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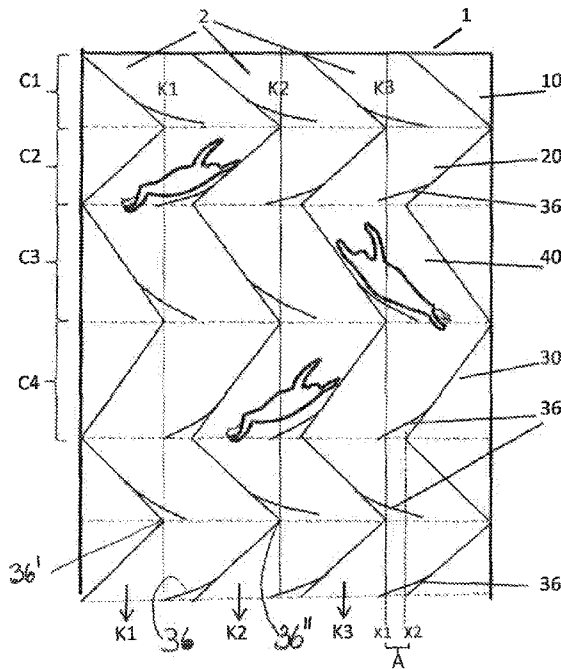


FIG. 5

(57) Abstract: There is disclosed a rescue device for evacuating persons from installations, where said device defines a rescue passage in a zigzag shaped pattern, where through persons may pass from above from an entrance to an exit through the rescue passage, and downwards to an exciting/landing area. The device is characterized by that it comprises a sheet (1) of two layers, a back layer (10) of a mostly not stretchable cloth material or a seine thread material (10) and a front layer (20) of an elastic and giving material (20) of a seine thread material with a mesh network, where said back (10) and front (20) layers are joined by a number of mutually separated and mostly parallel zigzag shaped seam patterns for forming one or more evacuation channels (2) between the cloth material/ the seine thread material (10) and the seine material (20) for the passage of persons during evacuation. A use of the device is also disclosed.

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Device for evacuating persons from installations

The present invention comprises a rescue device for evacuating people/persons from installations, where said device defines a rescue passage in a zigzag shaped pattern, where through persons may pass from an entrance above to an exit from said rescue passage, downwards to an exciting/landing area, as presented by claim 1. The invention also comprises a use of the safety device.

10 State of the art

Evacuating persons from larger heights in buildings or similar installations is often difficult when the usual escape routes are not available, or where these cannot be used due to fire with accompanying heat and smoke development.

15

Permanent installations on buildings for escaping such as outside stairways are not only costly and demands space, they also lack flexibility in relation to their placement, and they have an esthetic impact on the appearance of the building.

20 We here refer to US patent 3,994,366 (Okuma) and Norwegian patent NO-174.279 (Nordtvedt). The first patent describes a rescue device for evacuation from a ship etc. where a fire may arise, which forms a hose-shape with textiles on the back side and front side. The frontal part of a base cloth and a passage cloth are sewn together into a pipe shaped passage. In all embodiments pipe passages are formed due to a front cloth piece denoted by 3 being broader than the back cloth denoted by 2.

30 According to this solution the speed of the persons will increase downwards in the system, insecurity may easily arise, and following users and the exits may become unclear. At the same time one has no overview, and cannot see outside. In addition, there is no ventilation of e.g. smoke that may enter the passage. The ropes, denoted by 5, will not be sufficient to maintain the hose angle in order to achieve sufficient breaking effect.

The mentioned Norwegian patent NO-174.279 discloses an evacuation device where persons can let go and let themselves go down inside through a rescue hose one by one.

5

Aim of the present invention

Thus, it is desired to bring forth a rescue device for evacuation of persons from heights, where no permanent installation extending from the place where the person
10 is to be evacuated from to the place the person is to be evacuated to is necessary.

It is also an aim to bring forth a rescue device for mass evacuation of persons from buildings, ships, planes (on the ground or water) and so forth where there may arise a need for evacuation of persons downwards from great heights such as from one or
15 more stories of a building.

An aim of the invention is also to bring forth a rescue device for effective evacuation of persons from larger heights in case of an emergency, such as from buildings, planes, etc.
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An additional aim of the invention is to bring forth a rescue device that may be used by several persons simultaneously.

An additional aim of the invention is to bring forth a rescue device that removes the
25 need for persons standing in line in order to be let down one by one.

Thus, it is the aim to bring forth a rescue device suitable for evacuating several persons at the same time, so called mass evacuation.

30 An additional aim of the invention is to bring forth a rescue device that for example may be used for evacuation from all floors of a building.

An additional aim is to bring forth a solution where the cells of the rescue devices rescue sheet may be produced in modules, and then be fitted together to suitable
35 lengths for a specific place of use.

It is also an aim of the invention to bring forth a rescue device that may be rolled or wound up and stored in a spool or roll shape, that may easily be activated and rolled of or spooled out for use for evacuating.

- 5 In addition it is an aim that it may be rolled back up again into its storage position after use.

In addition, it is an aim that the rescue device is able to be moved along a building exterior face when it is to be used.

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In addition, it is an aim to produce the rescue device in a material that can withstand high temperatures and direct heat, i.e. that is does not soften, melt or burn, when it for example is subjugated to direct contact with flames, such as from an open fire in a building.

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The present invention

The rescue device in accordance with the present invention is characterized by
20 comprising a sheet of two layers, a back layer of a mostly not stretchy cloth material or a seine thread material and a front layer of an elastic and giving material of a seine thread material with a mesh network, where said back and front layers are joined by a number of mutually separated and mostly parallel zigzag shaped seam
25 patterns for forming one or more evacuation channels between the cloth material/ the seine thread material for the passage of persons during evacuation. The two layers are arranged one against the other.

According to a preferred embodiment the layers, seen in the sheet's mostly vertical
30 use position, are connected with seams forming a zigzag pattern with fall angles of from 45 degrees to 63 degrees in relation to a vertical line.

In accordance with yet another preferred embodiment the seams are made with the
35 lowest/loosest fall angle at the top and bottom of the rescue sheet, while the seams are made with steeper fall angles in an area between the top and bottom in the rescue sheet.

According to yet another preferred embodiment the seams are made with a fall angle of 45 degrees for the cell forming the entrance to the sheet, and then gradually rise to a fall angle of about 63 degrees in an area between the top and bottom, and then gradually fall to an angle of about 45 degrees at the bottom by the exit.

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According to yet another preferred embodiment there is arranged at the point where the fall/sliding direction in each cell is turning an extra seam with a looser fall/sliding angle, such as an angle of 30 to 40 degrees, as said seam ends in an area between two seam corners.

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According to another preferred embodiment the elastic material is connected to the cloth by welding and/or by sewing with thread.

15

According to another preferred embodiment the cells (C1, C2, ...) are arranged with distending elements arranged horizontally on the back side of the cloth as seen where the cloth is in use. Preferably the distending elements are ribs of nylon, metal or glass fiber.

20

According to another preferred embodiment there is, for one or more of the cells (C1, C2, C3) in the cloth, shaped an entry slit in the back layer, in order to make possible entrance from multiple stories, as each entry slit is covered by a loose cloth piece.

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According to another preferred embodiment the rescue sheet may be rolled up on a spool that is arranged with a releasable mechanism for unrolling, and by releasing said locking mechanism the sheet is rolled out from its rolled up storage position to its extended use position. This can be compared to a rolling curtain.

30

In accordance with another preferred embodiment the rescue sheet comprises several parallel running evacuation channels bordering each other.

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According to yet another preferred embodiment a number of tension compensators are mounted, in the shape of ribbons etc. sewn into or attached downwards along the back layer, or on its backside, and especially in form of non-stretchy ribbons, straps, armored straps, braided rope and/or lead rope.

According to another preferred embodiment the cells are produced for the rescue sheet construction in modules and then fastened together in suitable lengths for the specific places of use.

- 5 According to yet another preferred embodiment, when the back layer is made of a seine material it comprises a tighter seine material with smaller mesh size, especially made from a seine material not comprising knots, than the front netting material.

10 According to another preferred embodiment the side surface defining the cloth materials backside is covered by an extra heat reflecting flame retarding material, such as an aluminum foil.

15 According to the present invention the rescue device is used for mass evacuation of persons from a building, ship, plane (on the ground or water) and so forth, where a need may arise for evacuation of persons from larger heights such as from one or more stories of a building.

20 The new two-layer construction of the rescue device according to the invention is substantially different from what is discussed in the above mentioned US patent 3.994.366. According to the present construction it is not necessary to use with differences between the front and back layers, resulting from the front layer being made of a stretchy material sewn on with a zigzag shape to the back layer of a mostly non stretchy cloth/nylon, and where there in the back layer of the cloth/seine is fastened tension compensators in the form of non stretchy ribbons. It is the chosen

25 material for the two layers that is decisive for this advantage. In an unstressed position the two layers are laying completely next to each other, without forming any visible channel. Only when a person enters the entrance/opening at the top of the rescue device according to the present invention a channel will appear, and it closes again immediately after the person as he proceeds down through the channel.

30 The present invention thus brings forth a two layer rescue sheet of a back cloth layer and a front seine layer, or where both are seine material. The large advantage by adapting the construction with a broad sheet shape, is that it adapted to form many mutually parallel rescue channels, so that one may obtain mass evacuating by using the sheet. In addition it may simply be rolled up and hung back up after use, much

35 like a rolling curtain, which is not the purpose of said US patent.

And additionally, according to US 3.994.366, it only mentions making a rescue channel for one single person at a time, and not for several persons simultaneously (mass evacuation), like in the present invention.

5

Description of the figures

The embodiments of the present invention are now to be described by examples, where we refer to the following figures:

10

Figure 1 shows a segment of the front of a channel in a rescue sheet according to the present invention in a rolled down state.

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Figure 2 shows a perspective of the backside of the rescue sheet, and discloses among other things the placement of a bendable elastic outstretching element 14 for keeping the sheet spread open, and thus maintain the zigzag properties of the cells even when they are subjugated to weight by persons being evacuated through the rescue sheet slues.

20

Figure 3 shows a side cross section (in the X-X axis of figure 1) of a rescue sheet in accordance with the present invention in a rolled down state.

25

Figure 4 shows a magnified detail from figure 3, where a small part of the cloth is located between the cloth and seine material in order to cover an entrance slit 112 from the building 60 to the evacuation channel.

30

Figure 5 shows a rescue sheet according to the present invention with several channels K1, K2, K3 for the evacuation of persons. The figure also shows how the evacuation sheet is constructed with gradually steeper sliding track (angle) in the downwards direction.

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Figure 6 shows details in a channel K1 of a rescue sheet according to the present invention.

Figure 7 shows a set of different sliding angles in each cell that may be constructed into a specific rescue channel according to the present invention adapted to the

height of the building. More specifically, by which angle the seams defining the channel and sliding direction, is sown into the backside cloth.

5 Figure 8 shows a rescue sheet according to the present invention from the side in a rolled up position on a rolling axle 50.

Embodiments of the present invention

10 Figure 1 shows a section of a two layer rescue sheet 1 in accordance with the present invention, in a rolled down state and seen from the front. Rescue sheet 1 comprises a back layer 10 that may be an elongated, tightly woven cloth 10 comprising the backside of the rescue sheet 1.

15 On the front side of the sheet 10 and on top of this there is arranged a frontal layer 10 of elastic/giving material 20, especially a seine material, that is fastened or sewn to the cloth 10 with mutually parallel and mutually segregated zigzag joining seems downwards along the cloth, so that between two adjacent seems there is formed a
20 channel for gliding passage of a person being evacuated. The formation of the channel as the person passes by is based on the frontal layer bending outwards around the person.

Thread is used to sew the seine in place to the back cloth or seine layer.
Alternatively the zigzag shaped seems may be made by welding.

25

Together the two layers 10, 20 form a hose shaped rescue channel running downwards from an entrance to an exit. At the top end there is an entry area and on the bottom an exit area. The elastic/giving (extensible) seine material 20 is shaped with a mesh without knots that may be expanded/extended in a matter so that it may
30 be pulled/stretched out at a right angle of the cloth and spread out by the person, which thus shapes a tunnel that he may then glide through. For simplicities sake, but without being limited thereto, the invention shall be described below in regard to said preferred seine material. The back layer, the cloth 10, is preferably made from a flame retardant textile in a cloth shaped material such as Kevlar. Kevlar is an aramid
35 fiber with high tensile strength that can withstand high temperatures.

The back cloth layer is preferably a armored material, as it must be able to withstand large stretching forces when in use, i.e. it is as little as possible stretchy lengthwise. The requirement is that the cloth must be able to withstand heat from flames and fire, which from buildings is touching the cloth, i.e. without it softening, melting or catching on fire. The backside of the cloth may also be covered by a heat reflective foil such as aluminum.

Preferred seine materials are preferably chosen from the group comprising a Kevlar material, and is for starters shaped so that the stitches has a hexagonal or square shape and are preferably without knots.

The back layer 10 may also be shaped by a seine material, and then may be in a tighter knotless material than the frontal obligatory netting material. In both cases it is preferred to fasten stretch relief components of straps or belts that when the sheet is in use runs vertically.

The seine material 20 is attached by the edges of the seine on the cloth 10 by aid of mutually parallel zigzag seem 30a, 30b patterns, forming an evacuation channel 2 between the cloth 10 and the seine material 20. The seine material 20 may preferably comprise sewed on edging bands along the seams that are sown or fastened in a suitable manner to the cloth 10 along the seams 30 in order to achieve sufficient connection between the cloth and seine.

On the backside of the back layer, as shown in figure 2, there are pockets set in and fastened horizontally successive and bendable distending elements 14 that ensure that the construction is held as much as possible outstretched in the horizontal direction. These stays 14 are placed horizontally across the cloth surface between the two points. When a person is moving down the cannels, these stays are bent as a result of the impact of the passing person, and when he/she has passed by, they aid in the cloth/seine being pulled back to its original horizontal position. The stays 14 may be of a bendable plastic, metal, or in the shape of an elongated spiral spring and fire retardant such as the cloth/seine.

Figure 2 also shows longitudinal (i.e. vertical laying when the sheet is in use position) stretch relief components 15 of armoring or stretch bands that are fastened in (welded/sewn) on the backside of the back cloth layer 10 in what becomes the cloths vertical direction, ensuring that the cloth is not stretched vertically.

Figure 2 also shows schematically how a split 112 in the back layer shapes an entrance to the rescue channel. Around the edges of the split there are sewn reinforcement bands in order to avoid the cloth tearing under use as a result of vertical stretching movements.

Figure 3 shows a cross section along the line X-X on figure 1, and shows the three seam points 31, 32, 33 on the line X in the front layer 10, and the horizontal stays 14 in the back layer 20. A building is also suggested by 60.

Figure 4 shows an enlarged section from figure 3 and illustrates the slit opening 112 for stepping into the rescue passage. The figure also illustrates a façade 114 of a building, with an opening 113 such as a window, where through persons may step into the slit 112 to the rescue passage. A rip cord fastened to the cloth is shown by 116, and the persons to evacuate the building may pull this in order to pull the cloth to the façade, so the climb in may occur in a safe manner.

The width dimension of the evacuation channel may for example be 1 to 2 meters, for example 1.4 meters.

On figure 5 the rescue sheet 1 is shown with three mutually parallel zigzag shaped rescue channels K1, K2 and K3 in accordance with the present invention. There are also three persons 40 sliding downwards in a channel K2 and K3 each along the façade of a building. The rescue sheet 1 is preferably free hanging. In a free hanging embodiment there is then created three mutually parallel evacuation channels along the cloth 10.

The channels K1, K2 and K3 are mutually connected by zigzag shaped seems. This increases the flexibility during the production and the adaptability to different height conditions. Edge bands in the seine on top and bottom gives the possibility of splicing longitudinal single cells in the longitudinal direction, but also in the horizontal direction when the rescue sheet comprises several parallel running and adjacent evacuation channels. During the production of the rescue sheet 1 it is, for practical reasons, an advantage to produce modules where the seine material is sewn to the cloth material by seams that then together with the seine define the zigzag shaped evacuation channels.

A preferred embodiment is shown in figures 1 and 3, where the seine material is sewn to the cloth by aid of mutually parallel downwards sloped (zigzag) seams in order to create several evacuation channels 2 together with the cloth 10, and makes, in the vertical direction, parallel running zigzag shaped evacuation channels that typically but not necessary border each other at the edges. The edging bands 30 in the seine 20 may be used to connect parallel running evacuation channels at the edges with each other by sewing or so forth. Such a device with several evacuation channels increases the evacuation capacity by enabling the evacuation of several persons at the same time from a danger zone.

10

The zigzag shape of the evacuation channel, and the opening of each cell by aid of horizontal stays (seen in the direction of the rescue sheets direction of falling), friction between the seine and the person, as well as the elasticity of the seine material, limits the persons gliding speed during the downwards passage through the evacuation channel. The fall degree in the evacuation channel is decided by the choice of gliding angles α . By combining gliding angles and heights 4 of single cells the persons gliding speed during evacuation trough channel 2 is impacted.

15

Preferably said gliding angles α of between 45° - 63° are chosen and cell heights between about 1.5 – 2 meters in cells without entrance or exit. When the gliding angle and cell height increase, for instance from 45° to 50.3° , as shown in figure 6, the evacuation speed also increases.

20

Figure 7 shown preferred gliding angles in combination with cell heights. When both the cell height H and width B is 1 meter this corresponds to a quadratic cell with a gliding angle of 45° as illustrated by the figure. More specifically the figure illustrates the angle α that the channel forming seams are sewn according to. Preferably the angle α is ca 45° in the top section that a person steps into. Underway downwards in the channel the angle α may be increased such that the path becomes steeper and so that the gliding/sliding angle increases downwards so that it is ca 63° further down in the channel. It is sufficient that the cell width is 1 meter, and the height may vary.

25

30

The figure illustrates that when the seams are made so that the height increases by steps of 250mm from 1 meter to 2 meter with a constant with the sliding angle α becomes:

35

Cell height 1 meter and width B 1 meter corresponds to the angle $\alpha = 45^\circ$

Cell height 1.25 meter corresponds to an angle $\alpha = 50.3^\circ$

Cell height 1.5 meter corresponds to an angle $\alpha = 53.5^\circ$

5 Cell height 1.75 meter corresponds to an angle $\alpha = 60^\circ$

Cell height 2 meter corresponds to an angle $\alpha = 63.4^\circ$

10 The point of this it that the person must feel secure when he steps into the sliding channel by that the starting speed should not be too fast, while it is usually not a problem to increase the speed further downwards in the channel when the person has gotten used to it.

15 These seam angles are preferably adjusted so that the persons 40 gliding speed during the evacuation is low in the upper parts of the evacuation channel, while it increases in the middle, and then decreases again and is reduced/decelerated downwards towards the lower cells towards the exit 24.

20 Practically speaking the sliding angle may, in the three to four highest steps, be adjusted to 45° , and then increase gradually over the next three steps to $50,3$, $53,5^\circ$, 60° , 63° and then be reduced stepwise in the opposite direction back to 45° by the exit from the rescue channel.

25 How the cell height is increased gradually from the top and downwards, is also illustrated in figure 5, where one can see that the tilt angle from the top cell C1 and downwards in zigzag through cells C2, C3 and C4 increases from cell to cell in the downwards direction.

30 Choice of seine material and stitch distribution in the seine influences further the gliding speed of persons in the channel by influencing the deceleration effect through friction between the person and material in the evacuation channel. By use of a seine material the stitch distribution in the seine should preferably give good glide and simultaneously the friction between the person and material should insure that the speed does not become too high. At the same time one should avoid the person
35 getting hooked up in the seine stitches.

As shown in figures 1 and 3 the evacuation channel 2 is shaped with an additional sideways seam 36 in order to decelerate the person's passage down through the evacuation channel in the corners of the zigzag shaped channel. When the rescue sheet is hanging in its normal position, the sideways seam makes an angle of a little under ca 45 degrees with the horizontal, i.e. it makes a slight bow. The additional sideways seam 36 has a less steep fall angle, such as 30° to 40°, since the seam ends 136 in an area between two seam corners 36',36". The additional seam 36 decreases the gliding angle for the person and thus dampen both the fall speed and it leads to a more even passage of the person through the channel by avoiding too sudden and steep turns in the corners by the zigzag shaped evacuation channel. Thus, the person is lead sideways alternatively to each side, and therefore one avoids him falling close to straight down through the passage if there is a relative distance A between the straight vertical lines X1 and X2 between the seams inwards turning outer points 32, as is shown in figure 5. On figure 1 there is shown a situation where the distance X1-X2 is equal to 0 (zero). This corresponds to the line X also passing through the two "points" 31 and 33 on one side and the "point" 32 on the other side.

The top cell, and if need be more cells downwards in the rescue sheet 1, is fitted with an opening 12 that is preferably, but does not have to be, shaping a horizontal slit opening 112 in the backside of the cloth 10, as shown in figure 2 and 4. Figure 4 shows a cross section along the line Y-Y on figure 2, and shows the slit 112. These opening slits 112 in the rescue sheet, for example for evacuating from different floors of a ship or building, are provided with a covering cloth part 110 that makes up a closing element so that persons gliding downwards does not get hooked on the slit 112 laying under the part 110. Normally every such cell has a entrance slit 112 as shown in the figures, but it may do without. The cell height, width, and slit placement, is adjusted to the building where to the rescue sheet is to be used.

Cells both with and without an entry slit may have a gliding angle α at approximately 45°. Cells with entrance, but as needed also cells without an entrance, are also provided with bendable horizontally running distending elements 14 for holding the sheet correctly splayed open. This splaying of the cells is achieved by the bendable stays or bars 14 that runs across horizontally through the back cloth, and that is sewn into the cloth 20 (or is put in and fastened in a inside pocket on the flat side that defines the backside of the cloth surface) and that is preferably of a type nylon staves or glass fiber staves. When a person is passing down through the

slues/channel between the seine and cloth they form a hose around the person as the staves and cloth is bent around one side of the person, while the seine material stretches out around the other side. When the person has passed down through the staff is pushed out again to its straight shape so that the cloth/seine again forms a planar vertical surface.

The exit 24 at the end of the evacuation channel is preferably an opening in the bottom 140 on the front side in an evacuation channel 2, that for example open up at ground level, that is, an opening in the elastic/giving material 20. The opening may be a vertical cut in the seine material 20 that may be close by overlapping material pieces.

Preferably the cloth comprises a number of stretch relief components 15 in the shape of non-stretchy bands, straps, belts and so forth that is sewn in or fastened downwards lengthwise in the back layer 10, in the cloth, especially on its backside, as is shown in figure 2. According to a preferred embodiment the stretch relief components are equipped with insets of lead and are point fastened in the back piece, and fastened in the cloth each 30 cm of height distance on the backside of the cloth. The function of the stretch relief components is to dampen the stretch stress on the cloth 10 when persons are moving through the cannels during the evacuation. The stretch relief components 15 may be of a type of armored straps as for example is used for loading straps and such.

In storage mode the rescue sheet 1 is rolled up as a roll on a spool 50. The spool with the rolled up sheet 50 is mounted on the ceiling or walls of the construction that the persons are to be evacuated from, or it may be mounted on a beam along the building, as it may be mobile by being able to slide sideways as needed. The roll may be configured with a locking mechanism for manual or/and automatic release, so that it may be rolled down along the façade as needed. The dead weight of the rescue sheet may be additionally increased by sewn in weights, for examples of lead or similar, and contributes to the rescue sheet 1 being spooled quickly of the roll 50, so that it in a short amount of time is ready for evacuation of persons. By an automatic release mechanism the release may be connected for example with a fire alarm that gives a signal to the release as instances of fire is detected. If there is a manual release mechanism, and when the evacuation sheet is used for evacuation form several vertically spread out evacuation points (entrances to the evacuation

channel) each of these evacuation points should be provided with a device that may trigger the off spooling of the evacuation sheet.

5 The seine material is sewn with a strong thread, to the cloth, with zigzag seems, by aid of industrial sewing machines. The downwards angled seams may be programmed into the computer guiding the production process during the sewing.

10 The roll 50 may preferably be fitted with a crank mechanism or motor that enables spooling of the rescue sheet on a roll 50 after use, for further storage in a suitable placement on the façade of the building, or for carrying out maintenance work or testing of equipment. Preferably the roll is made with a suitable cover that may protect it from bad weather and wind.

15 The roll and/or rescue sheet may be provided with an emergency light, for making it easy to find the evacuation equipment in situations with limited visibility, such as in smoke filled or dark locals, or external surroundings.

20 The preferred features of different preferred embodiments for the present invention such as described above may be combined with each other without deviating from the scope of the present invention.

Patent Claims

1. Rescue device for evacuating persons from installations, where said device defines a rescue passage in a zigzag shaped pattern, where through persons may pass from above from an entrance to an exit from the rescue passage, and downwards to an exciting/landing area, characterized by that it comprises a sheet (1) of two layers, a back layer (10) of a mostly not stretchable cloth material or a seine thread material (10) and a front layer (20) of an elastic and giving material (20) of a seine thread material with a mesh network, where said back (10) and front (20) layers are joined by a number of mutually separated and mostly parallel zigzag shaped seam patterns for forming one or more evacuation channels (2) between the cloth material/ the seine thread material (10) and the seine material (20) for the passage of persons during evacuation.
2. Rescue device in accordance with claim 1, characterized by that seen in the sheet's (1) mostly vertical use position, the layers are connected with seams forming a zigzag pattern with fall angles of from 45° to 63° in relation to a vertical line.
3. Rescue device in accordance with claims 1-2, characterized by that the seams are made with the lowest/loosest fall angle at the top and bottom of the rescue sheet (1), while the seams are made with steeper fall angles in an area between the top and bottom in the rescue sheet.
4. Rescue device in accordance with one of the previous claims 1-3, characterized by that the seams are made with a fall angle of 45° for the cell shaping the entrance to the sheet (1), and then gradually rise to a fall angle of about 63° in the middle area between the top and bottom, and then gradually fall to an angle of about 45° at the bottom by the exit.
5. Rescue device in accordance with one or more of the previous claims, characterized by that adjacent to where the sliding direction in each cell turns there is an additional sideways seam 36 with a looser fall/sliding angle, such as an angle of 30° to 40° , as said seam ends (136) in an area between two seam corners (36', 36'').

6. Rescue device in accordance with one of the previous claims 1-5, characterized by that the elastic material (20) is connected to the cloth (10) by welding and/or by sewing with thread.
- 5 7. Rescue device in accordance with one of the previous claims, characterized by that the cells (C1, C2, ...) are provided with distending elements (14) arranged horizontally on the back side of the cloth as seen in the direction the cloth is used, preferably the distending elements (14) are ribs of nylon, metal or glass fiber.
- 10 8. Rescue device in accordance with one or more of the previous claims, characterized by that for one or more of the cells (C1, C2, C3) there is, in the cloth, shaped an entry slit (112) in the back layer, in order to make possible entrance from multiple stories, as each entry slit (112) is covered by a loose cloth piece (110).
- 15 9. Rescue device in accordance with one or more of the previous claims, characterized by that the rescue sheet (1) may be rolled up on a spool/roll (50) that is provided with a releasable locking mechanism for unrolling, and by releasing said locking mechanism the sheet is rolled out from its rolled up storage position to its extended use position.
- 20 10. Rescue device in accordance with one or more of the previous claims, characterized by that the rescue sheet (1) comprises several parallel running evacuation channels(2, K1, K2, K3) bordering each other.
- 25 11. Rescue device in accordance with one or more of the previous claims, characterized by that a number of tension compensators (15) is mounted in the shape of ribbons etc. sewn into or attached downwards along the back layer (10), or on its backside, and especially in form of non-stretchy ribbons, straps, armored straps, braided rope and/or lead rope.
- 30 12. Rescue device in accordance with one or more of the previous claims, characterized by that the cells in the rescue sheet construction (1) are constructed in modules and then fastened together in suitable lengths for the specific place of use.
- 35 13. Rescue device in accordance with one of the previous claims, characterized by that when the back layer (10) is made of a seine material it comprises a tighter

seine material with smaller mesh size, especially made from a seine material not comprising knots, than the required front netting material (20).

14. Rescue device in accordance with one of the previous claims, characterized
5 by that the side surface defining backside of the cloth materials is covered by an extra heat reflecting flame retarding material, such as an aluminum foil.

15. Use of a rescue device (1) according to claims 1-14, for mass evacuation of
10 persons from a building, ship, plane (on the ground or water) and similar where there may arise a need for evacuation of persons downwards from larger heights such as from one or more stories of a building.

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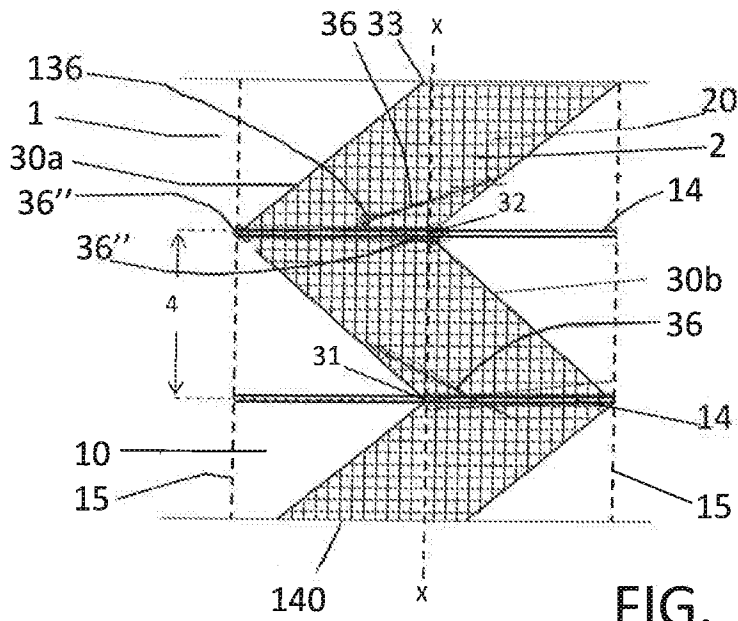


FIG. 1

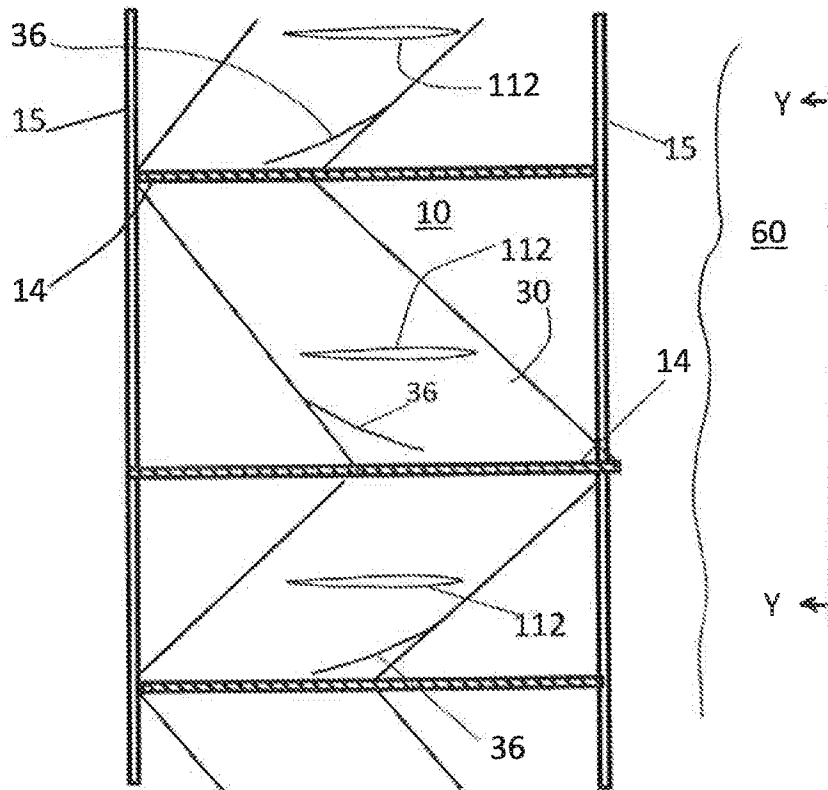


FIG. 2

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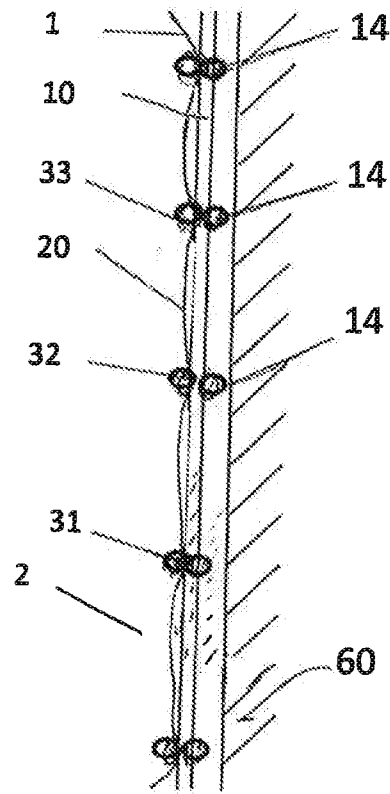


FIG. 3

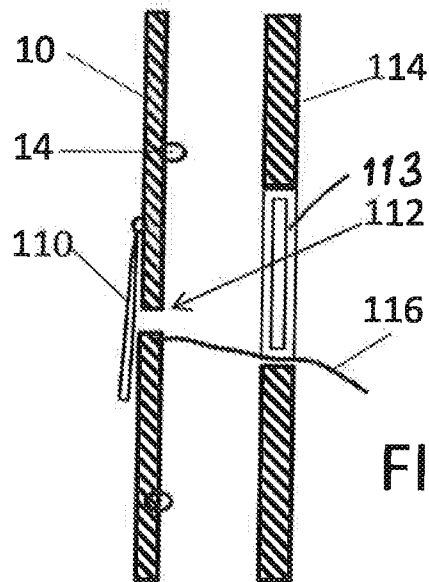


FIG. 4

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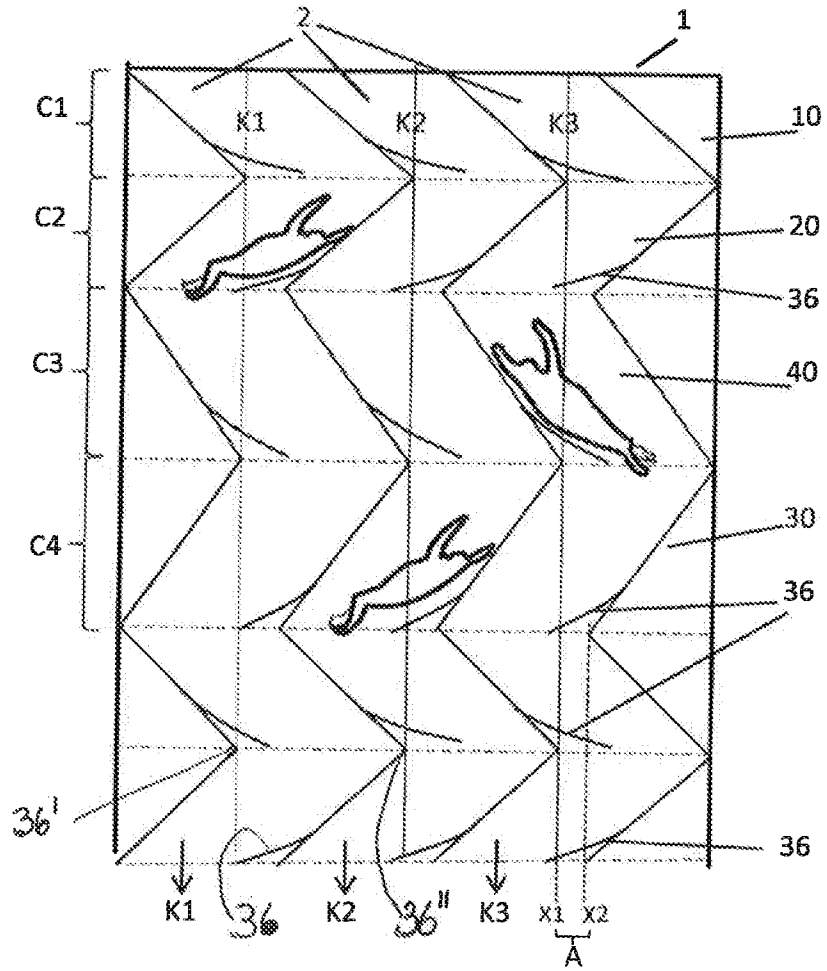


FIG. 5

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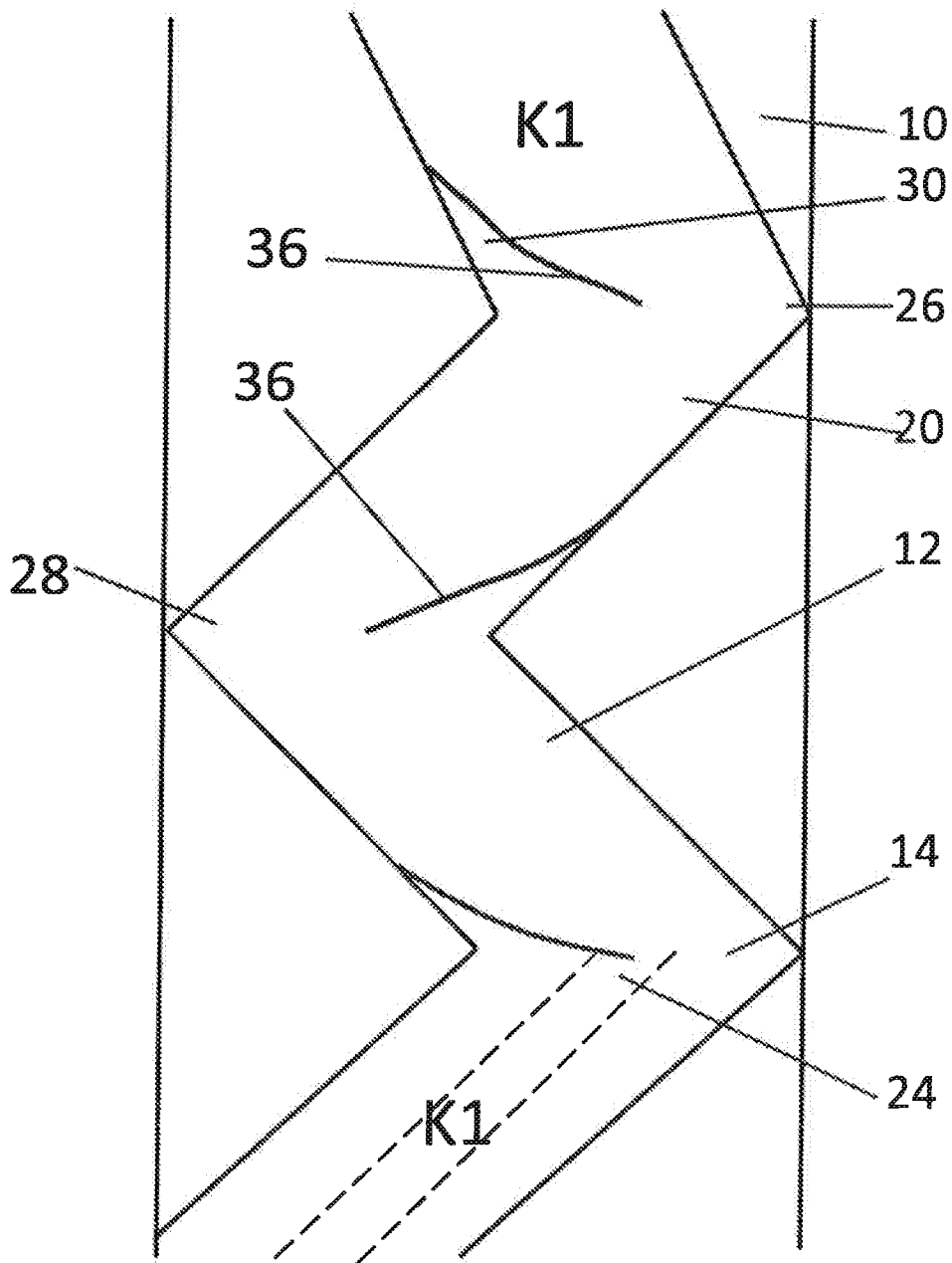


FIG. 6

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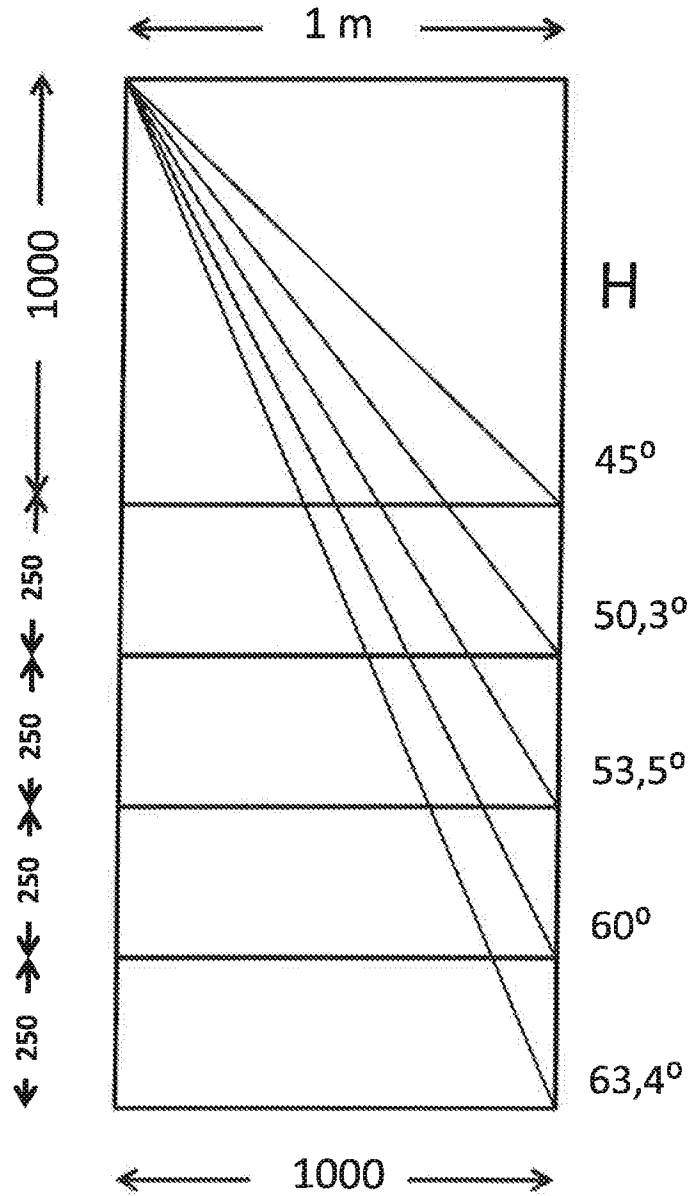


FIG. 7

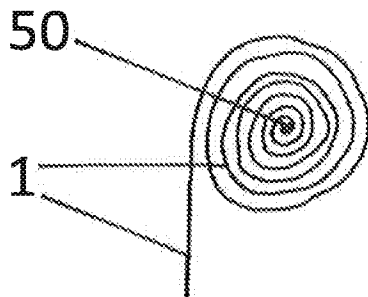


FIG. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2012/050116

A. CLASSIFICATION OF SUBJECT MATTER		
IPC: see extra sheet		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
IPC: A62B, B63C		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
SE, DK, FI, NO classes as above		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
EPO-Internal, PAJ, WPI data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4605095 A (KOIZUMI KENICHI), 12 August 1986 (1986-08-12); abstract; column 2, line 40 - column 3, line 7; column 5, line 18 - column 5, line 19; figures 5-6; claim 1	1-4, 6-15
A	--	5
Y	US 4705141 A (SPLAINE), 10 November 1987 (1987-11-10); abstract; figure 6	1-4, 6-15
A	--	5
A	JP 50080993 U (___), 12 July 1975 (1975-07-12); figures	1
	--	
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
15-02-2013		19-02-2013
Name and mailing address of the ISA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86		Authorized officer Mariana Eddin Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2012/050116

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 6598703 B1 (CATALAN ROBERTO SANCHEZ), 29 July 2003 (2003-07-29); abstract; figure 4 --	1
A	US 3994366 A (OKUMA MASAHIRO ET AL), 30 November 1976 (1976-11-30) -- -----	1

Continuation of: second sheet

International Patent Classification (IPC)

A62B 1/20 (2006.01)

B63C 9/22 (2006.01)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/NO2012/050116

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			GB	2168008 A	11/06/1986
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