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(54) CONCERTINA SMOKE OR FIRE BARRIER

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BARRIÈRE EN ACCORDÉON COUPE-FUMÉE OU COUPE-FEU

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Description

[0001] The present invention relates to a concertina smoke or fire barrier.

[0002] Normally fire and/or smoke barriers having a curtain include a roller from which the curtain is unwound for deployment of the curtain. Recently, concertina curtains have been available. Typically they comprise:

- a plurality of concertina-fold, curtain webs,
- a plurality of concertina flanges, a flange extending from a stitching joint between each adjacent pair of curtain webs and
- a tray to which a foot of the curtain is secured.

[0003] The flanges, in particular, render difficult provision of a personnel escape door.

[0004] FR2684008 A1, which represents the closest prior art, discloses a concertina smoke or fire barrier comprising a curtain having a plurality of vertical curtain webs, and a plurality of ballast bars, said barrier further comprises a normally closed door opening in the curtain, the door opening being provided by a slit formed between two vertical curtain webs, a hook and loop fastening tape, one piece of the tape being stitched to one web and another complementary piece being stitched to the curtain webs to the other side of the slit.

[0005] The object of the present invention is to provide concertina smoke or fire barrier having a personnel escape door.

[0006] According to the invention there is provided a concertina smoke or fire barrier comprising:

- a curtain having:
 - a plurality of concertina-fold, curtain webs and
 - a plurality of concertina flanges, a flange extending from a stitching joint between each adjacent pair of curtain webs,
- a normally closed door opening in the curtain, the door opening being provided by
 - a slit extending through several of curtain webs and their flanges,
 - cuts in the flanges adjacent the slit allowing flange portions between the slit and the cuts to be stitched against their webs,
 - a strip of curtain web material stitched along the length of the slit to the curtain webs to one side of the slit for covering it when the door opening is closed,
 - hook and loop fastening tape, one piece of the tape being stitched to the strip and another complementary piece being stitched to the curtain webs to the other side of the slit.

[0007] The flange portions, and the flanges, normally

comprise two thicknesses of curtain web material. One can be stitched to one side of the stitching joint and the other to the other, or both can be stitched to the same side.

[0008] The strip, and the complementary piece of tape, can be stitched to the sides of the webs away from the flanges. In the preferred embodiment, they are stitched over the cut flange portions.

[0009] Normally the curtain will have a tray to which its foot is secured and in which it is folded prior to deployment. A door part of the curtain adjacent the slit is free from the tray for opening of the door. The door may have slits along both sides, to enable it to flap open from the top. However, normally it has a single slit and opens as a triangle, flapping from the top of the slit to an end of its free bottom. A bottom bar may be provided along its free bottom to maintain the bottom straight and to weigh it down for closure.

[0010] Preferably, the strip is stitched to the curtain webs at the door side of the slit,

[0011] Where the curtain is for installation at a stair well or the like the flanges preferably extend away from the well with the strip arranged for the door to open outwards.

[0012] The curtain may also have signage on the door, preferably on the opening section of the door. It can be in the form of an exit sign with words or a visual representation to indicate that the door is able to open such as hands indicating where to push to open. Alternative representations can also be envisaged.

[0013] To help understanding of the invention, a specific embodiment thereof will now be described by way of example and with reference to the accompanying drawings, in which:

35 Figure 1 is a perspective view of a stair well having a fire or smoke curtain of the invention installed in withdrawn position;

40 Figure 2 is a view similar to Figure 1 showing the curtain deployed and the arrangement of a door in it in accordance with the invention;

45 Figure 3 is a scrap view of the curtain showing concertina panels and withdrawal straps;

Figure 4 is a similar scrap view showing a door edge strip;

Figure 5 is a scrap cross-sectional plan view of the strip; and

Figure 6 is a scrap cross-sectional view in an orthogonal plane showing a weighting bar tending to close the door.

[0014] Referring to the drawings, a stair well 1 has an upper floor opening 2 in the ceiling 3 above a lower floor 4 with a staircase 5 from the upper floor to the lower floor.

55 As shown in Figure 1, a concertina curtain tray 6 is installed in the ceiling, normally supporting a concertina curtain un-deployed above it. Figure 2 shows the curtain 7 deployed from the ceiling where a head end 8 of it is

secured to a foot end 9 secured to the tray, now resting on the floor 4.

[0015] The curtain is formed from several panels 11 of fire resistant material, one above the other, each having a main web 12 and an upper and lower flange 14,15. These extend sideways from the deployed curtain, with the panels being stitched together at stitching joints 16 between the webs, with the flanges extending out from the joints. Straps 17 are provided down the fall of the curtain, through reinforced apertures 18 in the flanges. These stabilise the curtain in case of a pressure across the curtain and enables the tray's lifting, via a non-shown winding mechanism in the ceiling which lifts the tray and with it the curtain.

[0016] For provision of a personnel escape door 21, a slit 22 is provided up the bottom five webs of the curtain, adjacent to the newel post 23 at the foot of the stairs. The slit is through the flanges 14, 15 and the stitching joints 16. Adjacent the slit, the flanges are cut to the stitching 16 to provide portions 24 of the flanges that can be folded flat again the curtain webs, whilst allowing the rest of the flanges to extend out as normal. To the side of the curtain away from the stairwell, from which the flanges extend, and opposite the foot of the stairs, a strip 25 of the fire resistant material is stitched along the slit. The strip abuts the panel webs and the flanges folded against the webs. The arrangement causes a small but manageable, local thickening of the curtain when folded on the raised tray.

[0017] The strip allows a door portion 26 of the curtain to be flapped away from the rest of the curtain by a person escaping down the stairs after the curtain has deployed. The flap is moved out of abutment with the wall portion 27 of the curtain on the other side of the slit.

[0018] For sealing the curtain at the slit 22 and strip 25, the latter overlaps the wall portion is provided with stitched on hook and loop fastening tape 28 facing the edge 29 of the wall portion and the edge 29 is provided with a complementary tape 30. The latter tape is stitched over the webs and folded flanges in like manner to the strip 25. The tapes normally fasten the door portion 26 to the wall portion 27, with strength to resist pressure across the curtain. However the hook and loop fastening can be opened by an escapee.

[0019] Whilst the curtain is secured to the tray 6 at the foot of the wall portion, at the door portion of the curtain, it is stitched into a pocket 31 containing a weighing down bar 32, typically of steel. When the door portion is flapped open, pivoting about a line 33 extending from the top of the slit, obliquely to a point 34 close to the edge of the curtain opposite the foot of the stairs, the bar is lifted. Release of the door allows the door portion to drop the bar in closing of it. Its end 35 at the foot of the slit 22 is stopped by an abutment 36 provided on the tray. The hook and loop fastening closes the strip against the wall portion of the curtain.

[0020] The invention is not intended to be restricted to the details of the above described embodiment. For in-

stance, the strip could be stitched to the wall portion to overlap the edge of the door. Further where it is expected that any fire emergency is likely to cause a pressure differential across the door such that inwards opening of the door is required, loop handles can be stitched to the door at the slit to enable it to be pulled towards an escapee.

10 Claims

1. A concertina smoke or fire barrier comprising:

- a curtain (7) having:
 - a plurality of concertina-fold curtain webs (12), and
 - a plurality of concertina flanges (14, 15), a flange extending from a stitching joint (16) between each adjacent pair of curtain webs,

• a normally closed door opening (21) in the curtain, the door opening being provided by:

- a slit (22) extending through several of curtain webs and their flanges,
- cuts in the flanges adjacent the slit allowing flange portions (24) between the slit and the cuts to be stitched against their webs,
- a strip of curtain web material (25) stitched along the length of the slit to the curtain webs to one side of the slit for covering it when the door opening is closed,
- hook and loop fastening tape (28, 30) , one piece of the tape (28) being stitched to the strip and another complementary piece (30) being stitched to the curtain webs to the other side of the slit.

2. A concertina smoke or fire barrier as claimed in claim 1, wherein the flange portions, and the flanges, comprise two thicknesses of curtain web material.

3. A concertina smoke or fire barrier as claimed in claim 2, wherein the two thicknesses of curtain web material are both stitched to the same side of the stitching joint.

4. A concertina smoke or fire barrier as claimed in claim 2, wherein the two thicknesses of curtain web material are not stitched to the same side of the stitching joint, one is stitched to one side of the stitching joint, and the other to the other.

5. A concertina smoke or fire barrier as claimed in any preceding claim, wherein the strip, and the complementary piece of tape, are stitched to the sides of the webs away from the flanges.

6. A concertina smoke or fire barrier as claimed in any of claims 1 to 4, wherein the strip, and the complementary piece of tape, are stitched over the cut flange portions. 5
7. A concertina smoke or fire barrier as claimed in any preceding claim, wherein the curtain has a tray (6) to which its foot is secured and/or in which it is folded prior to deployment. 10
8. A concertina smoke or fire barrier as claimed in claim 7, wherein a door part of the curtain adjacent the slit is free from the tray for opening of the door. 15
9. A concertina smoke or fire barrier as claimed in any preceding claim, wherein the door has slits along both sides, to enable it to flap open from the top and having a free bottom. 20
10. A concertina smoke or fire barrier as claimed in any of claims 1 to 8, wherein the door has a single slit and opens as a triangle, flapping from the top of the slit to an end of a free bottom of the door. 25
11. A concertina smoke or fire barrier as claimed in any of claims 9 or 10, wherein a bottom bar is provided along the free bottom to maintain the bottom straight and to weigh it down for closure. 30
12. A concertina smoke or fire barrier as claimed in any preceding claim, wherein the strip is stitched to the curtain webs at the door side of the slit. 35
13. A concertina smoke or fire barrier as claimed in any preceding claim, wherein where the curtain is adapted for installation at a stair well (1) or the like, the flanges preferably extend away from the well with the strip arranged for the door to open outwards. 40
14. A concertina smoke or fire barrier as claimed in any preceding claim, wherein the curtain has signage to indicate the door can be opened. 45
- Patentansprüche**
1. Ziehharmonikaartiger Rauch- oder Brandschutz, mit:
- einem Vorhang (7), der aufweist:
- eine Mehrzahl von ziehharmonikaförmig gefalteten Vorhangbahnen (12), und
 - eine Mehrzahl von Ziehharmonika-Stegen (14,15), wobei sich ein Steg von einer Nahtverbindung (16) zwischen jedem benachbarten Paar von Vorhangbahnen erstreckt,
- einer normalerweise geschlossenen Türöffnung (21) im Vorhang, wobei die Türöffnung gebildet wird durch
- einen Schlitz (22), der sich durch mehrere Vorhangbahnen und deren Stege erstreckt,
 - Einschnitte in den Stegen benachbart zu dem Schlitz, so dass Stegteile (24) zwischen dem Schlitz und den Einschnitten gegen ihre Bahnen genäht werden können,
 - einen Streifen aus Vorhangbahnmaterial (25), der entlang der Länge des Schlitzes an die Vorhangbahnen an einer Seite des Schlitzes angenäht ist, um diesen bei geschlossener Türöffnung abzudecken,
 - Klettverschlussband (23, 30) t, wobei ein Teil des Bandes (28) an den Streifen genäht ist und ein weiteres komplementäres Teil (30) an die Vorhangbahnen an der anderen Seite des Schlitzes genäht ist.
2. Ziehharmonikaartiger Rauch- oder Brandschutz nach Anspruch 1, wobei die Stegteile und die Stege zwei Dicken von Vorhangbahnmaterial aufweisen.
3. Ziehharmonikaartiger Rauch- oder Brandschutz nach Anspruch 2, wobei die beiden Dicken des Vorhangbahnmaterials an der gleichen Seite der Nahtverbindung angenäht sind.
4. Ziehharmonikaartiger Rauch- oder Brandschutz nach Anspruch 2, wobei die beiden Dicken des Vorhangbahnmaterials nicht auf der gleichen Seite der Nahtverbindung genäht sind, sondern eine auf einer Seite der Nahtverbindung und die andere auf der anderen.
5. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei der Streifen und das komplementäre Stück Band an den Seiten der Bahnen angenäht sind, die weg von den Stegen liegen.
6. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der Ansprüche 1 bis 4, wobei der Streifen und das komplementäre Stück Band über die geschnittenen Stegteile genäht sind.
7. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei der Vorhang eine Schiene (6) aufweist, an der sein Bodenende befestigt ist und/oder in der er vor der Entfaltung gefaltet ist.
8. Ziehharmonikaartiger Rauch- oder Brandschutz nach Anspruch 7, wobei ein an den Schlitz angrenzender Türteil des Vorhangs zum Öffnen der Tür mit der Schiene unverbunden ist.

9. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei die Tür auf beiden Seiten Schlitze und ein freies Bodenende hat, damit sie von oben aufklappen kann.
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10. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der Ansprüche 1 bis 8, wobei die Tür einen einzelnen Schlitz aufweist und sich als Dreieck öffnet, das von der Oberseite des Schlitzes bis zum Ende eines freien Bodenendes der Tür klappt.
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11. Ziehharmonikaartiger Rauch- oder Brandschutz nach Anspruch 9 oder 10, wobei ein Bodenbalken entlang des freien Bodenendes vorgesehen ist, um das Bodenende gerade zu halten und es zum Schließen zu beschweren.
- 15
12. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei der Streifen an der Türseite des Schlitzes an die Vorhangbahnen genäht ist.
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13. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei dort, wo der Vorhang zur Installation an einem Trepenschacht (1) oder dergleichen angepasst ist, die Stege sich vorzugsweise von dem Schacht weg erstrecken, wobei der Streifen so angeordnet ist, dass sich die Tür nach außen öffnet.
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14. Ziehharmonikaartiger Rauch- oder Brandschutz nach einem der vorstehenden Ansprüche, wobei der Vorhang eine Beschilderung hat, die anzeigt, dass die Tür geöffnet werden kann.
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15. 2. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans la revendication 1, dans laquelle les parties de méplat et les méplats comprennent deux épaisseurs de matériau de pan de rideau.
- 20
3. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans la revendication 2, dans laquelle les deux épaisseurs de matériau de pan de rideau sont toutes deux cousues du même côté du raccord cousu.
- 25
4. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans la revendication 2, dans laquelle les deux épaisseurs de matériau de pan de rideau ne sont pas cousues du même côté du raccord cousu, l'une étant cousue d'un côté du raccord cousu et l'autre, de l'autre côté.
- 30
5. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications précédentes, dans laquelle le ruban et la partie complémentaire de la bande sont cousus sur les côtés des pans éloignés des méplats.
- 35
6. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications 1 à 4, dans laquelle le ruban et la partie complémentaire de ruban sont cousus par-dessus les parties de méplat découpées.
- 40
7. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications précédentes, dans laquelle le rideau est muni d'un plateau (6) auquel est fixé son pied et/ou dans lequel il est replié avant déploiement.
- 45
8. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans la revendication 7, dans laquelle une partie de portière du rideau adjacente à la fente est libre par rapport au plateau pour ouvrir la portière.
- 50
9. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications pré-

Revendications

- Une barrière antifeu ou antifumée en accordéon, comprenant :
 - un rideau (7) avec :
 - une pluralité de pans de rideau pliés en accordéon (12), et
 - une pluralité de méplats d'accordéon (14, 15), un méplat s'étendant à partir d'un raccord cousu (16) entre chaque paire adjacente de pans de rideau,
 - dans le rideau, une ouverture de portière normalement fermée (21), l'ouverture de portière étant obtenue avec :
 - une fente (22) s'étendant sur l'étendue de plusieurs pans de rideau et de leurs méplats,
 - des découpes dans les pans adjacents à
- 5
- la fente pour permettre à des parties de méplat (24) comprises entre la fente et les découpes d'être cousues contre leurs pans,
- une bande de matériau de pan de rideau (25) cousue suivant la longueur de la fente au pans de rideau d'un côté de la fente pour la recouvrir lorsque l'ouverture de portière est fermée,
 - une bande de fixation autoagrippante (28, 30), une partie de la bande (28) étant cousue au ruban et une autre partie complémentaire (30) étant cousue aux pans de rideau de l'autre côté de la fente.

cédentes, dans laquelle la portière possède des fen-
tes le long de chacun des deux côtés, pour pouvoir
la découvrir à la manière d'un volet depuis le haut,
avec le bas libre.

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10. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications 1 à 8, dans laquelle la porte possède une unique fente et s'ouvre en triangle, en se découvrant en volet du haut de la fente à une extrémité d'un bas libre de la portière. 10
11. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications 9 ou 10, dans laquelle une barre inférieure est disposée le long du bas libre pour maintenir droit le bas et pour le lester pour le fermer. 15
12. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications pré- cédentes, dans laquelle le ruban est cousu aux pans de rideau au niveau du côté portière de la fente. 20
13. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications pré- cédentes, dans laquelle, lorsque le rideau est apte à être installé au niveau d'une trémie d'escalier (1) ou analogue, les méplats s'étendent de préférence en éloignement de la trémie avec le ruban agencé pour que la portière s'ouvre vers l'extérieur. 25 30
14. Une barrière antifeu ou antifumée en accordéon telle que revendiquée dans l'une des revendications pré- cédentes, dans laquelle le rideau est muni d'une si- gnalisation indiquant qu'il est possible d'ouvrir la por- tière. 35

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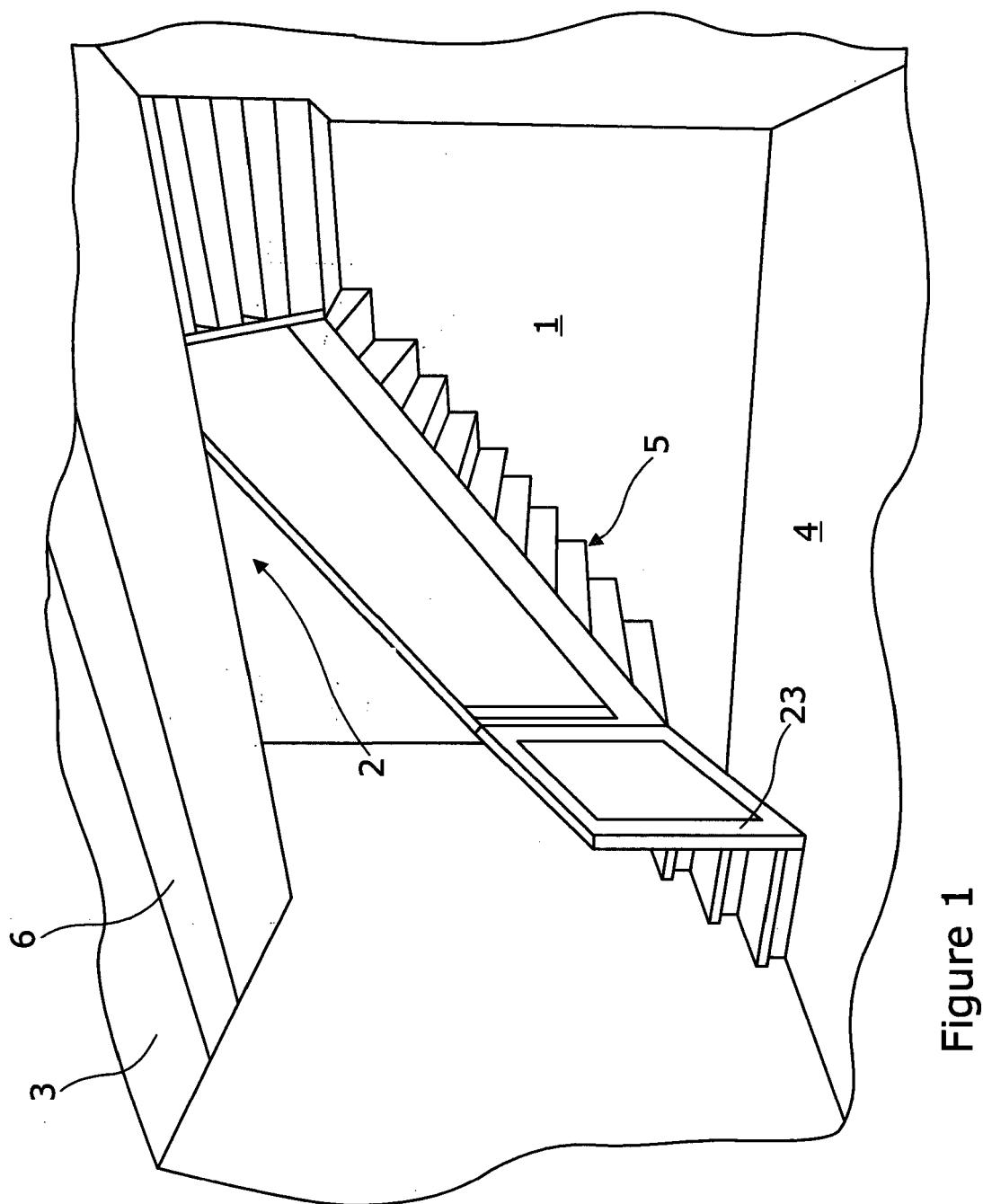


Figure 1

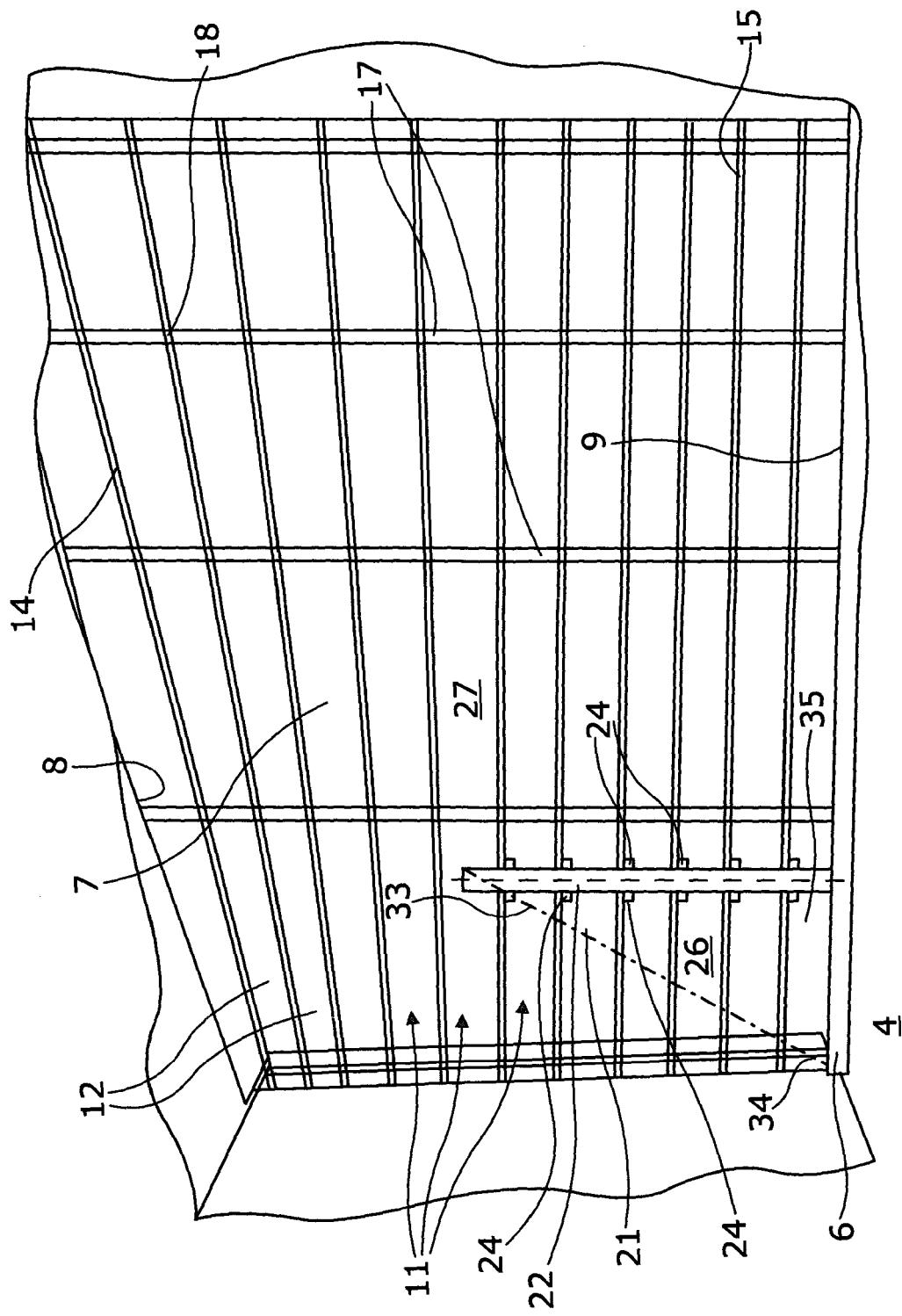


Figure 2

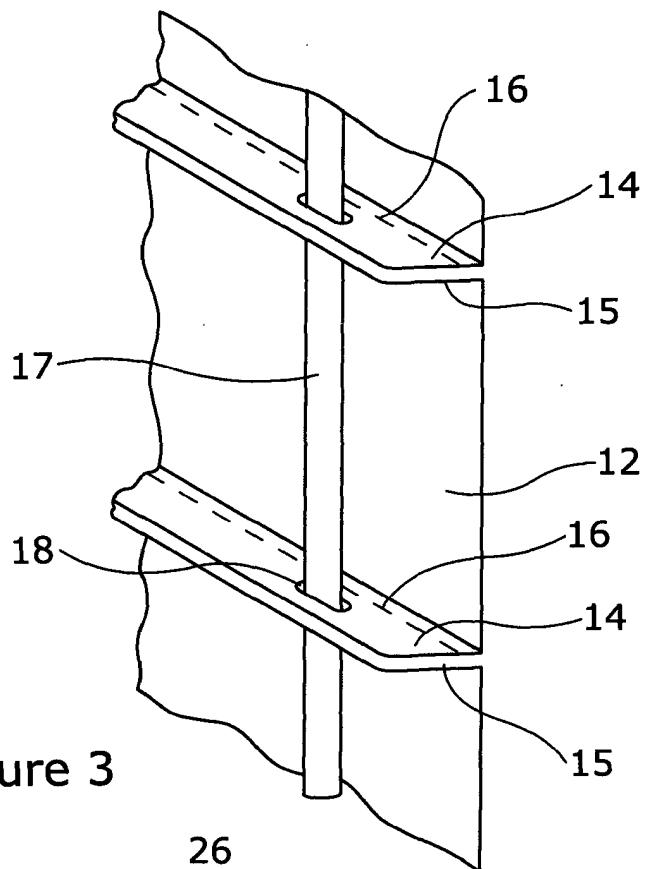


Figure 3

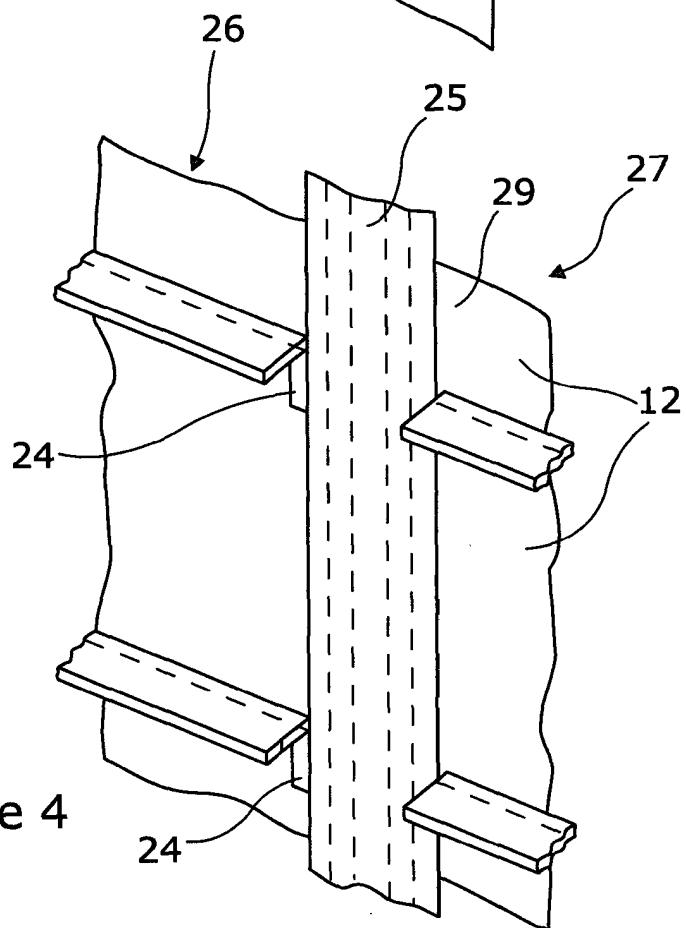


Figure 4

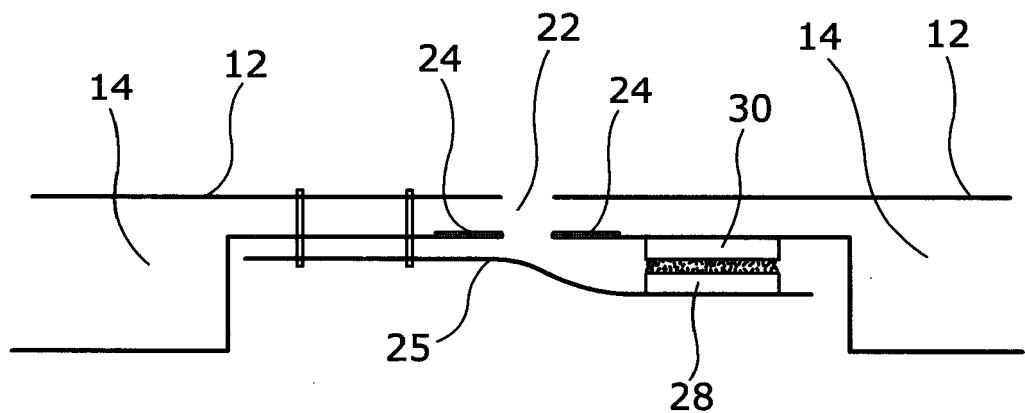


Figure 5

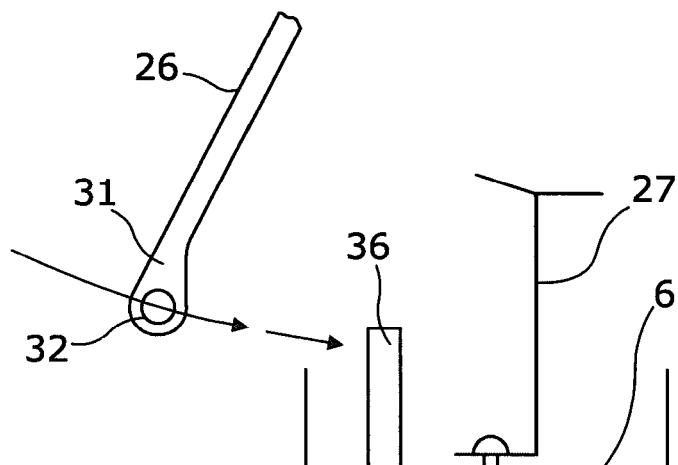


Figure 6

REFERENCES CITED IN THE DESCRIPTION

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