced from said opening for draining cooling fluid and condensate from said casing, a scroll positioned between said rear casing wall and said partition wall and partially encompassing said impeller to confine the vapor condensing operation within said scroll, said scroll cooperating with said casing and said partition wall to form a blower housing provided with an effluent opening communicating with said heater housing through space between said rear casing wall and said partition wall, and means for rotating said impeller to produce a closed circuit air flow through said opening, blower housing, heater housing and said drum.

2. Clothes drying apparatus comprising, a casing including a side wall and spaced front and rear walls, a partition wall connected to said casing between said front and rear walls, a revoluble clothes drum positioned within said casing between said front and partition walls, said drum including perforate side and rear walls and the flange projecting from said drum to restrict air flow around the rear of said drum, heating means for evaporating moisture from damp fabrics placed within said drum, a heater housing enclosing said heating means and connected to said casing to provide a means of communication between said perforate drum side wall and the space between said rear casing wall and said partition wall, an opening in said partition wall, a revoluble impeller positioned adjacent said opening between said rear casing wall and said partition wall for moving moisture vapors from said drum through said perforate rear drum wall and said opening, conduit means for impinging cooling fluid against said impeller to disperse said cooling fluid into a mist to condense out moisture vapors passing from said drum through said opening, a drain port spaced from said opening for draining cooling fluid and condensate from said casing, a scroll positioned between said rear casing wall and said partition wall and partially encompassing said impeller to confine the vapor condensing operations within said scroll, said scroll cooperating with said casing and said partition wall to form a blower housing provided with an effluent opening communicating with said heater housing through the space between said rear casing wall, said partition wall, and means for rotating said impeller to produce a closed circuit air flow through said opening, blower housing, heater housing and said drum.

3. Clothes drying apparatus comprising, a casing including a side wall and spaced front and rear walls, a partition wall connected to said casing between said front and rear walls, a perforate revoluble clothes drum positioned within said casing between said front and said partition walls, heating means for evaporating moisture from damp fabrics placed within said drum, a heater housing mounted on said side wall and enclosing said heating means to provide a means of communication between said perforate drum and the space between said rear casing wall and said partition wall, an opening in said partition wall, a revoluble impeller positioned adjacent said opening between said rear casing wall and said partition wall for moving moisture vapors from said drum through said opening, conduit means for impinging cooling fluid against said impeller to condense out moisture vapors passing from said drum through said opening, a drain port spaced from said opening for draining cooling fluid and condensate from said casing, a scroll positioned between said rear casing wall and said partition wall and partially encompassing said impeller to confine the vapor condensing operations within said scroll, said scroll cooperating with said casing and said partition wall to form a blower housing provided with an effluent opening communicating with said heater housing through the space between said rear casing wall and said partition wall, baffle means positioned within said space for changing the direction of air discharged from said housing to centrifugally separate droplets of fluid carried in said air, and means for rotating said impeller to produce a closed circuit air flow through said opening, blower housing, heater housing and said drum.

4. Clothes drying apparatus comprising, a casing including a side wall and spaced front and rear walls, a partition member connected to said casing between said front and rear walls, a revoluble clothes drum positioned within said casing between said front and partition walls, said drum including perforate side and rear walls and a flange projecting from said drum to restrict air flow around the rear of said drum, heating means for evaporating moisture from damp fabrics placed within said drum, a heater housing formed in said casing side wall and enclosing said heating means to provide a means of communication between said perforate drum side wall and the space between said rear casing wall and said partition wall, an opening in said partition wall, a revoluble impeller positioned adjacent said opening between said rear casing wall and said partition wall for moving moisture vapors from said drum through said perforate rear drum wall and said opening, conduit means for impinging cooling fluid against said impeller to disperse said cooling fluid into a mist to condense out moisture vapors passing from said drum through said opening and to scrub airborne lint from said vapor, a drain port spaced from said opening for draining cooling fluid, lint and condensate from said casing, a scroll positioned between said rear casing wall and said partition wall and partially encompassing said impeller to confine the vapor condensing operations within said scroll, said scroll cooperating with said casing and said partition wall to form a blower housing provided with an effluent opening communicating with said heater housing through the space between said rear casing wall and said partition wall, a plurality of spaced baffle members positioned within said space for changing the direction of air discharged from said housing to centrifugally separate droplets of fluid carried in said air, and means for rotating said impeller to produce a closed circuit air flow through said opening, blower housing, heater housing and said drum.

5. Clothes drying apparatus comprising, an imperforate casing including front and rear walls and a generally

tubular side wall interconnecting said front and rear walls, a partition located intermediate said front and rear walls and coacting with said side wall to define front and rear chambers, a perforate clothes drum positioned within said front chamber for receiving and tumbling damp fabrics, a drain opening in said casing, a second opening in said casing in said partition at a higher elevatonal level than that of said drain opening, an impeller positioned between said rear wall and partition adjacent said second opening for moving moisture vapors from said drum through said second opening, a scroll member positioned between said rear wall and partition and partially encompassing said impeller to form a blower housing with said casing for said impeller, conduit means for impinging cooling fluid against said impeller for condensing said moisture vapor and scrubbing lint from air entering said blower housing through said second opening, means for rotating said impeller to produce a unidirectional air flow from said drum through said second opening and said blower housing and means for heating moisture free air for evaporating moisture from said fabrics.

6. Clothes drying apparatus comprising, a casing including a pair of upstanding rear walls, a perforate clothes drum positioned within said casing for receiving damp fabrics to be tumbled wthin said drum, a drain opening in said casing, a second opening in said casing in one of said rear walls at a higher elevational level than that of said drain opening, an impeller positioned between said rear walls adjacent said second opening for moving moisture vapors from said drum through said second opening, a scroll member positioned between said rear walls and partially encompassing said impeller to form a blower housing with said casing for said impeller, conduit means for impingng cooling fluid against said impeller for condensing said moisture vapors and scrubbing lint from air entering said housing through said second opening, means for rotating said impeller to produce a unidirectional air flow through said drum by way of said second opening and said housing, a plurality of curved baffle plates spanning said upstanding rear walls for changing the direction of air discharged from said blower housing to centrifugally separate droplets of fluid carried in the air discharged from said blower housing and means for heating moisture free air for evaporating moisture from said fabrics.

7. Clothes drying apparatus comprising, an imperforate casing having spaced apart front and rear walls interconnected by a continuously formed side wall, a partition spaced from said rear wall and connected to said side wall to define front and rear chambers, said partition being in sealed relation with said side wall to isolate the front and rear chambers in the area of partition to side wall attachment, a perforate drum located within said front chamber, means for evaporating moisture from said fabrics, said partition provided with an opening therein, a scroll-shaped member spanning said partition and rear wall and cooperating therewith to define a blower housing, a revoluble impeller member mounted within said blower housing, means for rotating said impeller to move air-borne lint and moisture vapors from said drum into said blower housing through said opening, and conduit means for impinging cooling fluid against said impeller to condense said moisture vapors and scrub lint from air entering said blower housing through said opening.

8. Clothes drying apparatus comprising, a perforate drum including a perforate rear wall, enclosure means enclosing said drum and defining a drying chamber for damp fabrics placed within said drum, means restricting air flow around the rear of said drum, means for evaporating moisture from said fabrics, said enclosure means including a first wall provided with an opening communicating with the interior of said drum through said perforate rear wall, a second wall spaced from said first wall, a scroll-shaped member spanning said first and second walls and cooperating therewith to define a blower housing, a revoluble impeller mounted within said blower housing, means for rotating said impeller for moving air-borne lint and moisture vapors from said drum into said blower housing through said opening, and conduit means for impinging cooling fluid against said impeller to condense said moisture vapors and to scrub lint from air entering said blower housing through said opening.

9. The invention of claim 8 in which baffle members are attached to at least one of said first and second walls to centrifugally separate droplets of cooling fluid carried in the air passing through said blower housing.

10. Clothes drying apparatus comprising, a perforate drum, enclosure means enclosing said drum and defining a drying chamber for damp fabrics placed within said drum, means for evaporating moisture from said drum, said enclosure means including a first wall provided with an opening therein, an annular member connected to said first wall and encompassing said opening and cooperating therewith to define an orifice haivng a cross-sectional contour minimizing turbulance of air passing through said opening, a second wall spaced from said first wall, a third wall member spanning said first and second walls and cooperating therewith to define a blower housing having said orifice as its inlet, a revoluble impeller mounted within said blower housing, means for rotating said impeller for moving air-borne lint and moisture vapors from said drum into said blower housing through said orifice, and conduit means for impinging cooling fluid against said impeller to condense said moisture vapors and scrub lint from air entering said blower housing through said orifice.

11. The invention of claim 10 in which said opening is provided with a flange and in which said annular member is formed with a resilient lip encompassing said flange.

12. Clothes drying apparatus comprising, a perforate drum for receiving damp fabrics, enclosure means enclosing said drum and defining a drying chamber for said damp fabrics, means for evaporating moisture from said fabrics, said enclosure means including a first wall provided with an opening therein, a second wall spaced from said first wall, a second opening provided in said second wall in alignment with said first opening, a scroll-shaped member spanning said first and second walls partially around the peripheries of said first and second openings, said scroll-shaped member cooperating with said first and second walls to define a blower housing, a selectively removable plate connected to said second wall and covering said second opening, a bearing in said plate, an impeller mounted within said scroll-shaped wall between said first and second walls, a shaft journaled in said bearing and connected to said impeller for rotating said impeller to move air-borne lint and moisture vapors from said drum into said blower housing through said first opening, and conduit means for impinging cooling fluid against said impeller during the rotation of said shaft to condense said moisture vapors and scrub lint from air entering said blower housing through said first opening.

13. Clothes drying apparatus comprising an imperforate casing having front and rear walls and a continuously formed side wall interconnecting said front and rear walls, a vertically extending partition located between front and rear walls for dividing said casing into front and rear chambers, a perforate clothes drum mounted for rotation in said front chamber, a rotatable shaft for mounting said clothes drum, an air inlet means interconnecting said rear chamber and said front chamber, an air outlet means interconnecting said front chamber and said rear chamber, means including a blower and duct means in said rear chamber for circulating air between said outlet and inlet means in a closed path during the drying operation of said apparatus, thereby to pass air through said drum and dry the clothes therein, condensing means in said rear chamber for condensing moisture from the moist air leaving said front chamber, and a heater means in said front chamber associated with said

inlet means for heating said air immediately before it re-enters said clothes drum.

14. Clothes drying apparatus comprising, an imperforate casing having front and rear walls and a generally tubular side wall interconnecting said front and rear walls, a vertically extending partition coacting with said side wall to divide said casing into front and rear chambers, a perforate clothes drum mounted for rotation in said front chamber, an inlet means interconnecting said rear chamber and said front chamber, an air outlet means interconnecting said front chamber and said rear chamber, duct means for transporting air between said outlet and inlet means, impeller means located between the rear wall and said partition adjacent the outlet means for moving moisture vapors from said drum through said outlet means, said duct means including a housing means partially enclosing said impeller means, conduit means for directing a stream of water toward said impeller means such that said impeller means atomizes said cold water and produces a fine mist for condensing said moisture vapor and scrubbing lint from the air passing from said drum through said outlet means, means for rotating said impeller means to produce a unidirectional air flow from said drum, said outlet means, said duct means, said inlet means and back into said drum, and means for heating moisture free air for evaporating moisture from fabrics in said clothes drum.

15. The apparatus of claim 14 wherein said heating means is located in said front chamber and associated with said inlet means to heat the moisture free air immediately before it passes into said clothes drum.

16. In a clothes drying apparatus the combination comprising an imperforate casing having front and rear walls interconnected by a generally tubular side wall, a partition coacting with said side wall for dividing said casing into a drying chamber and a compartment, a revoluble perforate clothes drum mounted for rotation about a non-vertical axis in said drying chamber, an air inlet means interconnecting said drying chamber and compartment, a vapor-condenser unit located in said compartment, means for circulating air and moisture vapors from said drying chamber into said compartment through said air inlet means, means for supplying condensing fluids to said vapor-condenser unit for condensing the moisture vapor and scrubbing lint from the air circulated into said compartment from said drying chamber by said latter means, means for conducting air to said drying chamber, and means for heating the air conducted to said drying chamber in order to evaporate moisture from the fabrics within said perforate clothes drum.

17. In a clothes drying apparatus the combination comprising an imperforate casing having front and rear walls interconnected by a generally tubular side wall, a partition connected to said side wall for forming a drying chamber and compartment, said drying chamber and compartment being sealed off from one another in the area of partition and side wall attachment, a revoluble perforate clothes drum mounted for rotation about a non-vertical axis in said drying chamber, means for rotating said clothes drum, an air inlet means interconnecting said drying chamber and compartment, a vapor-condenser unit located in said compartment, impeller means for pumping air and moisture vapors through said air inlet means from said drying chamber and through said vapor condenser unit, means for supplying condensing fluids to said vapor-condenser unit for condensing the moisture vapor and scrubbing lint from the air pumped through said compartment from said drying chamber by said latter means, means for conducting air to said drying chamber, and means for heating the air conducted to said drying chamber in order to evaporate moisture from the fabrics within said perforate clothes drum.

18. In a clothes drying apparatus the combination comprising an imperforate casing having front and rear walls interconnected by a continuously formed side wall, a partition coacting with said side wall for dividing said casing into a front drying chamber and a rear compartment, a revoluble perforate clothes drum mounted for rotation about a non-vertical axis in said drying chamber, an air inlet means interconnecting said front drying chamber and rear compartment, duct members extending between, and joined to, said rear wall and said partition of said casing forming a vapor-condenser unit, means for circulating air and moisture vapors from said front drying chamber into said rear compartment through said air inlet means, means for supplying condensing fluids to said vapor-condenser unit for condensing the moisture vapor and scrubbing lint from the air circulated through said rear compartment from said drying chamber by said latter means, means for conducting air to said front drying chamber, and means for heating the air conducted to said front drying chamber in order to evaporate moisture from the fabrics within said perforate clothes drum.

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