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(71) Applicant: **PROSARA Systeem B.V.**
4411 BB Rilland (NL)

(72) Inventor: **Besters, Cornelis Franciscus**
4411 BB Rilland (NL)

(74) Representative: **Vernout, Robert et al**
Arnold & Siedsma
Sweelinckplein 1
2517 GK Den Haag (NL)

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(54) **System, tethering line and method for preventing a person from falling from a corner of a roof**

(57) A system for preventing a person from falling from a corner of a roof, comprising: a line for tethering said person to said roof; a first anchor installed on said roof for connecting a first outer end of said line to said roof; a second anchor installed on said roof for connecting a second outer end of said line to said roof; said anchors being located substantially on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof which form said corner are substantially equal; wherein

said first anchor is located at a larger distance from said corner than said second anchor; wherein said line is provided with line regulating means, which connects a central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line.

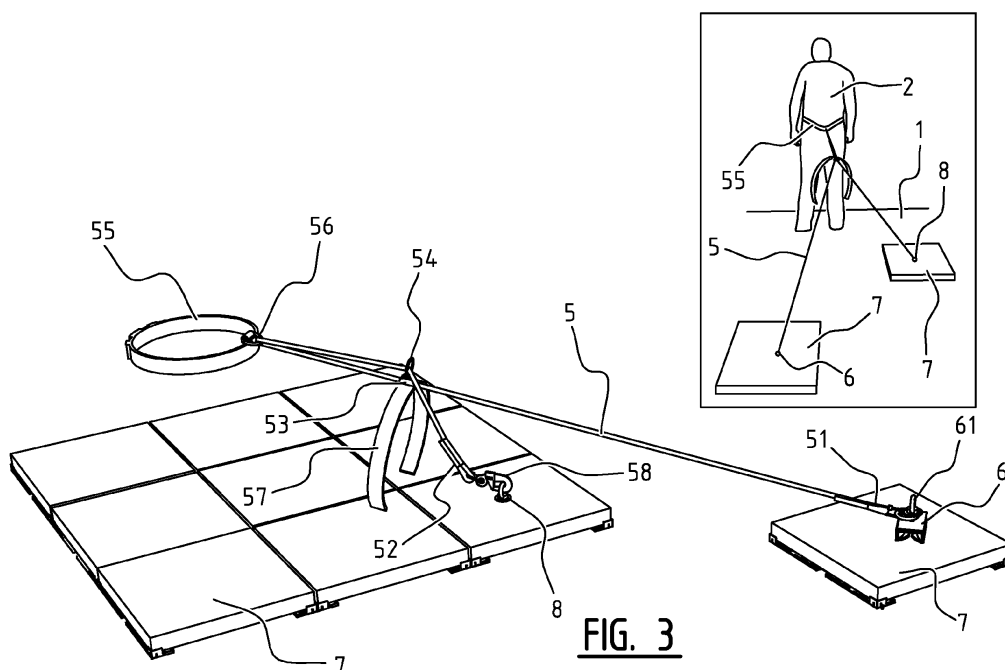


FIG. 3

Description

[0001] The invention relates to a system for preventing a person from falling from a corner of a roof, comprising a line for tethering said person to said roof, and a first anchor installed on said roof for connecting a first outer end of said line to said roof. Such a system is described in European patent application EP 1818480.

[0002] As any other part of a building, the roof of a building needs maintenance from time to time, and systems are provided for preventing that persons carrying out said maintenance fall from said roof. The invention in particular relates to such a system for substantially flat (parts of) roofs. Such a system comprises a guide system with a guide which extends on said roof substantially parallel to and at a distance from an edge of said roof, to which guide a line can be secured which line can be secured at its other end to said person. The line can be secured to the guide by a traveller which can travel along the rail, such that the person is able to move along the edge of the roof, without the risk of falling from the roof. A problem which arises near the corner of the roof, is that the line is too short for the person to reach said corner diagonally from the corner of the guide. Simply lengthening the line would be dangerous, as the person would be able to fall over the edge of the roof at both sides of the corner.

[0003] It is a goal of the invention to provide an improved system for preventing a person to fall from a corner of a roof of a building, which is safe to use, which is easy to use, which is simple, which is easy to install, which is expected to do less harm to the roof construction and/or roof characteristics and/or which can be easily reused.

[0004] According to the invention a second anchor installed on said roof for connecting a second outer end of said line to said roof; said anchors being located substantially on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof which form said corner are substantially equal; wherein said first anchor is located at a larger distance from said corner than said second anchor; wherein said line is provided with line regulating means, which connects a central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line. This configuration of line anchors and line regulator provide the person with the right freedom of movement, without running the risk of falling over the edges near the corner of the roof.

[0005] Preferably said first anchor is the corner of a guide extending at a distance along said edges of the roof, and said first outer end of said line is connected to

said guide by means of a traveller which can move along said guide, such that said person can walk along said edges. In this manner the person can use the same line for working along the edges of the roof and working near the corner of the roof, so that he is not tempted to completely release himself to change lines. Said second outer end of said line is preferably provided with connection means that allows said person to connect said second outer end with said traveller or said second anchor at the choice of said person, such that if said connection means are connected to said second anchor the securing means can reach a larger distance from said traveller than if said connection means are connected to said traveller. Said securing means preferably comprise a belt which the person can wear around his waist. A secondary securing means is preferably attached to said line near said line regulating means at the central part of the line, for connecting the central part of the line with said person. Said secondary securing means preferably comprise a second belt which the person can wear around his waist. Said connection means at said second outer end of the line preferably is a snap hook. In this manner an easy to use and safe system is provided.

[0006] Said second anchor is preferably mounted on said roof by means of gravity force acting on a weight to which said anchor is connected, said weight being such that the frictional force between the anchor and the roof is large enough to prevent that the person can accidentally move said anchor over said roof, whereby there is no need for making holes in the roofing, thermal insulation, and/or supporting construction of said roof.

[0007] The location for connecting said line to said second anchor is preferably located between 0.75 m and 1.75 m, more preferably approximately 1.25 m from the edges adjacent said corner. The location for connecting said line to said first anchor is preferably located at least 2 m from the edges adjacent said corner, for instance approximately 2 m, 3 m or 4 m. Said line preferably has a length which is approximately equal to: $2 \times$ (the distance between the location for connecting said line to said first anchor and the edges adjacent said corner - 0.75 m)..

[0008] The invention also relates to a line for tethering a person to a roof; wherein said line is provided with line regulating means, which connects the central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line.

[0009] Furthermore the invention relates to a method for preventing a person from falling from a corner of a roof; wherein two anchors are located substantially on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof which form said corner are substantially

equal; wherein a first one of said anchors is located at a larger distance from said corner than the second one of said anchors; said method comprising the steps of: using a line for tethering said person to said roof; wherein said line is provided with line regulating means, which connects a central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line; connecting the first and second outer ends of said line to said first anchor; disconnecting said second end of said line from said first anchor and connecting it to said second anchor. Said line preferably comprises secondary securing means which is attached to said line near said line regulating means at the central part of the line, and which is secured to said person before said second end of said line is connected to said second anchor, and the method further comprises the step of releasing said secondary securing means from the person after said second end of said line is connected to said second anchor.

[0010] The invention will be illustrated by means of a preferred embodiment as shown in the drawings, wherein:

Figure 1 is a perspective view of a preferred embodiment of the system of the invention;

Figure 2 is a prespective view of the system in a first mode of use;

Figure 3 is a prespective view of the system in a second mode of use; and

Figure 4 is a perspective view of the line unit for use in the system.

[0011] According to figure 1 the flat roof 1 of a building is provided with a system for preventing a person 2 to fall from the roof 1. The system comprises a rail system 3 with a rail 4, which is secured to tiles 7 on said roof, and a line 5 to which the person 2 is secured. The end of the line 5 is attached to the rail 4 by means of a traveller 6 which can run over said rail 4.

[0012] The rail 4 is arranged along the edges of the roof 1, at a distance of a few meters thereof. In the corners of the rail system a corner rail piece 41 is attached to the outer ends of the respective rails 4, such that the traveller 6 can run around the corner from one rail 4 to the next rail 4.

[0013] When the person is working in the corner of the roof, the corner rail piece 41 acts as a first anchor to which a first outer end 51 of the line 5 is connected by means of the traveller 6. A first mounting eye 61 is pro-

vided on top of the traveller 6. A second anchor in the form of a second mounting eye 8 is attached to a group of interconnected tiles 7 on said roof between the corner rail piece 41 and the corner of the roof. The corner rail piece 41 and the second mounting eye 8 are located on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof are equal.

[0014] As shown in figure 4, the line 5 is provided with line regulating means in the form of a ring 54 which is attached to a central connection point 53 of the line 5, and which connects the central connection point 53 of the line 5 with a part of the line 5 between the central connection point 53 and the second outer end 52 of the line, such that said central connection point 53 of the line 5 with the ring 54 can travel along said part of the line 5.

[0015] The line 5 is further provided with a first belt 55 for connecting the line with the person 2, which belt 55 is attached to a ring 56 around the line 5, such that the belt can travel along said line between said central connection point 53 and the second outer end 52 of the line. A secondary belt 57 is attached to the line 5 at the central connection point 53.

[0016] The second outer end of the line 5 is provided with a snap hook 58, which can be either attached by the person 2 to the first mounting eye 61 provided on top of the traveller 6 or to the second mounting eye 8.

[0017] As shown in figure 2, if the snap hook 58 is attached to the first mounting eye 61 the line 5 is folded at the central connection point 53, and both outer ends 51, 52 are attached to the traveller 6. The person 2 wears both the belt 55 as the secondary belt 57 in an overlying manner. The length of the folded line 5 is such that the person 2 is allowed to reach the edges of the roof 1 with his hands, but not to fall over the edges of the roof 1.

[0018] As shown in figure 3, if the person approaches the corner of the roof 1, he releases the snap hook 58 from the first mounting eye 61, and attaches it to the second mounting eye 8. Then he can release the secondary belt 57, so that he is allowed to reach with his hands till the corner of the roof 1, but not to fall over the corner or the edges of the roof 1. The configuration of the line 5 is such that if the person 2 stands up from a low kneeling position, he is automatically pulled away from the edges of the roof 1. When the person 2 is ready with working in the corner, he puts the secondary belt 57 back on, then moves the snap hook 58 from the second mounting eye 8 to the first mounting eye 61, and he can continue working safely along the edges of the roof 1.

[0019] While the above provides a full and complete disclosure of the preferred embodiments of the present invention, various modifications, alternate constructions and equivalents may be employed without departing from the true spirit and scope of the invention. Therefore, the above description and illustration should not be construed as limiting the scope of the invention.

Claims

1. A system for preventing a person from falling from a corner of a roof, comprising:
 - a line for tethering said person to said roof;
 - a first anchor installed on said roof for connecting a first outer end of said line to said roof;
 - a second anchor installed on said roof for connecting a second outer end of said line to said roof;
 - said anchors being located substantially on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof which form said corner are substantially equal;
 - wherein said first anchor is located at a larger distance from said corner than said second anchor;
 - wherein said line is provided with line regulating means, which connects a central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and
 - wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line.
2. The system in accordance with claim 1, wherein said first anchor is the corner of a guide extending at a distance along said edges of the roof, and said first outer end of said line is connected to said guide by means of a traveller which can move along said guide, such that said person can walk along said edges.
3. The system in accordance with claim 1 or 2, wherein said second outer end of said line is provided with connection means that allows said person to connect said second outer end with said traveller or said second anchor at the choice of said person, such that if said connection means are connected to said second anchor the securing means can reach a larger distance from said traveller than if said connection means are connected to said traveller.
4. The system in accordance with claim 1, 2 or 3, wherein said securing means comprise a belt which the person can wear around his waist.
5. The system in accordance with any of the preceding claims, wherein a secondary securing means is attached to said line near said line regulating means at the central part of the line, for connecting the central part of the line with said person.
6. The system in accordance with claim 5, wherein said secondary securing means comprise a second belt which the person can wear around his waist.
7. The system in accordance with any of the preceding claims, wherein said connection means at said second outer end of the line is a snap hook.
8. The system in accordance with any of the preceding claims, wherein said second anchor is mounted on said roof by means of gravity force acting on a weight to which said anchor is connected, said weight being such that the frictional force between the anchor and the roof is large enough to prevent that the person can accidentally move said anchor over said roof.
9. The system in accordance with any of the preceding claims, wherein the location for connecting said line to said second anchor is located between 0.75 m and 1.75 m, preferably approximately 1.25 m from the edges adjacent said corner.
10. The system in accordance with any of the preceding claims, wherein the location for connecting said line to said first anchor is located at least 2 m from the edges adjacent said corner.
11. The system in accordance with any of the preceding claims, wherein said line has a length which is approximately equal to: $2 \times$ (the distance between the location for connecting said line to said first anchor and the edges adjacent said corner - 0.75 m)..
12. A line for tethering a person to a roof;
 - wherein said line is provided with line regulating means, which connects a central part of the line with the part of said line between said central part and the second outer end of the line, such that said central part of the line with the line regulating means can travel along said part of the line; and
 - wherein said line is provided with securing means for connecting the line with said person, such that said securing means can travel along said line between said central part of said line and said second outer end of said line.
13. A method for preventing a person from falling from a corner of a roof;
 - wherein two anchors are located substantially on an axis extending from said corner towards the centre of the roof, wherein the angles between said axis and both edges of the roof which form said corner are substantially equal;
 - wherein a first one of said anchors is located at a larger distance from said corner than the second one of said anchors;

said method comprising the steps of:

using a line for tethering said person to said roof;
wherein said line is provided with line regulating
means, which connects a central part of the line 5
with the part of said line between said central
part and the second outer end of the line, such
that said central part of the line with the line reg-
ulating means can travel along said part of the
line; and 10
wherein said line is provided with securing
means for connecting the line with said person,
such that said securing means can travel along
said line between said central part of said line
and said second outer end of said line; 15
connecting the first and second outer ends of
said line to said first anchor;
disconnecting said second end of said line from
said first anchor and connecting it to said second
anchor. 20

14. The method in accordance with claim 13, wherein
said line comprises secondary securing means
which is attached to said line near said line regulating
means at the central part of the line, and which is 25
secured to said person before said second end of
said line is connected to said second anchor, and
the method further comprises the step of releasing
said secondary securing means from the person af-
ter said second end of said line is connected to said 30
second anchor.

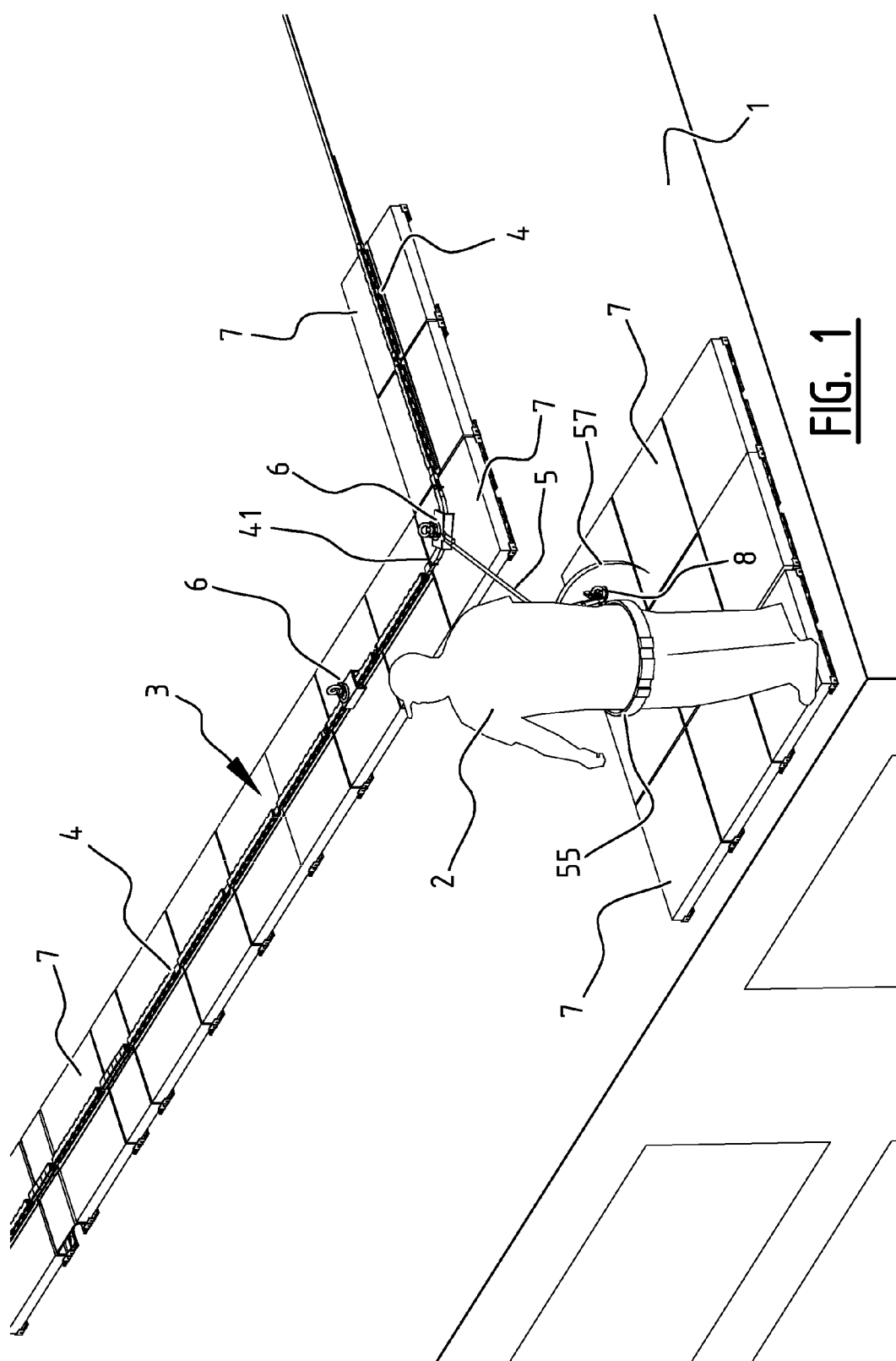
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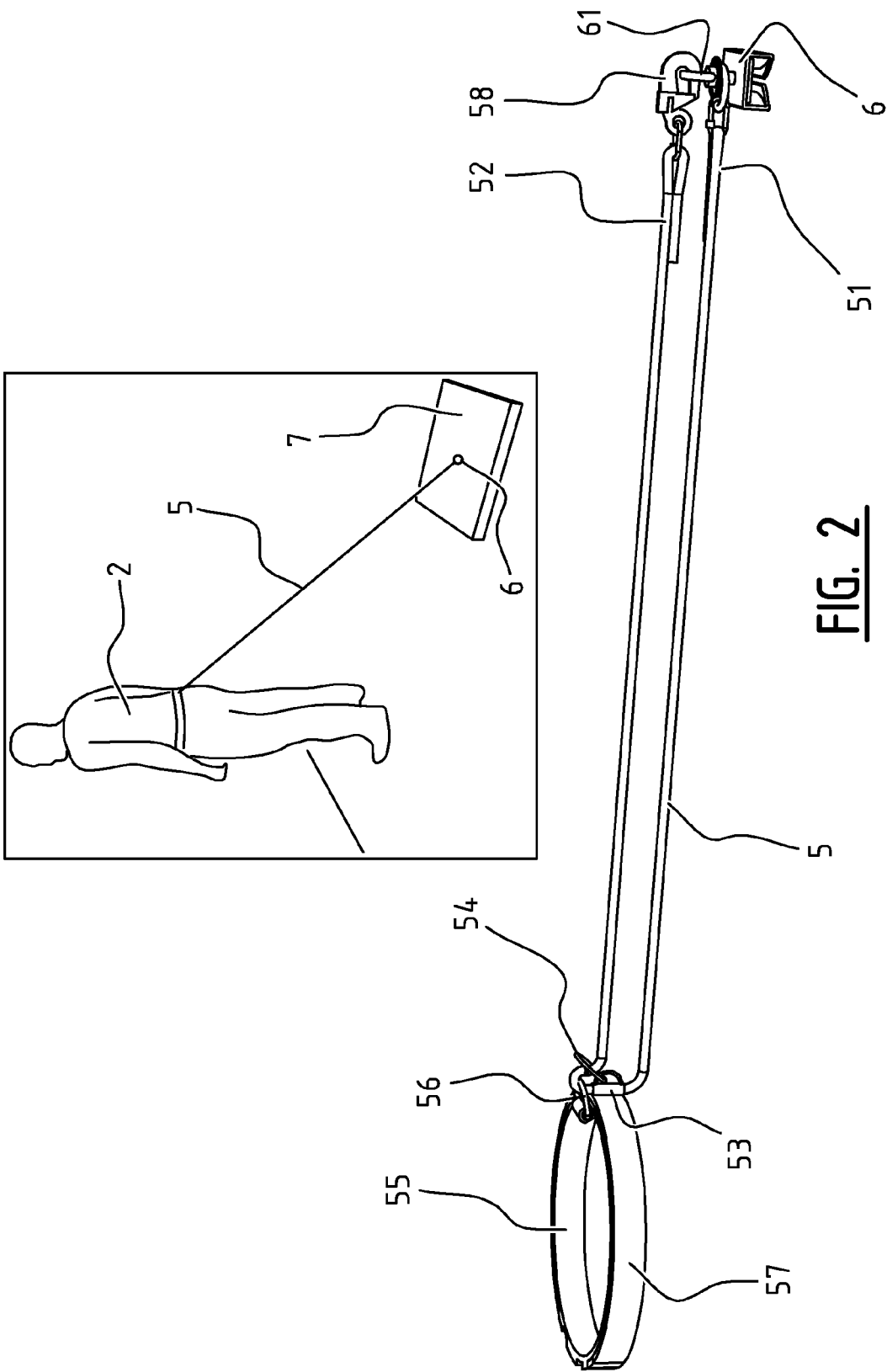
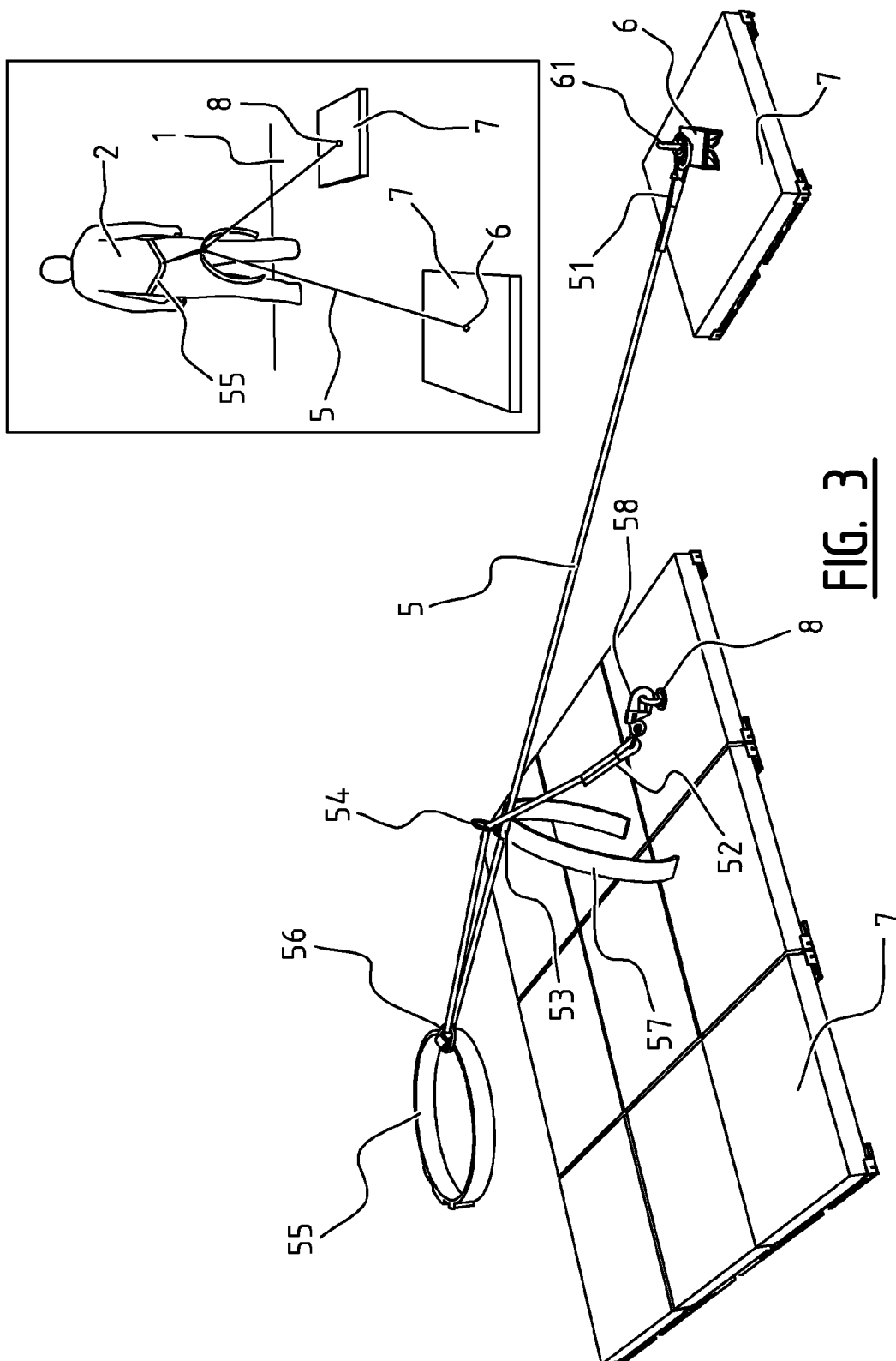


FIG. 2



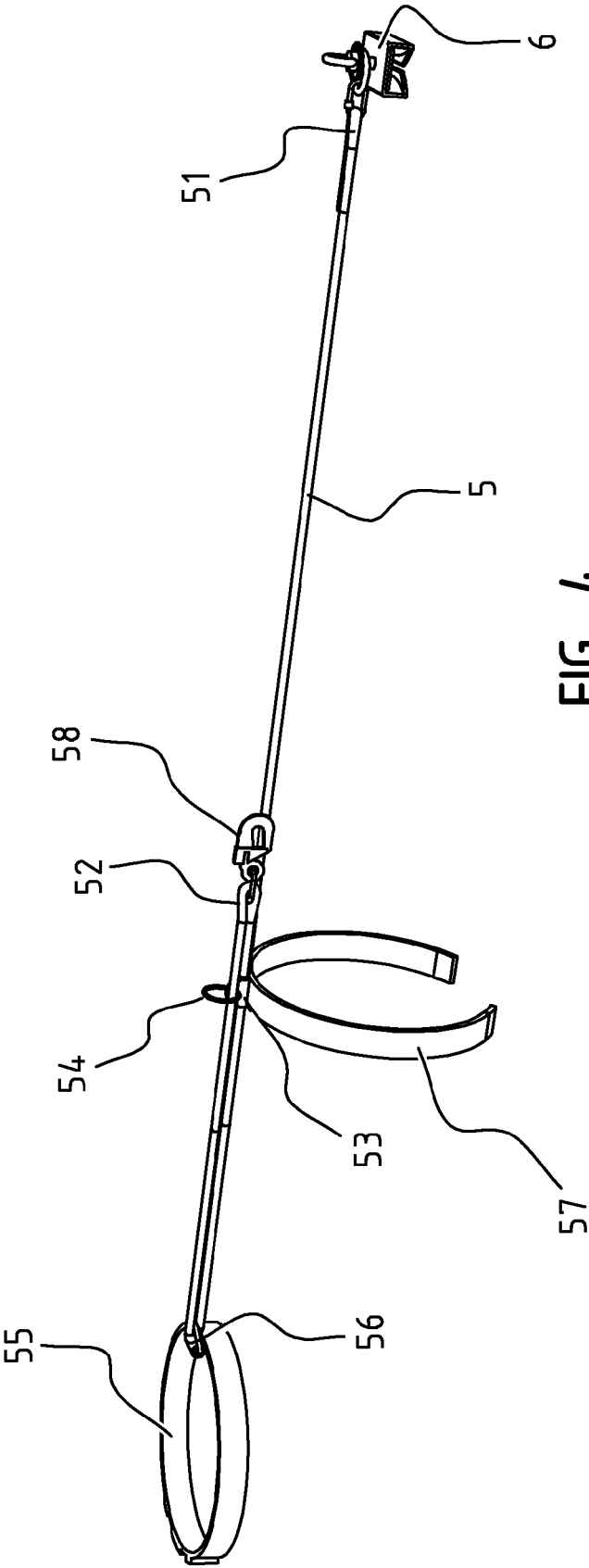


FIG. 4

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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