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(54) **Device for the discharge of moist air from a laundry dryer.**

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Description

The present invention relates to a device for the discharge of moist air from a laundry dryer of the domestic type having an open drying air circuit.

Appliances of this type comprise a laundry-receiving drum rotatably mounted in a housing for the passage therethrough of warm drying air which a ventilator aspirates from the environment to direct it through a heater apparatus and through the laundry-receiving drum, from which the then warm and moist air returns to the exterior of the appliance through a discharge conduit connected to the housing of the appliance.

For permitting the user to install an appliance of this type at any suitable location or position, the housing is usually provided with several discharge openings formed in different walls thereof, for instance in the sidewalls and the rear wall.

In addition, for preventing the discharged warm and moist air from causing damage to the environment of the appliance, an extensible conduit is usually provided for connection to a selected discharge opening of the housing, the free end of the conduit being adapted to be connected to an outlet, for instance a window, a door, a ventilation shaft or the like of the room in which the appliance is installed.

This extensible conduit, which may have a length of about 2.5 meters when fully extended, involves numerous disadvantages, however, the most important one of which is the difficulty of suitably storing it when not in use.

In the second place, while the one end of the extensible conduit can be readily fixed to the selected outlet opening of the housing as by means of a hose clamp, a snap fit attachment or a bayonet coupling, the other end of the conduit is usually only clamped between the door, the window or the like and its respective frame. This does obviously not ensure a reliable retention of the free end of the conduit, which may therefore assume any position.

A laundry dryer known from German Patent 3,044,731 is provided with an extensible discharge conduit which is permanently connected to an air outlet and housed in a chamber formed in the housing of the appliance in the contracted inoperative state. A lid for closing the chamber is hinged to the extensible conduit and provided with means for releasably securing the free end of the conduit to a window grille or the like. In a similar manner, European Patent 0,071,312 describes a laundry dryer with a discharge conduit in the form of an extensible hose which in its inoperative state is housed within the appliance and can be withdrawn therefrom to the required length for connecting it to a ventilation opening. In these constructions, how-

ever, the extensible conduit is not an accessory of the appliance, but an integral part thereof. This results in a considerable limitation of the flexibility regarding the installation of the appliance, since the air discharge opening has always to be provided on the side of the housing formed with the access opening to the chamber housing the conduit.

In view of the above considerations, the main object of the invention is the provision of a device for the discharge of air from a laundry dryer of the type described, permitting the extensible conduit to be readily detached from the appliance and to be conveniently stored when not in use.

A further object of the invention is to simplify and rationalize the handling of the extensible conduit while retaining its character of an independent accessory of the appliance.

These and other objects are attained according to the invention by a device for the discharge of moist air from a laundry dryer, particularly of the domestic type and having an open circuit for the discharge of the warm and moist drying air to the environment through one or several outlets formed in the housing of the appliance, and a resiliently extensible conduit which in the operative state is releasably connectable to one of the discharge outlets of the appliance and to a ventilation opening in a boundary wall of a room in which the appliance is installed, and which in its contracted inoperative state can be accommodated within the appliance, characterized in that said device comprises a receptacle for the extensible conduit in the form of a rigid tubular sleeve, and two coupling rings secured to the ends of the conduit and provided on their outer surfaces with respective first and second quick-coupling means, said first quick-coupling means being adapted to connect the respective ends of the conduit to the ends of said receptacle, and said second quick-coupling means being adapted to connect one end of the conduit to a discharge outlet of the appliance, and the other end to a diffuser element or to a ventilating passage in a boundary wall of a room.

The characteristics of the invention will become more clearly evident from the following description, given by way of example with reference to the accompanying drawings, wherein:

- fig. 1 illustrates a laundry dryer provided with a discharge device according to the invention,
- fig. 2 shows an exploded perspective view of the discharge device of fig. 1,
- fig. 3 and 4 show a top plan view and an end view, respectively, of a terminal element of the device of fig. 2, and
- fig. 5 shows a sideview of the terminal

element of figs. 3 and 4 as releasably attached to a window sill.

Shown in fig. 1 is a conventional laundry dryer 5 of the open drying-air circulation type, comprising a housing 6 in which there is rotatably mounted a drum 7 for containing the laundry to be dried.

Although not shown in the drawings, dryer 5 also includes a fan operable to aspirate air from the environment and to direct it through a likewise not shown heater device and through drum 7 for subsequent discharge through at least one of several discharge outlets 9, 10, 11, 12 formed in different walls of housing 6 of dryer 5.

Discharge outlets 9, 10, 11, 12 are adapted to have a conduit connected thereto for directing the moist air discharged from the dryer to the ambient exterior.

According to the invention this conduit 13 is extensible and adapted to be coaxially housed in a cylindrical receptacle 14 adapted to contain the full length of conduit 13 in its contracted inoperative state. The ends of extensible conduit 13, which may for instance be made of a helically wound metal wire and a plastic envelope bonded thereto, are releasably secured in respective double-sided coupling rings 15, 16 (fig. 2), for instance by being threadedly engaged with helically grooved walls of openings extending through rings 15 and 16. Each coupling ring 15, 16 carries on its outer peripheral surface two groups of coupling pins 17 and 18 adapted respectively to permit the ends of conduit 13 connected to respective ends of receptacle 14, and coupling ring 16 to be connected to a discharge outlet of the appliance, and coupling ring 15, to a ventilation passage (not shown) or the like.

In a corresponding manner the circumferential walls of discharge outlets 9, 10, 11, 12 of dryer 5 and of the end portions of receptacle 14 are formed with coupling slots 19 for engagement with coupling pins 17, 18. Coupling ring 16, irrespective of whether connected to receptacle 14 or not, may thus be coupled to any of the discharge outlets for permitting extensible conduit 13 to be used in or from any suitable position. At the end of the drying operation, extensible conduit 13 can be pushed completely into receptacle 14 and secured therein by means of coupling ring 15, whereupon receptacle 14 with conduit 13 housed therein can be detached from the dryer for convenient storage. According to a further characteristic of the invention, rather than being connected to a ventilation passage or the like, coupling ring 15 may be coupled to a diffuser element 20 having an elongate flattened discharge outlet 21 and a flexible hook member 22 permitting diffuser element 20 to be releasably secured to a window sill, a shutter or the like. The geometry and the flexibility of hook

member 22 are of course selected so as to permit it to be engaged with window sills 25, shutters or the like of different thickness (Fig. 5).

Discharge outlet 21 of diffuser element 20 is surrounded by an outwards projecting rim 23 permitting diffuser 20 to be retained by a sash window or a sliding shutter.

Receptacle 14 may also be permanently installed in the wall of a room or the like to act as a ventilation passage and at the same time as a housing for storing extensible conduit 13 when not in use.

The outer surface of receptacle 14 is provided with longitudinally extending ribs 24 for facilitating the handling of the device or for anchoring the receptacle when it is permanently installed in a wall or the like.

According to another advantageous aspect, receptacle 14 may be made of an extruded plastic material and cut to a suitable length as required by the dimensions of extensible conduit 13 and/or the wall in which it is to be installed.

As shown in the above description, the invention attains the stated object of providing a discharge device permitting the extensible conduit to be conveniently stored in its contracted state when not in use, while retaining its character as a separate accessory of the appliance.

These advantages have been obtained moreover without limiting the flexibility with regard to the installation of the appliance and without requiring its internal construction to be modified, but with considerable improvements in handling and use of the appliance. The device according to the invention may of course be modified in various ways within the spirit of the invention as claimed.

The connection means on coupling rings 15, 16, receptacle 14, diffuser element 20 and the discharge outlets of dryer 5 may thus be formed as snap-fit connector means, screw-threaded connections or any other type of readily and quickly releasable connection.

Claims

1. A device for the discharge of moist air from a laundry dryer, particularly of the domestic type, having an open circuit for the discharge of warm and moist air into the ambient environment through one or several discharge outlets (9, 10, 11, 12) formed in the housing (6) of the dryer (5) and through a resiliently extensible conduit adapted in its operative state to be releasably connected to one of said discharge outlets (9, 10, 11, 12) of the dryer (5) and to a ventilation opening in a boundary wall of a room in which the dryer is installed, while in its contracted inoperative state, said conduit

can be accommodated within the dryer (5), characterized in that said device comprises a receptacle for said extensible conduit (13) in the form of a rigid tubular sleeve (14), and two coupling rings (15, 16) secured to the ends of said conduit (13) and provided on their respective outer peripheral surfaces with first (17) and second (18) quick-coupling means, said first quick-coupling means (17) permitting the ends of said conduit (13) to be secured to respective ends of said receptacle (14), and said second quick-coupling means (18) permitting one end of said conduit (13) to a discharge outlet (9, 10, 11 or 12) of said dryer (5), and the other end to be connected to a diffuser element (20) or to a ventilation passage in a boundary wall of a room.

2. A device according to claim 1, characterized in that each of said coupling rings (15, 16) has its outer peripheral surface provided with coupling pins (17, 18) adapted respectively to engage corresponding coupling slots (19) formed in the peripheral walls of said discharge outlets (9, 10, 11, 12) of said dryer (5) or of said diffuser element (20) or said ventilation passage, and in respective end portions of said tubular receptacle (14).
3. A device according to claim 1, characterized in that said tubular receptacle (14) is provided with longitudinal ribs (24) for facilitating its handling and adapted to act as anchoring means when said receptacle (14) is permanently installed in a boundary wall to act as a ventilation passage.
4. A device according to claim 1, characterized in that said diffuser element (20) is of elongate flattened shape and provided with a flexible hook member (22) permitting it to be attached to a window sill or the like, and with an outwards projecting peripheral rim (23) surrounding its elongate flattened discharge opening (21) and adapted to be retained by the lower edge of a sash window, a sliding shutter or the like.

Revendications

1. Dispositif pour évacuer l'air humide d'un sèche-linge, notamment du type domestique, ayant un circuit ouvert pour l'évacuation de l'air chaud et humide dans l'environnement ambiant par une ou plusieurs ouvertures d'évacuation (9,10,11,12) formées dans le coffre (6) du sèche-linge (5) et par un conduit élastiquement extensible adapté, dans son état opéra-

tionnel, pour être raccordé de façon amovible à l'une de ces ouvertures d'évacuation (9,10,11,12) du sèche-linge (5) et à une ouverture de ventilation dans une paroi du local dans lequel est installé le sèche-linge, tandis que, dans son état de repos contracté, le conduit peut être logé à l'intérieur du sèche-linge (5), caractérisé en ce que ce dispositif comprend un réceptacle pour le conduit extensible (13) sous la forme d'un manchon tubulaire rigide (14), et deux bagues de raccordement (15,16) fixées aux extrémités de ce conduit (13) et dont les surfaces périphériques extérieures respectives comportent un premier (17) et un deuxième (18) moyen de raccordement rapide, le premier moyen de raccordement rapide (17) permettant de fixer les extrémités du conduit (13) aux extrémités respectives du réceptacle (14), et le deuxième moyen de raccordement rapide (18) permettant de fixer une extrémité du conduit (13) sur une sortie d'évacuation (9,10,11 ou 12) du sèche-linge (5), et l'autre extrémité à un élément diffuseur (20) ou à un passage de ventilation dans une paroi du local.

2. Dispositif selon la revendication 1, caractérisé en ce que chaque bague de raccordement (15,16) a sa surface périphérique extérieure présentant des tétons de raccordement (17,18) adaptés respectivement pour coopérer avec des fentes de raccordement correspondantes (19) formées dans les parois périphériques des sorties d'évacuation (9,10,11,12) du sèche-linge (5) ou de l'élément diffuseur (20) ou du passage de ventilation, et dans des portions terminales respectives du réceptacle tubulaire (14).
3. Dispositif selon la revendication 1, caractérisé en ce que le réceptacle tubulaire (14) comporte des nervures longitudinales (24) pour faciliter sa manipulation et adaptées pour servir de moyens d'ancrage lorsque le réceptacle (14) est installé de façon permanente dans une paroi pour servir de passage de ventilation.
4. Dispositif selon la revendication 1, caractérisé en ce que l'élément diffuseur (20) a une forme aplatie allongée et est équipé d'un élément de crochet flexible (22) lui permettant d'être fixé sur un appui de fenêtre ou analogue, et d'un rebord périphérique se projetant vers l'extérieur (23) entourant son ouverture d'évacuation aplatie allongée (21) et adapté pour être retenu par le bord inférieur d'une fenêtre à guillotine, d'un volet coulissant ou analogue.

Patentansprüche

1. Vorrichtung zum Abführen von feuchter Luft aus einem Wäschetrockner, insbesondere vom Haushaltstyp, mit einem offenen Kreislauf für die Abgabe von warmer und feuchter Luft in die Umgebung durch eine oder mehrere Auslaßöffnungen (9, 10, 11, 12), die in dem Gehäuse (6) des Trockners (5) ausgebildet sind, und durch eine elastisch dehnbare Leitung, die in ihrem betriebsbereiten Zustand dazu eingerichtet ist, lösbar mit einer der Auslaßöffnungen (9, 10, 11, 12) des Trockners (5) und mit einer Entlüftungsöffnung in einer Umgrenzungswand eines Raums verbunden zu werden, in der der Trockner installiert ist, während sie in ihrem unwirksamen Zustand zusammengezogen ist und die innerhalb des Trockners (5) untergebracht werden kann, **dadurch gekennzeichnet**, daß die Vorrichtung einen Behälter für die ausdehnbare Leitung (13) in Form einer steifen tubusförmigen Hülse (14) und zwei Kupplungsringe (15, 16) aufweist, die an den Enden der Leitung (13) befestigt sind und die an ihrem äußeren Umfangsflächen jeweils mit einer ersten (17) bzw. einer zweiten (18) Schnellkupplungseinrichtung versehen sind, wobei die erste Schnellkupplungseinrichtung (17) ermöglicht, die Enden der Leitung (13) an den betreffenden Enden des Behälters (14) zu befestigen und die zweiten Schnellkupplungseinrichtungen (18) ein Ende der Leitung (13) an einer Auslaßöffnung (9, 10, 11 oder 12) des Trockners (5) und das andere Ende an einem Diffuserelement (20) oder einem Entlüftungsdurchlaß in einer Begrenzungswand des Raumes zu befestigen erlauben.
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2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß jeder der Kupplungsringe (15, 16) an seiner äußeren Umfangsfläche mit Kupplungsstiften (17, 18) versehen ist, die jeweils dazu eingerichtet sind, in entsprechende Kupplungsschlitze (19) einzugreifen, die in den Umfangswänden der Auslaßöffnungen (9, 10, 11, 12) des Trockners (5) oder des Diffuserelements (20) oder des Entlüftungsdurchlasses und den jeweiligen Endabschnitten des tubusförmigen Behälters (14) einzugreifen.
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3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß der tubusförmige Behälter (18) mit Längsrippen (24) versehen ist, um seine Handhabung zu erleichtern und um als Verankerungseinrichtungen zu wirken, wenn der Behälter (14) permanent in einer Umgrenzungswand installiert ist, um als Entlüftungs-
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durchgang zu wirken.

4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet**, daß das Diffuserelement (20) von langgestreckter, flacher Gestalt ist und mit einem flexiblen Hakenelement (22) versehen ist, das es ihm erlaubt, ihn an einem Fensterbrett od.dgl. zu befestigen, und mit einer auswärts vorstehenden Umfangsrippe (28) versehen ist, der die langgestreckte, flache Auslaßöffnung (21) umgibt und dazu eingerichtet ist, von dem unteren Rand eines Schiebefensters, eines Schiebeverschlusses od.dgl. gehalten zu werden.



