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A DEVICE IN GAS PURIFYING INSTALLATIONS FOR PREVENTING DISCHARGE OF UNPURIFIED GAS UPON CHANGES OF THE GAS-FLOW DIRECTION.

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Description

The present invention relates to gas purifying installations operating with reversal of the gas-through-flow direction, and more precisely it concerns an arrangement by means of which polluted gas which on account of the reversal of the gas-flow direction remains untreated, is prevented from reaching the environment.

The invention concerns e.g. the type of gas purification installation which is described in SE-A-441 623. In this type of purifying installation, the gas to be treated travels through the installation alternately in opposite directions. The change of direction generally is effected with the aid of a reversing valve arranged in a manner ensuring that treated discharge gas and untreated supply gas alternately flow through the valve chambers. However, one consequence of this arrangement is that when the gas flow direction is changed, untreated gas will be discharged into the surrounding atmosphere without having passed through the treatment zone of the purifying installation, unless special means are provided to prevent this from happening.

The main object of the present invention is to provide an efficient device of simple construction by means of which untreated gases are positively prevented from reaching the atmosphere in connections with reversal of the gas through-flow direction through the purifying installation.

The object is achieved in accordance with the invention in that prior to reversal of the direction of the gas, clean air or other clean gas is made to flow to the operative part of the installation in order to temporarily fill the part of the installation which prior to the reversal of the direction of the gas serves as the inlet and after the reversal of the direction of the gas serves as the outlet.

This may be performed with the aid of a unit in accordance with the invention which is adapted for use in gas purifying installations of the kind operating with reversal of the gas through-flow direction and comprising a double-purpose channel system, which upon operation in one flow direction forms the inlet channel feeding polluted gas into the installation and upon operation in the opposite flow direction forms the outlet channel discharging purified gas therefrom, which unit is mounted within the inlet channel, this unit consisting of an inlet chamber, an outlet chamber and a multi-channel system positioned intermediate the inlet and outlet chambers and comprising at least two channels, whereas in the interior of the inlet chamber is located a valve means which, depending on its position, directs gas entering the inlet channel to one or the other of the two channels.

One embodiment of the invention will be described in closer detail in the following with reference to the accompanying drawings, wherein

Fig. 1 illustrates a purifying installation which is equipped with a device in accordance with the invention, immediately preceding the reversal of the flow direction of the gas through the purifying installation;

Fig. 2 illustrates the installation immediately after completion of the reversal of the through-flow direction;

Fig. 3 illustrates the same installation immediately prior to the next reversal of the through-flow direction, and

Fig. 4 illustrates the installation immediately after the last-mentioned reversal of the through-flow direction.

The purifying installation illustrated in the drawings and generally referred to by reference numeral 1 is of a type known *per se* and described e.g. in SE-A-441 623. The illustrated installation comprises a chamber having two perforated walls 2 defining between them a treatment zone 3, preferably consisting of sand, wherein heating elements 4 are positioned. At its top and its bottom the device comprises collection and through-flow chambers 5 and 6 respectively, to which are connected gas conduits 7 and 8, respectively. The gas conduits 7, 8 meet in a valve housing 9 into which opens a conduit 10 connecting the valve housing with the surrounding atmosphere. Both conduits 7 and 8 carry gas to and from the installation 1, depending on the position in which a valve means 11 is set inside the valve housing 9.

In the installation illustrated in the drawings, gas is heat-treated for combustion of the impurities contained in the gas. In case the inherent combustion of the gas is not sufficient to sustain a sufficiently high temperature level inside the treatment zone 3, additional energy is supplied by the heating elements 4 to assist in elevating the temperature. To maintain a maximum temperature level inside the treatment zone 3, the gas is forced to pass alternately in opposite directions through the treatment zone, the reversals of direction being effected by means of the valve 9, 11. In the position of the valve illustrated in Fig. 1, untreated gas thus passes through an inlet channel 12 and via the valve housing 9 and the conduit 7 it enters the upper collection box 5 from which it passes through the treatment bed 3, whereupon the thus treated gas is discharged by way of the collection box 6, the conduit 8 and the valve housing 9 into the surrounding atmosphere through the outlet conduit 10.

Fig. 3 illustrates the valve means in the alternative setting position in which untreated gas flows through the common channel 12, the valve housing 9, the conduit 8 and the collection chamber 6 to pass through the treatment bed 3. Gas treated therein passes further outwards through the collection chamber 5, the conduit 7, the valve housing 9 and it is discharged to the atmosphere through the outlet 10. Accordingly, if polluted gas to be treated is sup-

plied continuously through the channel 12, any such gas that may remain in the regions closest to the valve housing at the time immediately following a reversal of the valve means, i.e. in the conduit temporarily serving as the inlet conduit from the valve housing and in the corresponding collection box in the treatment chamber, would reach the atmosphere in an untreated condition, since after a reversal these regions of the system will serve as outlet conduits and consequently gas present in these regions will not yet have reached the treatment zone 3 of the purifying installation.

The purpose of the invention is to prevent such discharges of untreated gas and to this end it provides a device generally consisting of an auxiliary unit 13 which is mounted in the common inlet 12 leading to the valve housing 9. The auxiliary device 13 consists of a channel system including an inlet chamber 14, an outlet chamber 15 and a multi-channel system positioned intermediate the inlet and outlet chambers and comprising at least two channels 16 and 17. It goes without saying that the two channels could be in the form of two groups of channels 16 and 17, respectively. In the interior of the inlet chamber is located a flap valve 18 which, depending on its position, directs gas entering the common channel 12 to one or the other of the two channel systems 16 or 17. The outlet chamber 15 serves to direct gas discharged from the two channel systems 16, 17 to the common inlet channel 12 leading to the valve housing 9. Spaced from the outlet ends of the two channels 16, 17, preferably in the entrance region of said two channels, are fresh air intake channels 19 and 20, respectively, the flow area of which is relatively restricted in comparison with that of the rest of the channels 16, 17. Pressure-increasing devices, such as fans or similar means may be connected to the intake channels 19, 20.

In operation, the device functions in the following manner. In the position of the valve flaps 11 and 18 illustrated in Fig. 1 polluted gas flowing through the channel 12 will pass via the channel system 16, the outlet chamber 15, the valve housing 9, the conduit 7 and the collection chamber 5 up to the treatment zone 3 and from there further via the collection chamber 6, the conduit 8, the valve housing 9 to be discharged into the atmosphere in purified condition through the outlet 10. In the meantime, fresh air is supplied through the air intake 20 into the channel system 17, filling the latter, while polluted gas, previously present in the channel system 17, will be forced into the channel 12 via the outlet chamber 15.

Upon reversal of the valve 11 to change the flow direction of the gas through the installation 1 also the position of valve 18 is reversed, with the result that, as illustrated in Fig. 2, polluted gas instead will pass through the channel system 17 and into the valve housing via the outlet chamber 15 while the channel system 16 successively filled with fresh air entering

through the intake 19 and polluted gas remaining inside the channel system 16 successively will flow into the installation 1 while the fresh air gradually fills the channel system 16.

In Fig. 3 is illustrated the position when the entire channel system 16 is filled with fresh air entering at a comparatively slow rate. As a result thereof it may happen that some fresh air will be entrained by the polluted gases into the installation, also after filling of the associated channel system with fresh air, if some further time passes before a change of flow direction takes place. On account of the slow inflow of fresh air owing to the comparatively narrow intake passages 19 and 20, respectively, this does not constitute a significant disadvantage in the system. The volume of the channel systems 16, 17 should, however, be sufficient to allow fresh air contained therein to flow through the entire purifying installation 1 before reversal of the valve flap 11 is effected. Owing to this arrangement no polluted untreated gas will remain inside that region of the system which after the reversal will act as an outlet channel. This also means that the reversal of the valve 18 should take place sufficiently ahead of the reversal of the valve 11 to allow the installation 1 to be filled with fresh air or other clean gas supplied through the intake passages 19, 20 before the valve 11 is reversed. In other words, flushing of the installation is allowed to take place before the flow direction is reversed. The volume of the channel systems 16, 17 should not either be too large since an unnecessarily slow through-flow of fresh air in the purifying installation 1 results in unnecessary cooling thereof. This is particularly delicate when the intervals between each reversal of the direction are brief.

Other means than those described could be used to flush the installation 1 clean by means of fresh air or other clean gas prior to the reversal of the flow direction. In accordance with the embodiment illustrated in the drawings the auxiliary device 13 is in the shape of a channel system and in the foregoing description reference is made to a channel system but obviously it is possible to arrange the chambers formed by the channels in some other way. Also other types of vessels may be filled alternately with fresh air and polluted gas and alternately be shunted into the regular supply inlet to the purifying installation.

Claims

1. A gas purifying installation, preferably of combustion type, of the kind operating with reversal of the gas through-flow direction and having a double-purpose channel system, which system, upon operation in one flow direction, forms the inlet channel feeding polluted gas into the installation and upon operation in the opposite flow direction, forms the outlet channel discharging purified gas

therefrom, **characterized** by a unit (13) mounted within the inlet channel (12), this unit consisting of an inlet chamber (14), an outlet chamber (15) and a multi-channel system positioned intermediate the inlet and outlet chambers and comprising at least two channels (16, 17), whereas in the interior of the inlet chamber (14) is located a valve means (18) which, depending on its position, directs gas entering the inlet channel (12) to one or the other of the two channels (16, 17).

2. A device as claimed in claim 1, **characterized** in that the valve means is a reversing valve (18) located in the inlet end of the parallel channels and in that spaced from the outlet ends of the two channels (16, 17), preferably in the entrance region of said two channels, are fresh air intake channels (19, 20).
3. A device as claimed in claim 2, **characterized** in that means are provided to equalize the pressures in the fresh air intake channels (19, 20) and the parallel channels (16, 17).

Patentansprüche

1. Gasreinigungsanlage, vorzugsweise vom Verbrennungstyp, die mit Umkehr der Gasdurchströmungsrichtung arbeitet und ein Doppelzweck-Kanalsystem aufweist, das beim Betrieb in der einen Strömungsrichtung den Einlasskanal bildet, welcher der Anlage verunreinigtes Gas zuführt, und bei Betrieb in der entgegengesetzten Strömungsrichtung den Auslasskanal bildet, welcher gereinigtes Gas aus der Anlage heraus trägt, **gekennzeichnet** durch eine im Einlasskanal (12) angebrachte Einheit (13), die eine Einlasskammer (14), eine Auslasskammer (15) und ein Mehrkanalsystem umfasst, das zwischen der Einlass- und Auslasskammer angeordnet ist und zumindest zwei Kanäle (16, 17) umfasst, während im Inneren der Einlasskammer (14) ein Ventilmittel (18) angeordnet ist, das je nach seiner Position das in den Einlasskanal (12) eintretende Gas in den einen oder den anderen der beiden Kanäle (16, 17) lenkt.
2. Anlage nach Anspruch 1, dadurch **gekennzeichnet**, dass das Ventilmittel ein im Einlassende der parallelen Kanäle angebrachtes Umschaltventil (18) ist, und dass im Abstand von den Auslassenden der beiden Kanäle (16, 17), vorzugsweise im Eintrittsbereich der beiden Kanäle, Frischluft-Eintrittskanäle (19, 20) vorgesehen sind.
3. Anlage nach Anspruch 2, dadurch **gekennzeichnet**, dass Mittel zum Ausgleichen des Druckver-

hältnisses in den Frischluft-Eintrittskanälen (19, 20) und den parallelen Kanälen (16, 17) vorgesehen sind.

Revendications

1. Installation de purification de gaz, de préférence du type à combustion, du genre fonctionnant avec inversion de la direction d'écoulement de gaz et comportant un dispositif de canal à double fonction, ledit dispositif, lorsqu'en fonction dans une direction d'écoulement, constitue le canal d'admission alimentant l'installation en gaz pollué et lorsqu'en fonction dans la direction opposée d'écoulement, constitue le canal d'émission qui en décharge le gaz purifié, caractérisée par un élément (13) monté à l'intérieur du canal d'admission (12), cet élément étant constitué d'une chambre d'admission (14), d'une chambre d'émission (15) et d'un dispositif à canaux multiples positionné entre les chambres d'admission et d'émission et comprenant au moins deux canaux (16,17), alors qu'à l'intérieur de la chambre d'admission (14) se trouve un moyen soupape (18) qui, suivant sa position, dirige le gaz entrant dans le canal d'admission (12) vers l'un ou l'autre des deux canaux (16,17).
2. Dispositif suivant la revendication 1, caractérisé en ce que le moyen soupape est une soupape à inversion (18) située dans l'extrémité d'admission des canaux parallèles et en ce que des canaux d'arrivée d'air frais (19,20) se trouvent à l'écart des extrémités d'émission des deux canaux (16,17), de préférence dans la région d'entrée desdits deux canaux..
3. Dispositif suivant la revendication 2, caractérisé en ce qu'il comporte des moyens d'égaliser les pressions dans les canaux d'arrivée d'air frais (19,20) et dans les canaux parallèles (16,17).

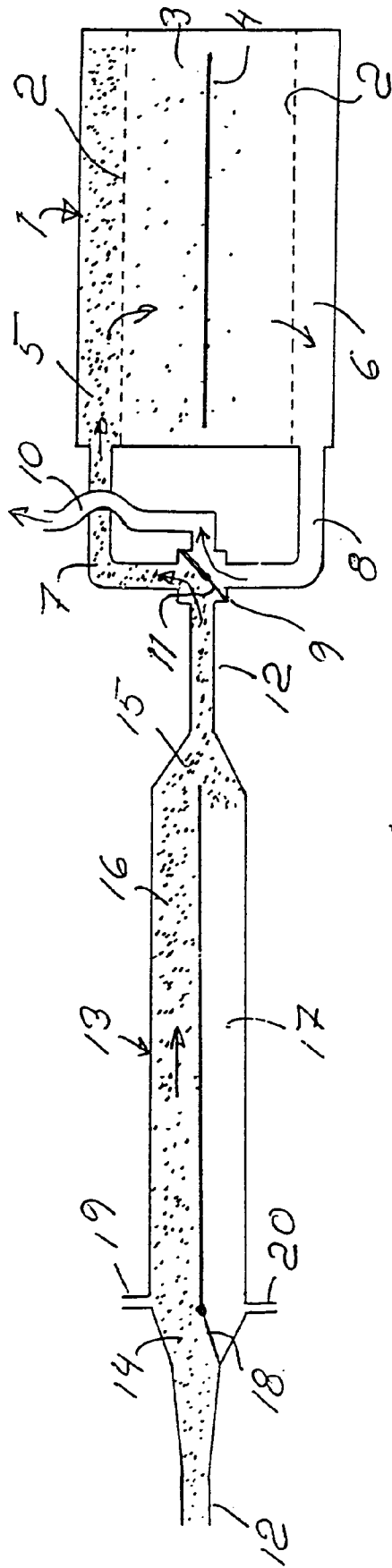


Fig. 1

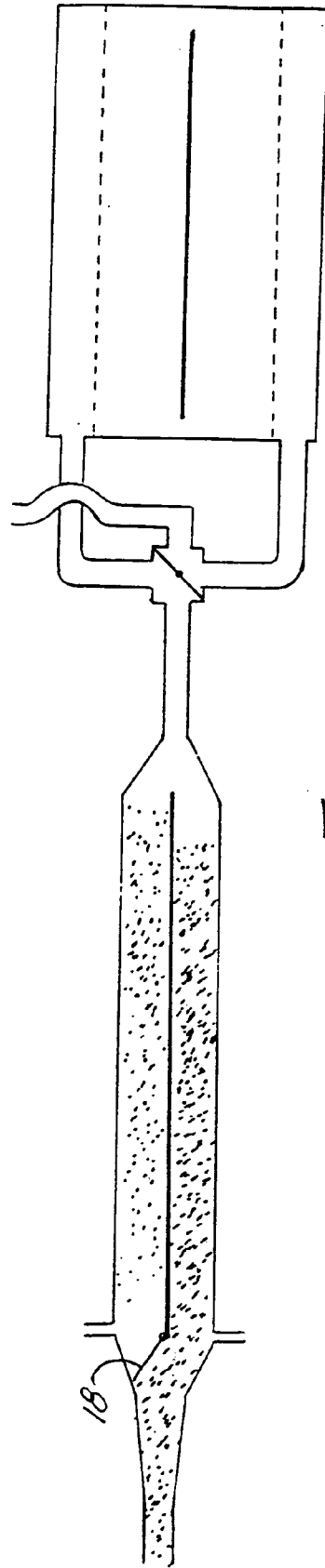


Fig. 2

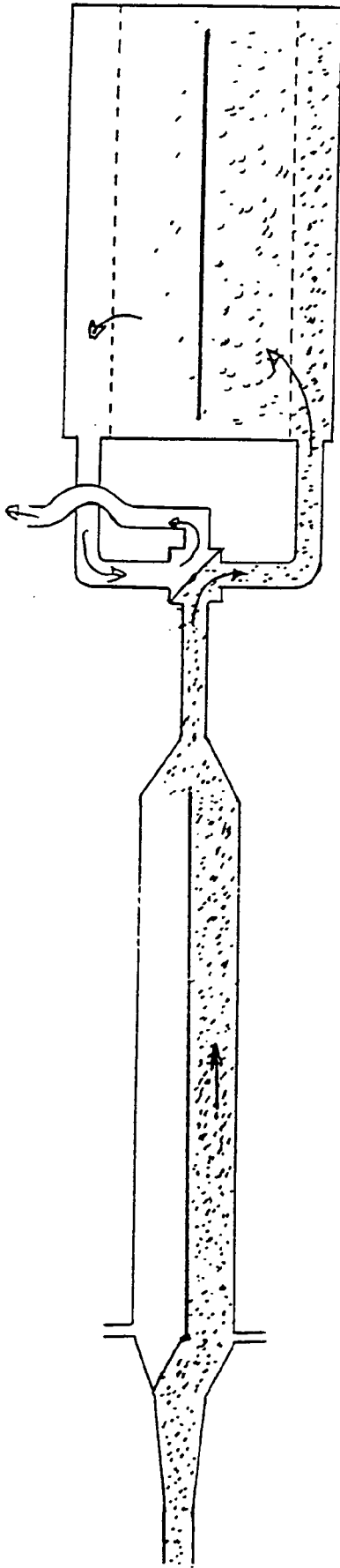


Fig. 3

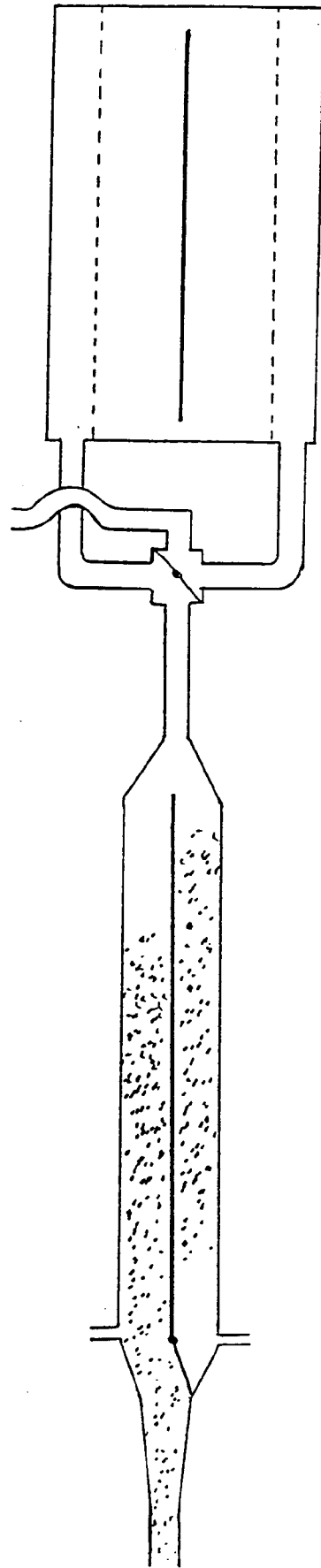


Fig. 4