Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

Field of the Invention

[0001] The present invention relates to a mounting article for use in mounting monolithic structures for use in pollution control devices. More specifically, the present invention relates to a sheet material having reduced surface tension that is used to mount and support monoliths used in pollution control devices.

Background of the Invention

[0002] Intumescent sheet materials are typically used in pollution control devices to mount and support a fragile monolith within a housing. The monoliths are typically made of ceramic but may also be made of metal such as stainless steel. The housings are also typically made of metal and preferably are made of stainless steel. Metal housings typically have coefficients of thermal expansion that are much greater than the thermal expansion coefficients of ceramic monoliths. The intumescent sheet materials are disposed between the monolith and the housing to protect the monolith from damage and to prevent the exhaust gases from bypassing the monolith and exiting untreated. Typically, the catalysts that are supported on the monolith do not effectively treat the exhaust gases until the monolith and the catalyst reach the optimum operating temperature. One way of reducing the time required for the monolith and catalyst to reach the optimum operating temperature is to move the catalytic converter closer to the engine, which also results in higher operating temperatures. Because of the higher operating temperatures, thicker mounting mat materials are required. The thicker mounting mats keep the housing relatively cool while maintaining a high temperature gradient across the mounting mat which is beneficial for the monolith holding performance of the mounting mat. However, the types of converter monoliths that are typically used for these applications have relatively smaller monolith cross-sections, making it difficult to wrap the thicker mounting materials around the smaller contours of the monolith without cracking or breaking the sheet material.

[0003] JP-A-02061313 discloses a structure consisting of a ceramic honeycomb having many cells inside, a buffer material wound around the ceramic honeycomb and a metal container housing the buffer material and having an exhaust gas inlet port facing the front and backsides of the ceramic honeycomb. The face to be touched by the ceramic honeycomb of the buffer material has many holes and/or many grooves.

[0004] JP-A-61089916 discloses a seal-mat consisting of heat-resistant fiber such as asbestos, rock wool, ceramic fiber, carbon fiber, etc. Concaves of optional profile and amount are provided on one side or both sides of the seal-mat. Providing means of concaves are optional. Owing to the concave provision, when excessive compression is applied, one part of convex portions of the surface of seal-mat moves to the concave portions and the compression is reduced and as a result breaking possibility of honeycomb catalyst is largely lowered.

Summary of the Invention

[0005] The present invention provides a mounting article useful for mounting a pollution control element in the form of a monolith structure within a housing of a pollution control device. The mounting article comprises a sheet material having major top and bottom surfaces, a thickness, a width and a length, said sheet material being dimensioned so as to be wrapped lengthwise around and mount the pollution control element in the housing and having at least one score-line in at least one of the major top and bottom surfaces. The mounting article has at least one score-line extending the entire width of the sheet material in a direction perpendicular to the length so as to reduce or relieve tension in at least one of the major top and bottom surfaces when said sheet material is wrapped lengthwise around, so as to mount, the pollution control element in the housing. In a preferred embodiment, the sheet material has two score-lines across the width of the sheet material. In another preferred embodiment, the sheet material is an intumescent sheet material.

[0006] The present invention also provides a pollution control device comprising a housing, a pollution control element disposed within the housing, and a mounting article of the invention disposed between the pollution control element and the housing. One of the advantages of the mounting articles of the invention is that the invention allows the use of relatively thicker sheet materials in pollution control devices without undesirable cracking or breaking of the sheet material.

[0007] As used herein a “score-line” means a controlled and intended discontinuity in a surface of the sheet material which does not penetrate the entire thickness of the sheet material used to mount a pollution control element.

[0008] As used herein “intumescent sheet material” means a sheet material useful for mounting a pollution control device within a housing that contains an intumescent material that swells, foams, or expands when subjected to sufficient thermal energy.

[0009] As used herein, a “non-intumescent sheet material” means a substantially inorganic, fibrous sheet material which does not contain an intumescent material and which does not expand beyond the amount expected from the inherent coefficient of thermal expansion of the non-intumescent materials when subjected to thermal energy.
Brief Description of the Drawings

[0010]

Figure 1 is perspective exploded view of a catalytic converter showing the mounting article of the present invention.

Figure 2 is another view of the catalytic converter of Figure 1 showing the mounting article of the present invention peeled away from the monolith.

Figure 3A is a plan view of an embodiment of the mounting article of the invention and Figure 3B is a front view of an oval monolith wrapped in the mounting article of Figure 3A.

Figure 4A is a plan view of an embodiment of the mounting article of the invention and Figure 4B is a front view of an oval monolith wrapped in the mounting article of Figure 4A.

Figure 5A is a plan view of an embodiment of the mounting article of the invention and Figure 5B is a front view of an oval monolith wrapped in the mounting article of Figure 5A.

Figure 6A is a plan view of a sheet material having a plurality of score-lines and Figure 6B is a front view of a round monolith wrapped in the mounting article of Figure 6A.

Figure 7A is a cross-sectional view of a sheet material having a plurality of score-lines and Figure 7B is a front view of a round monolith wrapped with the mounting article of Figure 7A.

Figure 8A is a plan view of a sheet material having a plurality of score-lines on both surfaces and Figure 8B is a front view of a round monolith wrapped in the sheet material of Figure 8A.

Figures 9 and 10 are plan views of other embodiments of the mounting article of the invention.

Figure 11 is a perspective view of a die for making an embodiment of the mounting articles of the invention.

Detailed Description of the Preferred Embodiments

[0011] Although the mounting articles of the present invention are suitable for use in a variety of pollution control devices, such as catalytic converters and diesel particulate filters, elements, or traps, their use is described herein in connection with a catalytic converter. The description is intended to be illustrative of the use of the mounting articles of the present invention and should not be construed as limiting the use of the mounting articles to catalytic converters.

[0012] Referring to Figures 1 and 2, catalytic converter 10 comprises a metallic housing 12 with generally conical inlet 14 and outlet 16. The housing, which is also known as a can or casing, can be made from suitable materials known in the art for such use and is typically made from metal. Preferably, housing 12 is made from stainless steel. A monolithic catalytic element 18 is disposed within the housing 12 and is made from a honey-combed monolithic body of either ceramic or metal. Suitable catalytic elements, also known as monoliths, are known in the art and include those made from ceramic or metal. In this embodiment, monolith 18 is generally oval shaped in cross-section and has areas of maximum or larger radius of curvature 19 and areas of minimum radius of curvature 13. Monolith 18 is used to support the catalyst materials for the converter. A useful monolith is disclosed, for example, in U.S. RE 27,747 (Johnson). Monolith has a plurality of gas flow channels 21 therethrough. The catalyst materials coated onto the catalytic converter monoliths include those known in the art, for example, metals such as ruthenium, osmium, rhodium, iridium, nickel, palladium, and platinum and metal oxides such as vanadium pentoxide and titanium dioxide. Useful catalytic coatings are described in more detail in, for example, U.S. Patent No. 3,441,381 (Keith et al.).

[0013] For purposes of the invention, the monolith may be any shape that can be wrapped with a sheet material. Examples of such shapes include those having the cross-sectional shape of a circle, ellipse, trapezoid, square, rectangle, triangle and polygon.

[0014] Surrounding monolith 18 is surface tension relieved mounting article 20. Mounting article 20 comprises a sheet material 22 useful for mounting catalytic converters having surface discontinuities or score-lines 24 into top surface 23 of the sheet material. Top surface 23 is the surface of the sheet material that is adjacent to the housing when sheet material 22 is mounted within a catalytic converter. Bottom surface 25 is the surface of the sheet material that is adjacent to the monolith when the sheet material is mounted within a catalytic converter.

[0015] As seen more clearly in Figures 3A and 3B, score-lines 24 adjacent each end of sheet material 22 extend transversely and in parallel across the width and perpendicular to the length of the sheet material 22. Figure 3B illustrates a sheet material 22 surrounding an oval shaped monolith 18 and demonstrates how score-lines 24 relieve surface tension in the sheet. In this embodiment, score-lines 24 are preferably placed in the top surface 23 of the sheet material 22 at the point or within the area of the surface which corresponds to the smallest radius of curvature 13 of the monolith when the sheet material is wrapped around the monolith. As shown in Figure 3B, score-lines 24 provide openings 26 in the sheet material 22 that are predictable in location, depth and width. Predictable openings are advantageous because they can be taken into account when designing the housing for the catalytic converter. For example, since the openings in the sheet materials are predictable, a single converter housing design could be used to prevent the bypassing of polluting exhaust gases through the predictable openings and the housings can be easily reproduced in the quantity desired.

[0016] Figures 4A and 5A illustrate other embodi-
ments of the tension relieved mounting article of the invention. The sheet material 22 of Figure 4A has two pairs of score-lines 24 in top surface 23 which corresponds to the smallest radius of curvature of the monolith. As shown in Figure 4B, when the sheet material 22 is wrapped around an oval shaped monolith 18, two predictable openings 26 in the area of highest tension are formed. Figures 5A and 5B show an embodiment of the mounting article of the invention having three pairs of score-lines 24 in the top surface 23 of the sheet material 22 and the resulting predictable openings 26 formed after the monolith 18 is wrapped in the sheet material. One of the advantages of a sheet material having a plurality or multiple score-lines in areas of high surface tension is that the length of sheet material required to wrap a given monolith is reduced by each additional score-line added to a surface of the sheet material.

[0017] Figures 6A and 6B show mounting article 20 comprising a sheet material 22 having a plurality of score-lines 24 over the top surface 23 of the sheet material. As shown in Figure 6B, the plurality of score-lines 24 provide predictable openings 26 in the surface of the sheet material. A sheet material having a plurality of score-lines over the surface of the sheet material is preferred for round monoliths having relatively small diameters.

[0018] Figure 7A shows a mounting article 30 comprising a sheet material 22 having a plurality of score-lines 24 formed by attaching strips 32 of a mounting material onto a sheet material layer 34 such that the strips 32 are adjacent one another. The strips 32 are attached adjacent one another so to provide score-lines 24 in the surface of the sheet material 22. The score-lines provide predictable openings 26 in the surface of the sheet material after the sheet material is wrapped around a round monolith 18 as shown in Figure 7B. The strips 32 may be attached to the sheet material layer by stitching, staples, adhesives and the like. The width of the score-lines may be determined by the placement of the strips on a layer of the sheet material. Strips 32 and sheet material layer 34 may be made from the same materials as those described for sheet materials 22 below. It is also contemplated that the sheet material layer may also comprise strips of mounting material that are adhered to strips in a staggered fashion to provide alternating score lines in both surfaces of a mounting article.

[0019] Figures 8A and 8B illustrate a mounting article 20 of the invention comprising a sheet material 22 having score-lines 24 on both surfaces of the sheet material. The score-lines 24 on the inside surface 25 of sheet material 22 preferably have a greater width than corresponding score-lines 24 on the outer surface 23 of the sheet material 22 so to allow for compression of the inner surface of the sheet material.

[0020] As illustrated in Figures 9 and 10, the score-lines 24 may be provided in the surface of the sheet material 22 in any pattern as long as the openings created in the sheet material after wrapping a monolith are predictable and do not provide further undesirable cracking or propagation of the opening. The score-lines are preferably straight or linear in form.

[0021] The score-lines can be present across the width or the length of the sheet material, or both. Preferably, the score-lines extend across the entire width of the sheet material.

[0022] Sheet material 22 may be any resilient sheet that is useful for mounting monoliths, filter elements, or traps within a housing. The sheet material may comprise non-intumescent materials, intumescent materials or a combination thereof. The sheet material may be multilayered in structure, for example, two or more relatively thin intumescent or non-intumescent sheet materials adhered or laminated together to form a uniform, thicker sheet material. Useful adhesives include web adhesives and hot melt adhesives. A preferred adhesive is a web adhesive.

[0023] Examples of useful non-intumescent sheet materials include those made from ceramic fibers. Useful ceramic fibers include alumina-boria-silica fibers, alumina-silica fibers, alumina-phosphorous pentoxide fibers, zirconia-silica fibers, zirconia-alumina fibers, and alumina fibers. Commercially available fibers include those under the trademarks FIBERMAX, available from Unifrax, SAFFIL LD, available from ICI Chemicals and Polymers, ALCEN alumina fibers, available from Denka, and MAFTECH fibers, available from Mitsubishi.

[0024] The fibers are typically formed by blowing or spinning using methods known in the industry. The fibers are formed into a sheet by various known methods including blowing the fibers onto a collection screen as is practiced in the nonwoven industry. Non-intumescent sheet materials may also be made by wet-laid or papermaking techniques. Non-intumescent sheets made of ceramic fibers are generally compressed and held in the compressed state to facilitate handling during the canning process. Compression techniques include resin bonding, stitch bonding, or vacuum packing.

[0025] Preferably, sheet material 22 comprises a resilient, flexible intumescent sheet comprising from about 5 to about 65 percent by weight of unexpanded vermiculite particles or flakes, such flakes being either untreated or treated by being ion exchanged with an ammonia compound such as ammonium dihydrogen phosphate, ammonium carbonate, ammonium chloride, or other suitable ammonium compound as described in U.S. Patent No. 4,305,992 (Langer et al.); from about 10 to about 60 percent by weight of inorganic fibers including aluminosilicate fibers, glass fibers, zirconia-silica, and crystalline alumina fibers; from about 3 to about 25 percent by weight of an organic binder, for example, natural rubber latices, styrene-butadiene latices, butadiene acrylonitrile latices, latices of acrylate or methacrylate polymers and copolymers and the like; and up to about 40 percent by weight of inorganic filler material such as expanded vermiculite, hollow glass microspheres, and bentonite and other clays and the like. Useful intumes-
cent sheet materials also include those described in U. S. Patent No. 5,523,059 (Langer).

Further examples of useful intumescent sheet materials include those described in U.S. Patent Nos. 3,916,057 (Hatch et al.), 4,305,992 (Langer et al.), 4,385,135 (Langer et al.), 5,254,410 (Langer et al.), 4,865,818 (Merry et al.), 5,151,253 (Merry et al.), and 5,290,522 Rogers et al.). Useful commercially available intumescent mats and sheets include those sold under the INTERAM trademark by Minnesota Mining & Manufacturing Company of St. Paul, Minnesota.

Available single layer intumescent sheet materials typically range in thickness from about 0.5 mm to about 15 mm. If two intumescent sheets are attached together, by mechanical means such as adhesive, staples or stitches and the like, then the thickness of the sheet materials typically range from about 1 mm to about 30 mm. Preferably, the thickness of the sheet material used in the present invention ranges from about 0.8 mm to about 20 mm and more preferably from about 6 mm to about 20 mm.

The score-lines may be placed in or cut into either surface or both surfaces of the sheet material and are preferably placed into the surface of the intumescent sheet material which is adjacent to the can or casing of the catalytic converter, the top surface. The score-lines are also preferably placed into the surface of the intumescent sheet material such that they correspond to the minimum radius of curvature of the monolith. The only limitation to the depth of a score-line into the surface of the sheet material is such that the score-line does not go completely through the entire width of the sheet material or otherwise is cut to such a depth that when the sheet material is wrapped around the monolith and placed under stress, the score-line does not tear or propagate completely through the sheet material.

On the other hand, the score-line should not be so shallow so that when the sheet material is wrapped around the monolith and placed under tension, that the score-line results in unpredictable tearing or propagating which results in an undesirable depth, width or direction of the score-line. The depth of the score-lines is also related to the radius of curvature of the monolith which is directly related to the amount of surface tension placed on the sheet. As the radius of curvature decreases, the amount of surface tension in the corresponding region of the sheet increases. The limit of the depth of the score-lines for any particular end use can easily be determined by one skilled in the art without undue experimentation.

Preferably, the depth of the score-line may range from about 20 to about 90 percent of the thickness of the sheet material. More preferably, the depth of the score-lines is about 50 percent of the thickness of the sheet material.

The width of the score-lines when the sheet material is flat is not limited as long as the resulting gap or opening in the surface of the sheet material is repeatable and predictable in depth and width when the sheet material is wrapped around a monolith. Useful cross-sectional shapes for score-lines include vertical line shaped, "V"-shaped, "U"-shaped, triangular shaped, and square shaped. Generally, the widths of the score-lines may be up to about 20 mm. Preferably, the width of the score-line ranges from 0 (die cut) to about 5 mm.

The distance between adjacent multiple score-lines will depend on the particular end use. Accordingly, the distance between score-lines should be such that the tension in the surface of the sheet is relieved without undesirable propagating or tearing of the score-line and which results in a predictable opening when the sheet material is wrapped around a monolith. Generally, the distance between adjacent score-lines ranges from about 1 mm to about 100 mm with a distance between adjacent multiple score-lines being from about 1 mm to about 30 mm being preferred.

The score-lines may be formed or placed into the surface of the sheet material by any means known in the art. Useful score-line producing means include cutting, such as die cutting and forming the score-lines, for example by attaching spaced strips to a layer of sheet material or by other forming means.

Preferably, the score-lines are cut into a surface of an intumescent or non-intumescent sheet material by any convenient cutting means, such as by a utility knife, a razor and the like. More preferably, the score-lines can be cut into the surface of the sheet material simultaneously when the sheet material is die cut from a large sheet (not shown) to a predetermined size and shape. Figure 11 shows die 40 having a base 42 and a cavity 44 defined by die perimeter 46. Within cavity 44 are two scoring die rules 48 and a foamed ejection material 50. Die perimeter 46 and scoring dies 48 are typically made of metal, such as steel or stainless steel, and the base can be any rigid substrate, such as wood, plastic or metal and the like.

The thickness or height of scoring die rules 48 corresponds to the desired depth of the resulting score-lines and is less than the height of the perimeter die. The various heights of the scoring dies and the perimeter die may be adjusted depending on the thickness of the particular sheet material being cut. Of course the length of the sheet material is determined by the circumference of the monolith to be wrapped. The sheet materials of the invention have a length such that the two ends of the wrapped sheet material meet without overlapping and have no visible gap between the ends.

In use, a sheet of intumescent or non-intumescent mounting material is placed on top of die 40, pressure is applied onto the sheet material from a die cutter (not shown) and a scored and die-cut mounting article may be easily removed from the die due to foamed and resilient ejection material 50.

In use, the scored sheet materials of the invention are disposed between the monolith and the housing in similar fashion for either a catalytic converter of a die-
Object and advantages of this invention are described above in Examples 1-3 was die cut with the die using a ROTOMATIC II brand die cutter, available from Ampak, Inc., Anderson, SC. The die cut and scored sheet material could be easily removed from the die without cracking or breaking. The scored sheet material was flexed by hand to simulate the wrapping of a monolith. The two score-lines formed openings in the sheet material which had uniform widths and depths without undesirable cracking or propagating.

Example 5 and Comparison Sample C2

Two INTERAM brand type 100 intumescent mats were laminated together with a web adhesive to form a sheet material having a basis weight of about 6200 g/m². The sheet material was cut into two approximately 97 mm X 400 mm sheet materials for wrapping a ceramic oval monolith having a major axis of 5 in (12.7 cm), minor axis of 2.5 in (6.35 cm) and a length of 4.37 in (11.1 cm). The monolith was initially wrapped with the sheet material for sizing and the excess length was cut away. The monolith was wrapped with the sized sheet material C2 (no score-lines) and random surface cracks appeared in the areas of smallest radius curvature (major axis).

[0047] Two score-lines were cut into the other 97 mm X 400 mm sheet material and were spaced such that each score-line would correspond to areas of smallest radius of curvature. The score-lines extended into the
sheet material to a depth of about 50% of the thickness of the sheet material and extended across the total width of the sheet. The sheet material was cut to the appropriate length and the monolith was wrapped. Uniform openings in the areas of the score-lines were observed with no additional random surface cracking observable.

Example 6 and Comparative Example C3

Sheet materials were prepared as in Example 5 above except that the Example 6 sheet material had eight evenly spaced score-lines in its surface. Each of the score-lines extended completely across the width of the sheet. Each of the above sheet materials were wrapped around a round ceramic monolith having a diameter of 2.66 in (6.76 cm) and a length of 4 in (10.2 cm). A random crack in the surface of the comparison sheet material extended across the width of the sheet. The sheet material of Example 6 provided uniform openings in the area of the score-lines without any additional random cracking.

Example 7

A sheet of INTERAM brand Type 100 intumescent mounting sheet was cut into nine 4 in (10.2 cm) X 1 in (2.54 cm) strips. These strips were adhered (Case Sealing Adhesive, Minnesota Mining and Manufacturing Company) to the surface of a 4 in (10.2 cm) X 9 in (22.9 cm) sheet of INTERAM brand Type 100 intumescent sheet material, the strips contacting one another. The sheet material was wrapped around the round monolith as in Example 5 such that the score-lines provided openings that faced away from the monolith. The openings were predictable and uniform. No additional random cracks were observed.

Claims

1. A mounting article (20) useful for mounting a pollution control element (10) in a housing (12) of a pollution control device, said mounting article (20) comprising a sheet material having major top (23) and bottom surfaces (25), a thickness, a width and a length, said sheet material (22) being dimensioned so as to be wrapped lengthwise around and mount the pollution control element in the housing and having at least one score-line in at least one of the major top (23) and bottom surfaces (25), said mounting article (20) being characterized by said at least one score-line (24) extending across the entire width of said sheet material (22) in a direction perpendicular to the length so as to reduce or relieve tension in said at least one of the major top and bottom surfaces.

2. A pollution control device comprising:

a housing (12);

a pollution control element (10) disposed within the housing (12) and a mounting article (20) disposed between the pollution control element (10) and the housing (12), said mounting article (20) comprising a sheet material (22) having major top and bottom surfaces, a thickness, a length and a width, said sheet material (22) being wrapped lengthwise around, as to mount, said pollution control element (10) in said housing (12) and having at least one score-line (24) in at least one of said major top and bottom surfaces, said pollution control device being characterized by said at least one score-line (24) extending across the entire width of said sheet material (22) in a direction perpendicular to the length so as to reduce or relieve tension in said at least one of the major top and bottom surfaces.

3. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said sheet material has at least two score-lines (24) in said at least one of the major top and bottom surfaces.

4. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein the depth of said at least one score-line (24) ranges from about 5 to about 90 percent of the thickness of said sheet material.

5. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said at least one score-line (24) is in the major top surface of said sheet material (22).

6. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said sheet (22) material is intumescent.

7. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said sheet material (22) is intumescent, said at least one score-line (24) extending across the entire width of the major top surface of said sheet material (22) and perpendicular to the length of said sheet material (22) and wherein the depth of said at least one score-line (24) is about 50 percent of the thickness of said sheet material (22).

8. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said sheet material (22) includes a sheet material layer having a surface suitable for receiving strips of sheet material
said strips of sheet material (22) being attached to the surface of said sheet material layer in an adjacent manner to provide said at least one score-line (24).

9. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said at least one score-line (24) is U-shaped.

10. The pollution control device of claim 2 or the mounting article (20) of claim 1, wherein said at least one score-line (24) is straight in form.

11. The pollution control device of claim 2, wherein said pollution control element (10) has round shape and said sheet material (22) has a plurality of said score-line (24) in said major top surface, with said major top surface facing said housing (12).

12. The pollution control device of claim 2, wherein said sheet material (22) has at least one of said score-line (24) in said major bottom surface, with said major bottom surface facing said pollution control element (10).

13. The pollution control device of claim 14 wherein said major bottom surface has a plurality of said score-line (24).

14. The pollution control device of claim 2 or the mounting article of claim 1, wherein the score-line extends across the width of the mounting article (20), said score-line having a sinusoidal wave or zig-zag pattern.

Patentansprüche

1. Montagegegenstand (20), der zur Montage eines Schadstoffkontrollelements (10) in einem Gehäuse (12) einer Schadstoffkontrollvorrichtung brauchbar ist, wobei der Montagegegenstand (20) ein Bahnmaterial mit einer Hauptober- (23) und einer Hauptunterseite (25) umfasst und die Dicke, die Breite und die Länge des Bahnmaterials (22) so bemessen sind, dass es in Längsrichtung um das Schadstoffkontrollelement gewickelt wird und das Schadstoffkontrollelement im Gehäuse montiert und das Bahnmaterial wenigstens eine Faltlinie in wenigstens entweder der Hauptober- (23) und der Hauptunterseite (25) aufweist, wobei der Montagegegenstand (20) dadurch gekennzeichnet ist, dass wenigstens eine Faltlinie (24) sich über die gesamte Breite des Bahnmaterials (22) in einer zur Länge senkrechten Richtung erstreckt, so dass die Spannung in wenigstens entweder der Hauptober- (23) und der Hauptunterseite (25) vermindert oder entlastet wird, wenn das Bahnmaterial (22) in Längsrichtung herumgewickelt wird, um das Schadstoffkontrollelement (10) im Gehäuse (12) zu montieren.

2. Schadstoffkontrollvorrichtung, umfassend:

   ein Gehäuse (12);

   - ein im Gehäuse (12) angeordnetes Schadstoffkontrollelement (10) und einen zwischen dem Schadstoffkontrollelement (10) und dem Gehäuse (12) angeordneten Montagegegenstand (20), wobei der Montagegegenstand (20) ein Bahnmaterial (22) mit einer Hauptober- und einer Hauptunterseite, einer Dicke, einer Länge und einer Breite umfasst, das Bahnmaterial (22) in Längsrichtung um das Schadstoffkontrollelement (10) gewickelt ist, wodurch es im Gehäuse (12) montiert wird, und wenigstens eine Faltlinie (24) wenigstens entweder auf der Hauptober oder der Hauptunterseite aufweist, wobei die Schadstoffkontrollvorrichtung dadurch gekennzeichnet ist, dass wenigstens eine Faltlinie (24) sich über die gesamte Breite des Bahnmaterials (22) in einer zur Länge senkrechten Richtung erstreckt, so dass die Spannung in wenigstens entweder der Hauptober- und der Hauptunterseite vermindert oder entlastet wird.

3. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei das Bahnmaterial wenigstens zwei Faltlinien (24) in wenigstens entweder der Hauptober- oder der Hauptunterseite aufweist.

4. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei die Tiefe der wenigstens einen Faltlinie (24) von etwa 5 bis etwa 90 % der Dicke des Bahnmaterials reicht.

5. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei die wenigstens eine Faltlinie (24) sich in der Hauptoberseite des Bahnmaterials (22) befindet.

6. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei das Bahnmaterial (22) aufschäumend ist.

7. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei das Bahnmaterial (22) aufschäumend ist, wenigstens eine Faltlinie (24) sich über die gesamte Breite der Hauptoberseite des Bahnmaterials (22) und senkrecht zur Länge des Bahnmaterials (22) erstreckt und wobei die Tiefe der wenigstens einen Faltlinie (24) etwa 50 % der Dicke des Bahnmate-
8. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei das Bahnmaterial (22) eine Bahnmaterialschicht mit einer Oberfläche umfasst, die zur Aufnahme von Streifen des Bahnmaterials (22) geeignet ist, wobei die Streifen aus Bahnmaterial (22) nebeneinanderliegend an der Oberfläche der Bahnmaterialschicht angebracht sind, wodurch die wenigstens eine Faltlinie (24) erhalten wird.

9. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei die wenigstens eine Faltlinie (24) U-förmig ist.

10. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei die wenigstens eine Faltlinie (24) eine gerade Form aufweist.

11. Schadstoffkontrollvorrichtung nach Anspruch 2, wobei das Schadstoffkontroelelement (10) eine rund Form hat und das Bahnmaterial (22) eine Mehrzahl von Faltlinien (14) in der Hauptoberseite aufweist, wobei die Hauptoberseite dem Gehäuse (12) gegenüberliegt.

12. Schadstoffkontrollvorrichtung nach Anspruch 2, wobei das Bahnmaterial (22) wenigstens eine Faltlinie (24) in der Hauptunterseite aufweist, wobei die Hauptunterseite dem Schadstoffkontroelelement (10) gegenüberliegt.

13. Schadstoffkontrollvorrichtung nach Anspruch 14, wobei die Hauptunterseite eine Mehrzahl der Faltlinien (24) aufweist.

14. Schadstoffkontrollvorrichtung nach Anspruch 2 oder Montagegegenstand (20) nach Anspruch 1, wobei die Faltlinie sich über die Breite des Montagegegenstands (20) erstreckt, wobei die Faltlinie ein Sinuswellenoder ein Zickzackmuster aufweist.

Revendications

1. Article de montage (20) utile pour monter un élément de contrôle de la pollution (10) dans un boîtier (12) d'un dispositif de contrôle de la pollution, ledit article de montage (20) comprenant un matériau en feuille ayant des surfaces supérieure (23) et inférieure (25) principales, une épaisseur, une largeur et une longueur, ledit matériau en feuille (22) étant dimensionné de manière à être enroulé dans le sens de la longueur autour et à supporter l'élément de contrôle de la pollution dans le boîtier et ayant au moins une ligne d'entaille dans au moins une des surfaces supérieure (23) et inférieure (25) principales, ledit article de montage (20) étant caractérisé par ladite au moins une ligne d'entaille (24) s'étendant à travers toute la largeur dudit matériau en feuille (22) dans une direction perpendiculaire à la longueur de manière à réduire ou diminuer la tension dans ladite au moins une des surfaces supérieure (23) et inférieure (25) principales lorsque ledit matériau en feuille (22) est enroulé autour dans le sens de la longueur, de manière à supporter l'élément de contrôle de la pollution (10) dans le boîtier (12).

2. Dispositif de contrôle de la pollution comprenant :

- un boîtier (12) ;
- un élément de contrôle de la pollution (10) disposé à l'intérieur du boîtier (12) et
- un article de montage (20) disposé entre l'élément de contrôle de la pollution (10) et le boîtier (12), ledit article de montage (20) comprenant un matériau en feuille (22) ayant des surfaces supérieure et inférieure principales, une épaisseur, une longueur et une largeur, ledit matériau en feuille (22) étant enroulé dans le sens de la longueur autour, de manière le supporter, dudit élément de contrôle de la pollution (10) dans ledit boîtier (12) et ayant au moins une ligne d'entaille (24) dans au moins une desdites surfaces inférieure et supérieure principales, ledit élément de contrôle de la pollution étant caractérisé par ladite au moins une ligne d'entaille (24) s'étendant à travers toute la largeur dudit matériau en feuille (22) dans une direction perpendiculaire à la longueur de manière à réduire ou diminuer la tension dans ladite au moins une des surfaces supérieure (23) et inférieure (25) principales.

3. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequeldit matériau en feuille a au moins deux lignes d'entaille (24) dans ladite au moins une des surfaces inférieure et supérieure principales.

4. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel la profondeur de ladite au moins une ligne d'entaille (24) est dans une gamme comprise entre environ 5 et environ 90 pour cent de l'épaisseur dudit matériau en feuille.

5. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel la profondeur de ladite au moins une ligne d'entaille (24) est dans une gamme comprise entre environ 5 et environ 90 pour cent de l'épaisseur dudit matériau en feuille.
dication 1, dans lequel ladite au moins une ligne d'entaille (24) est dans la surface principale supérieure dudit matériau en feuille (22).

6. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel ledit matériau en feuille (22) est intumescent.

7. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel ledit matériau en feuille (22) est intumescent, ladite au moins une ligne d'entaille (24) s'étend à travers toute la largeur de la surface principale supérieure dudit matériau en feuille (22) et perpendiculairement à la longueur dudit matériau en feuille (22) et dans lequel l'épaisseur de ladite au moins une ligne d'entaille (24) est d'environ 50 pour cent de l'épaisseur dudit matériau en feuille (22).

8. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel ledit matériau en feuille (22) comprend une couche de matériau en feuille ayant une surface appropriée à recevoir des bandes de matériau en feuille (22), lesdites bandes de matériau en feuille (22) étant attachées à la surface de ladite couche de matériau en feuille d'une manière adjacente pour fournir ladite au moins une ligne d'entaille (24).

9. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel ladite au moins une couche de matériau en feuille (24) est en forme de U.

10. Dispositif de contrôle de la pollution selon la revendication 2 ou article de montage (20) selon la revendication 1, dans lequel ladite au moins une couche de matériau en feuille (24) est de forme rectiligne.

11. Dispositif de contrôle de la pollution selon la revendication 2, dans lequel ledit élément de contrôle de la pollution (10) a une forme ronde et ledit matériau en feuille (22) a une multiplicité desdites lignes d'entaille (24) dans ladite surface principale supérieure, avec ladite surface supérieure principale faisant face audit boîtier (12).

12. Dispositif de contrôle de la pollution selon la revendication 2, dans lequel ledit matériau en feuille (22) a au moins une de ladite ligne d'entaille (24) dans ladite surface inférieure principale, avec ladite surface principale inférieure faisant face audit élément de contrôle de la pollution (10).

13. Dispositif de contrôle de la pollution selon la revendication 12, dans lequel ladite surface principale inférieure a une multiplicité desdites lignes d'entaille (24).