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• **ECS Easy Chimney System AB**
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(54) **Chimney**

(57) The present invention is for a chimney having a flexible steel tube flue and a surrounding jacket and insulating material between the flue and the jacket.

The jacket comprises an outer jacket (3) and an inner jacket (2) where the outer jacket (3) is continuous

along the whole length of the chimney and the inner jacket (2) is split into sections between which there are open slots. The insulating material (5) is in the shape of powder or granules and flowing. A container for insulating material is arranged at the upper section of the chimney.

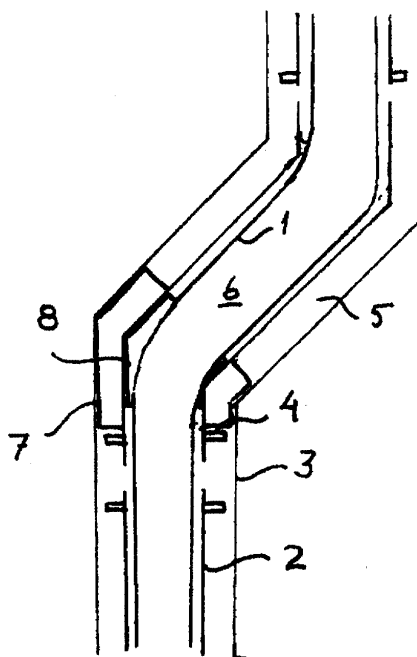


FIG 3

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Description

[0001] The present invention is for a chimney which may be used with one or more fireplaces or hearths both at new installations and rebuilding.

[0002] Chimneys for fireplaces or hearths which are intended to generate heat primarily for heating and hot water generation have traditionally been built of brick. The chimney stack then mainly has its extension inside through the building. There have also been developed chimneys having chimney flues made from steel. Due to the high temperatures of the flue gases these ways of building strictly regulated and at known constructions it is required that the chimneys or flues are built into special shafts in the building. This takes up a lot of space and means that the building of the chimney must be at the site. Further requirements then are that the shaft must be sealed so that the intrusion of oxygen to possibly leaking out flue gases is prevented as the gases may be explosive. Conventional outer jackets made from metal or concrete, pumice or the like has joints and are not satisfactorily sealed.

[0003] The object of the present invention is a chimney which has flue flues made from steel and so made that it may be installed without a shaft. This means that a chimney may be installed inside or adjacent all kinds of building constructions and building materials. It is also an object that it shall be possible to assemble the chimney in whole in a factory for direct installation at its place in the building. It is further an object to achieve a chimney of low weight so that it may be put on the existing framing of joists without any reinforcement thereof. The chimney according to the invention and embodiments thereof has the characterising features which are mentioned in the claims.

[0004] In order that the chimney may be installed without a shaft the temperature at its outer surface may not at any moment or at any spot be above a highest allowed temperature. The chimney according to the present invention thus has a smoke flue which is surrounded by an inner jacket and an outer jacket, preferably made from steel. The space between the outer jacket and the smoke flue is filled with insulating material which is of granular or powder form or other form which allows flowing of the material. The chimney is so designed that no empty pockets may occur within the insulating material neither at manufacture nor at use. For this aim the inner jacket is so adapted that it has regular discontinuities through which the insulating material may pass between the two sides of the inner jacket, where the motions of the insulating material may be caused by expansion and retraction of the smoke flue due to the always occurring changes of temperature. Preferably the smoke flue is made from corrugated steel. A reservoir or compensation possibility for insulating material is arranged at the top section of the chimney.

[0005] The invention will below be described more in detail with reference to the embodiment which is shown

in the enclosed figures.

[0006] Figure 1 is a horizontal cross section through a vertical section of a chimney.

[0007] Figure 2 is a vertical cross section through the section of the chimney.

[0008] Figure 3 is a vertical cross section through a partially deflecting chimney.

[0009] The chimney according to the invention comprises a smoke flue 1 which is surrounded by an inner jacket 2 and an outer jacket 3. The inner jacket flue 2 is connected to the outer jacket 3 by means of members 4 whereas the smoke flue 1 is freely arranged inside the inner jacket. The three tubes are mainly concentric but deviations occur at chimneys having deflections. The space between the outer jacket 3 and the smoke flue 1 is totally filled with insulating material.

[0010] The smoke flue 1 is preferably made from corrugated, spirally wound steel which forms a flexible tube. Goods and dimensions are selected considering the application where the selection of fuel and the number of hearths are essential parameters. The smoke flue tube is continuous without any discontinuities or junctions except for possible branching where smoke flues from several hearths are joined. The outer jacket 3 is divided into sections which are joined by sleeves to a continuous outer jacket. Also the inner jacket 2 is divided into sections. These are fixedly mounted to the outer jacket by means of members 4 so that there is an open slot between each of the inner jacket sections.

[0011] Chimneys according to the invention may be made with some sections deflecting from the vertical line for example as shown in figure 3. The sections of the outer jacket are connected by sleeves 7 and the section of the inner jacket in a corresponding way by joint guides 8. There are members 4 as required between the outer and inner jacket and that section of the inner jacket which deviates from the vertical line is preferably without joint slots.

[0012] The insulating material 5 is selected so that it will fill up all of the accessible space between the smoke flue and outer jacket. Thus the material ought to be powdered or granular and be flowing. At manufacture and installation of a chimney according to the invention the individual sections of the outer and inner jacket are first joined together where after jacket sections are put together to a chimney jacket. The flexible flue is then inserted into the jacket and connected to the hearth in known manner. After this the insulating material is filled in between the flue and the outer jacket by way of pouring into the volume 5 from the top of the chimney. The slots between the sections of the inner jacket will then secure that all accessible space is filled with insulating material as this may flow both vertically downwards into accessible volumes and between the sides of the inner jacket by passing through the slots.

[0013] When in use the chimney is exposed to great variations of temperature which cause expansion and contraction of the flue and the jackets, causing that the

insulating material is deformed and very slowly disintegrates into small parts. The disintegration and the movements cause a gradual compacting of the insulating material. Additional insulating material may continuously be added from the storage container and the upwards and downwards movements of the corrugated surface, which are caused by the changes of temperature, provide a feeding function which secures that fresh insulating material is continuously supplied so that no empty pockets occur in the insulation. At the top of the chimney there are means for compensation of the reduced volume of insulating material. Primarily this comprises a ring of rockwool or the like flexible or elastic insulating material which fills up the entire space between the flue and the outer jacket. At the assembly the height of the ring is compressed and it then expands downwards as the volume of the granular insulating material is reduced. Another alternative is to arrange at the top of the chimney a container which is in open connection with the insulation volume 5. The container, which for example may be made as a surrounding funnel or be arranged at one side of the top of the chimney, is filled up with a supply of insulating material which gradually flows down into the insulation space as the existing material there is reduced in volume. The container is filled up with insulating material when required.

[0014] As it is secured with a chimney according to the invention that there always is sufficient amount of insulating material between the outer jacket and the flue so that the outside temperature of the outer jacket always is below the highest temperature allowed the chimney may be installed without a surrounding shaft. It may wholly or partially be prefabricated at a factory, which is preferred in case of new buildings, while by rebuilding and replacement of old chimneys it is also possible to manufacture the jacket as sections of desired length. The are put in position and the flue is then inserted and insulating material is filled in. Preferably the outer jacket is made as sections which are that much longer than the sections of the inner jacket as corresponds to the size of the desired slots between the sections of the inner jacket. At the assembly it is preferred to make use of joint sleeves with insulating material so that a sealed outer jacket is obtained.

[0015] Chimney according to the invention also brings further advantages with it. The low-weight and steady design means that the chimney may be raised on existing framing of joists without reinforcements and the structure is self-supporting also at sidewise deflecting design. Compared to previously known designs also the problem with noise that is generated at the changes of length of the material is reduced. Control and inspection is made easier as the installation is well visible and all joints may be positioned so that they are readily available for inspection. The chimney may be adapted to various conditions of use and more than one flue may be installed in one and the same jacket. At change of hearth or method of heating, e. g. changing oil to logs, the flue

may be exchanged so that the best condition also are obtained.

[0016] The chimney according to the invention further has the important advantage that there is smaller decrease of the temperature of the flue gas than is the case with hereto known chimney designs for corresponding applications and uses. The reduced decrease of the drop of the temperature may be utilised either to lower the temperature of the output gas from the hearth and so achieve a higher efficiency thereof or to achieve a higher temperature of the flue gases out from the chimney. It is a further advantage that at start up the initially cold chimney quickly reaches a steady state temperature both of the flue and the outer jacket.

[0017] Within the frame of the inventive idea there are also other possible embodiments besides what is apparent from the examples above. Both the flue and the surrounding jacket may have cross sections which are different from circular, primarily elliptic or rectangular shapes are possible. At certain embodiments with a straight chimney or a chimney which only has a small sideways deviation the flue may be a smooth tube.

Claims

1. Chimney having a flexible steel tube flue and a surrounding jacket and insulating material between the flue and the jacket characterized in that the jacket comprises an outer jacket (3) and an inner jacket (2) where the outer jacket (3) is continuous along the whole length of the chimney and the inner jacket (2) is split into sections between which there are open slots.
2. Chimney according to claim 1 characterized in that the insulating material (5) is in the shape of powder or granules and flowing.
3. Chimney according to claim 2 characterized in that the flue (1) is made from a flexible tube of corrugated steel.
4. Chimney according to claim 2 or 3 characterized in that means for increasing the volume of insulating material is arranged at the upper section of the chimney in order to compensate for a reduction of the volume of the powdered or granular insulating material.
5. Chimney according to claim 4 characterized in that the means comprises a ring or the like flexible or elastic insulating material which fills up the space between the flue and the outer jacket.

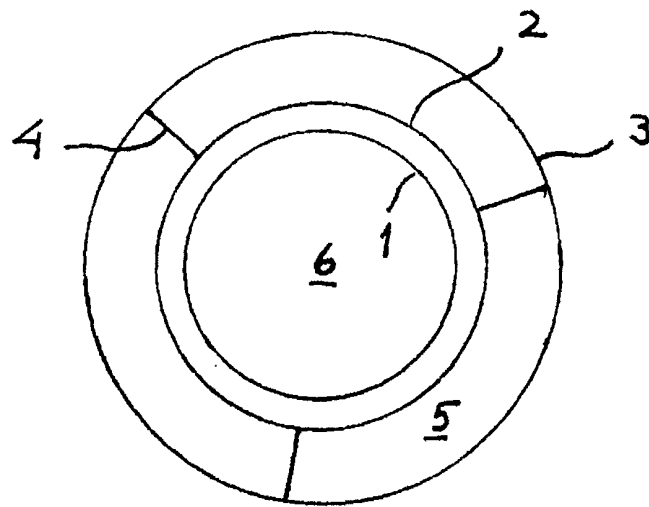


FIG 1

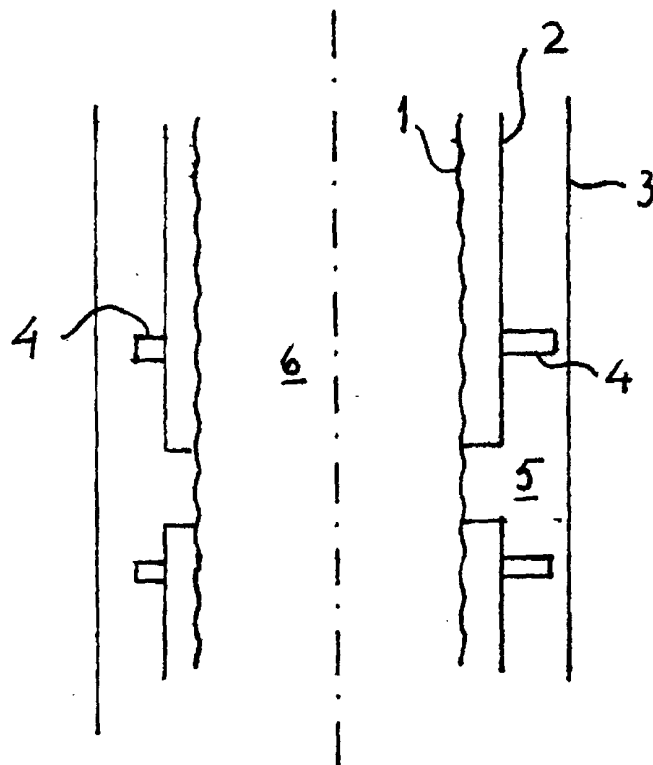


FIG 2

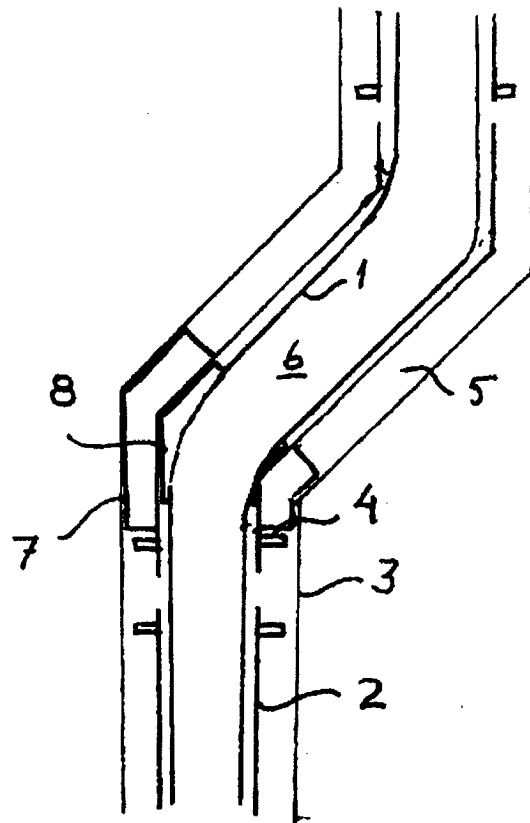


FIG 3



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EUROPEAN SEARCH REPORT

Application Number
EP 00 85 0196

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 3 464 174 A (ROSENBERG PER JAN AKE) 2 September 1969 (1969-09-02) * column 2, line 12 - line 33 * * column 2, line 43 - line 48 * * column 3, line 47 - line 72; figure 1 * ----	1,2	F23J11/00 F23J13/02
A	GB 1 032 469 A (BEAUMONT) * page 1, line 74 - page 2, line 70; figure 1 * ----	1,2,5	
A	US 2 457 470 A (HOWLE) 28 December 1948 (1948-12-28) * the whole document * ----	1,2,5	
A	US 2 457 471 A (HOWLE) 28 December 1948 (1948-12-28) * the whole document * ----	1,2	
A	DE 20 16 520 A (KUTTER) 21 October 1971 (1971-10-21) * page 10, paragraphs 2,3; figure 4 * ----	1,3	
A	GB 2 336 893 A (GARROD JOHN TREVOR) 3 November 1999 (1999-11-03) * the whole document * -----	1,3	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Place of search		Date of completion of the search	Examiner
THE HAGUE		31 January 2001	Coli, E
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 85 0196

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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31-01-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3464174 A	02-09-1969	SE 302350 B	15-07-1968
		DE 1683444 A	27-01-1972
		DK 130318 B	03-02-1975
		FI 42367 B	31-03-1970
		GB 1181138 A	11-02-1970
		NO 119251 B	20-04-1970
GB 1032469 A		NONE	
US 2457470 A	28-12-1948	NONE	
US 2457471 A	28-12-1948	NONE	
DE 2016520 A	21-10-1971	NONE	
GB 2336893 A	03-11-1999	NONE	