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**DE-A-2 308 641
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Description

This invention relates to a heating appliance and concerns a heating appliance having a gas burner, and a control valve disposed in front of the inlet of the gas burner and operable to control the burner output by means of an on/off switching operation and by regulating the gas supply to the gas burner during the gas supply phases thereby to provide for a pulse-duration modulated gas proportioning and burner output.

Such a heating appliance is known from the DE—A—23 08 641, the gas burner described there being intended in particular for cookers, but it renders it possible, with a regulated on/off control in adjustable pulse-duration modulation, to adjust the heating energy continuously over a wide range, at any rate with regard to its average value.

In the case of space heating there is also frequently a need for the effective and robust heating by means of gas burners to be able to be controlled more sensitively than is possible with the selection between switching on and switching off. Accordingly, it is the object of this invention to develop a heating appliance of the above-mentioned controllable type so that it can be used advantageously for space heating.

According to this invention, this problem is solved in that the heating appliance is constructed in the form of a heat radiator with at least one radiator tube extending in alignment with the mouth of the gas burner and a fan disposed on the radiator tube at the end remote from the gas burner, and in that the radiator tube is of strong-walled construction with a weight of more than 2.5 g/cm² relative to its generated surface.

Fundamentally, according to this invention, in the first instance, the heating appliance of the type designated at the beginning is provided with a shape in the form of a heat radiator and so achieves an extremely efficient low-loss method of operation. The radiator tube renders it possible, by radiation, to heat regions which are scarcely accessible with other means of heat transmission. In addition, the exhaust gases of the burner enter the ambient air with a heating effect.

The combination of a thermal radiator with a gas burner controlled *via* a control valve for a pulse-duration modulated gas proportioning could not be used, however, if radiator tubes of a conventional type were to be used for this. These are conventionally of thin-walled construction with a view to saving material, saving weight and providing for rapid heating up. In contrast, the radiator tube in the heating appliance according to this invention is made thick-walled with a weight of more than 2.5 g/cm² and according to a preferred embodiment with a weight of about 3 g/cm² of generated surface of the tube. The mass incorporated in this case ensures that, in switching operation, the radiator maintains its temperature to such an extent that no noticeable fluctuations in radiation occur but instead a constant comfortable feeding of warmth develops in work

places where such radiators are typically mounted.

At the same time, assurance is provided that the temperature of the radiator tube can be kept low, for example in a range of less than 300°C, in which case a radiation of less than 6 mW per gram results in relation to the mass of the radiator tube. Thus the phases of switching on and off can be extended to several minutes.

Particularly in the case of large radiator tubes, several metres long, longer switching cycles should be provided because each switching on has to be preceded by a scavenging operation which removes any explosive gas which may have remained behind in the radiator tube, before renewed ignition. Such a scavenging operation, to be fixed at 20 seconds for example, then determines the order of magnitude in time of the following switching on and off cycles.

One way of carrying out this invention is described in detail below by way of example with reference to drawings which illustrate only one specific embodiment and in which

Figure 1 is a view of a heating appliance in accordance with this invention from below and

Figure 2 is a side view of the heating appliance of Figure 1.

With reference to the drawings, the heating appliance, designated as a whole by 1, has a radiation tube which consists of two tube portions 2, 3 extending parallel to one another, and a return bend 4 connecting these two tube portions 2, 3. The radiation tube is connected to a box-like reflector 5 at both ends *via* welded-on struts and stiffened at the same time.

The radiator tube formed in U-shape with the tube portions 2, 3 and the return bend 4, has two ends which are situated close beside one another, in front of one of which there is disposed a gas burner 10 with a magnetically operated valve 11 (and associated control). An exhaust-gas fan 12 is disposed in front of the other end of the tube, formed by the tube portion 3. The heating appliance 1 can be disposed as a whole over a place for a worker or another region to be heated, particularly in a large or open space, and the appliance ensures an effective localized radiation heating after the necessary gas and current connections have been installed.

Briefly, the mode of operation of the appliance 1 is as follows:

At the beginning of a predetermined switching on phase, subject to control, the exhaust-gas fan 12 switches on and draws air through the radiator tube composed of the tube portions 2 and 3 and the return bend 4 in order to scavenge the radiator tube. Then the ignition of the gas burner is switched on and the supply of gas started so that the burner runs for a preset time and heats the radiator tube 2, 3, 4. The radiator tube is of particularly strong-walled construction so that during the heating, only a gradual heating-up of the tube from the inside outwards results and the heat radiated from the tube, which in any case is set to a temperature of less than 300°C, rises only

gradually and slightly before the gas burner is switched off for a preset limited (cooling) time. Thus gas burning periods and non-gas burning intervals of several minutes, well above the scavenging period of 20 seconds for example, can be provided which avoids unnecessary expenditure on scavenging and unnecessary wear of the control valve without the heat radiated from the appliance pulsating in a manner which can be felt unpleasantly.

Claims

1. A heating appliance having a gas burner and a control valve, disposed in front of the inlet of the gas burner, for a pulse-duration modulated gas proportioning and burner output, characterised in that the heating appliance is constructed in the form of a heat radiator (1) with at least one radiator tube (2, 3) extending in alignment with the mouth of the gas burner (10) and a fan (12) disposed on the radiator tube (3) at the end remote from the gas burner, and in that the radiator tube (2, 3) is of strong-walled construction with a weight of more than 2.5 g/cm² relative to its generated surface.

2. A heating appliance as claimed in Claim 1, characterised in that the radiator tube (2, 3) is constructed in the form of a radiant tube with a weight of about 3 g/cm².

3. A heating appliance as claimed in Claim 1 or 2, characterised in that the radiator tube (2, 3) extends in U-shape and that the gas burner (10) and the fan (12) are disposed situated close beside one another at the two ends of the radiator tube.

4. A heating appliance as claimed in Claim 1, 2 or 3, characterised in that the radiator tube (2, 3) is anchored, at least at the end, to a reflector (5) extending in the longitudinal direction of the tube and above the tube.

Patentansprüche

1. Heizapparat mit einem Gasbrenner und einem vor dem Einlauf des Gasbrenners angeordneten Steuerventil für eine impulsbreitenmodulierte Gasdosierung und Brennerleistung, dadurch gekennzeichnet, daß der Heizapparat in Form eines Wärmestrahlers (1) mit zumindest einem sich fluchtend mit der Mündung des Gasbrenners (10) erstreckenden Strahlerrohr (2, 3) und einem an dem Strahlerrohr (3) an dem dem Gasbrenner abgelegenen Ende angeordneten

Ventilator (12) gestaltet ist, und daß das Strahlerrohr (2, 3) von starkwandigem Aufbau mit einem Gewicht von mehr als 2,5 g/cm² bezogen auf seine Wirkfläche ausgebildet ist.

2. Heizapparat nach Anspruch 1, dadurch gekennzeichnet, daß das Strahlerrohr (2, 3) in Form eines Strahlerrohrs mit einem Gewicht von etwa 3 g/cm² ausgebildet ist.

3. Heizapparat nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Strahlerrohr (2, 3) U-förmig verläuft und daß der Gasbrenner (10) und der Ventilator (12) dicht nebeneinanderliegend an den beiden Enden des Strahlerrohrs angeordnet sind.

4. Heizapparat nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß das Strahlerrohr (2, 3) zumindest endseitig mit einem in Längsrichtung des Rohrs und oberhalb dieses verlaufenden Reflektor (5) verankert ist.

Revendications

1. Appareil de chauffage comportant un brûleur à gaz et une vanne de commande disposée en avant de l'orifice d'entrée du brûleur à gaz, de manière à fournir un débit de sortie du brûleur et une proportion du gaz à modulation de durée d'impulsion, caractérisé en ce qu'il est construit sous la forme d'un radiateur de chaleur (1) comportant au moins un tube radiateur (23) qui s'étend à l'alignement avec l'orifice de sortie du brûleur à gaz (10) et un ventilateur (12) disposé sur le tube radiateur (3) à l'extrémité de celui-ci qui est éloignée du brûleur à gaz, et en ce que le tube radiateur (2, 3) est du type à paroi épaisse ayant un poids supérieur à 2,5 g/cm² par rapport à sa surface engendrée.

2. Appareil de chauffage suivant la revendication 1 caractérisé en ce que le tube radiateur (2, 3) est réalisé sous la forme d'un tube radiant ayant un poids d'environ 3 g/cm².

3. Appareil de chauffage suivant l'une quelconque des revendications 1 ou 2 caractérisé en ce que le tube radiateur (2, 3) s'étend avec une forme en U et le brûleur à gaz (10) et le ventilateur (12) sont disposés à proximité l'un de l'autre, aux deux extrémités du tube radiateur.

4. Appareil de chauffage suivant l'une quelconque des revendications 1, 2 ou 3 caractérisé en ce que le tube radiateur (2, 3) est fixé, au moins à son extrémité, sur un réflecteur (5) s'étendant dans la direction longitudinale du tube et au-dessus de celui-ci.

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