

Slide for movement of persons, animals or objects

The invention concerns a slide for transfer of persons, animals or objects, comprising a bottom and two lateral edges arranged on each side of the bottom at an angle in relation to the bottom, wherein during use the slide is attached at a highest located upper end to an exit location, and at a lowest located lower end is releasably connected to a receiver, and wherein the slide consists of several adjacent sections whose first ends face the slide's upper end and second ends face the slide's lower end.

Evacuation of, for example, vessels can be performed in several ways. People often have to jump into the water and then swim to a life raft or lifeboat. During evacuation of a vessel unconscious people, animals or objects are sometimes also dropped into the water and then transported to a life raft or lifeboat.

Norwegian patent publication no. 93864 describes an inflatable slide for use in the evacuation of ships.

In recent years several evacuation systems of the inflatable slide type have been installed on ships. However, the performance of these slides has been unreliable since it has been shown that the inflation into the operative position has not always worked properly. For operational purposes the slides must be certified before installation and subsequently recertified annually by an approved workshop. The slides also have to be recertified after every occasion when they have been activated, regardless of whether they have been activated in connection with an evacuation situation or a routine test. Investments in connection with the purchase and constant recertification of inflatable slides represent substantial costs, and the costs for recertification are instrumental in limiting the number of exercises in the use of the inflatable slides, which is unsatisfactory from a safety point of view. Another unfortunate side of the inflatable slides from the safety point of view is their vulnerability to open fire and physical damage due to punctures.

The object of the invention is to provide a slide for transfer of persons, animals or objects, which slide is not encumbered by the above-mentioned disadvantages.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



This object is achieved according to the invention with a slide of the type mentioned in the introduction, characterized by the features which are indicated in the claims.

5 The invention therefore consists of a slide composed of several sections. In a folded condition the slide constitutes a compact unit which is easily accommodated on board a vessel or other location. The slide can be unfolded in order to constitute an escape route down to a receiver, e.g. a raft or a lifeboat.

10 The invention will now be explained in more detail in connection with a description of several embodiments with reference to the drawing, in which

- fig. 1 is a perspective view of a first embodiment of a slide according to the invention,
fig. 2 illustrates the slide in fig. 1 viewed from above,
fig. 3 illustrates the slide in fig. 1 viewed from the side, in a folded position,
15 fig. 4 illustrates the slide in fig. 1 viewed from the side as it begins to unfold,
fig. 5 illustrates sections of a slide in detail,
figs. 6 a,b,c,d illustrate the slide in fig. 1 in a folded position, ready for unfolding, beginning to unfold and completely unfolded
20 respectively,
fig. 7 illustrates a rotating joint for a slide,
fig. 8 illustrates a slide with a lateral protector and a decelerator,
fig. 9 illustrates the upper part of a slide with a protective screen,
25 fig. 10 is a perspective view of a second embodiment of a slide according to the invention,
fig. 11 illustrates the slide in fig. 10 viewed from above, and
fig. 12-14 illustrates details at the transition between two sections of the slide in fig. 10.

30 Fig. 1 illustrates a slide 1 according to the invention in perspective. The slide consists of an upper section 2, a central section 3 and a lower section 4. Each section consists of two lateral edges 5 and a bottom 6, and each section has a first end 7 and a second end 8 (only indicated by reference numeral for the upper section). The slide has an upper end 9 which is attached to a vessel,

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



and a lower end 10 which, when the slide is in use, is releasably connected to a receiver, which may be a life raft. The sections of the slide are connected to one another by rotating joints 11, thus enabling the slide to be folded up.

5 Fig. 2 illustrates the slide from above. Here it can be seen how the axes of the rotating joints 11 are perpendicular to the slide's longitudinal direction. It further illustrates how the width of the sections decreases from the first end 7 to the second end 8. Moreover the internal distance between the lateral edges of the first end of an underlying section is greater than the external width of the second end of an overlying section, thus enabling the second end of an
10 overlying section to be placed between the lateral edges of the first end of an underlying section.

Figs. 3 and 4 illustrate the slide in a folded position and beginning to unfold respectively. Here it is illustrated how the sections can be rotated 180° during folding, thus enabling an underlying section to be placed inside an overlying
15 section. In order to achieve this, for those sections which are not located at the slide's upper and lower end, the external width of the first end of an underlying section must be less than the internal distance between the lateral edges of the second end of a section which is located two sections above the overlying section. At the upper and lower ends of the slide, where the section
20 is not connected to any new section, and consequently there is a more room at the end of the section, the width of the sections is adapted to this.

In this manner it is possible to fold the sections together as illustrated in fig. 3, thus forming a compact unit whose volume is not greater than the sum of the total volume of the two uppermost sections.

25 Fig. 5 illustrates an overlying and an underlying section of a slide, separated from each other. An overlying section 12 has a first end 13 and a second end 14. The first end 13 can be connected to a second section or it can be attached to the vessel. The second end 14 of the section is connected to the first end 16 of an underlying section 15. The connection is implemented by
30 means of holes or pins 17, 17' in the second end 14 of the overlying section 12 and corresponding holes or pins 18, 18' in the first end 16 of the underlying section 15, thus forming two rotating joints 17, 18 and 17', 18'. The figure illustrates the connection principle, which will also apply to the embodiment in figs. 10-14.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



It is possible to rotate the sections 180° in relation to one another since the distance a from the rotating joint 18, 18' to the bottom 36 of the underlying section is greater than the distance b from the rotating joints 17, 17' to an outer side of the lateral edges 19 of the overlying section. The distance b is any distance from the rotating joints 17, 17' to the outer side of the lateral edges 19 in the sections' range of rotation, the range of rotation of approximately 180° in fig. 5 being indicated by the angle ν , and the distances b in the range of rotation's outer edges being indicated by b1, b2.

During folding the lateral edges 19 of the overlying section and the lateral edges 20 of the underlying section cross one another, and consequently it is essential that the sum of the height c of the lateral edges 19 of the overlying section, and the height d of the lateral edges 20 of the underlying section in the crossing area must be less than the total thickness of the folded sections, in order that the lateral edges should not abut against one another.

Figs. 6a, b, c, d illustrate an unfolding of the slide. In fig. 6a the slide 1 is shown folded on a vessel 21, attached to a securing point 25 and a davit 24. Fig. 6b illustrates the slide beginning to unfold where a wire 23, fastened to the rotating joint 11 in the slide 1, is fed out from the davit 24. The upper end of the slide rotates about the securing point 25, thus causing the slide to be inclined over the water. Fig. 6c illustrates how the slide's sections are rotated in the rotating joint 11, and fig. 6d illustrates the slide completely unfolded, with the slide's lower end 10 releasably located in a raft 22.

Fig. 7 illustrates a detail of the rotating connection between the second end 14 of an overlying section and the first end 16 of an underlying section. The second end of the overlying section and the first end of the underlying section have portions with contact surfaces 26, 27 which stop the rotating movement when the slide is completely unfolded. A snap lock in the form of a male part 28 and a female part 29 ensure that the slide's sections are not rotated backwards in the event of random loads.

Fig. 8 illustrates a slide 1 attached to a hatch 30 in a vessel 21. In the unfolded position the slide leads down to a raft 22. In connection with the attachment to the hatch 30, the upper end of the slide is supplied with a lateral protector 31. The lateral protector 31 prevents the user from seeing out at the sides and ensures that he does not fall out of the slide when using it.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



Fig. 8 further illustrates how the slide is equipped at the bottom with a decelerator 32 in the form of a cushion, thus reducing the speed of the user as he approaches the raft.

5 Fig. 9 illustrates the top part of a slide 1 attached to a vessel 21. The slide is attached at the vessel's deck 34, and a tunnel 33 is provided here around the entire entrance section of the slide. Compared to the lateral protector 31 the tunnel 33 provides better protection for the user, while at the same time providing better prevention from seeing out at the sides.

10 Fig. 10 illustrates a second embodiment of the rescue slide where a slide 101 consists of an upper section 102, a central section 103 and a lower section 104. Each section consists of two lateral edges 105 and a bottom 106, and each section has a first end 107 and a second end 108 (only indicated by reference numeral for the upper section). The slide has an upper end 109 which is attached to a vessel, and a lower end 110 which, when the slide is in
15 use, is releasably connected to a receiver, which may be a life raft. The slide's sections are connected to one another by a rotating joint 111, thus enabling the slide to be folded up.

Reference is made to the general connection principle which is described in fig. 5. In the embodiment in fig. 10 the external width of the first end 16 of
20 an underlying section is less than the internal distance between the lateral edges of the second end 14 of an overlying section, and the first end 16 of the underlying section is located between the lateral edges of the second end 14 of the overlying section. The rotating joints 17, 17', 18, 18' are provided in the sections' lateral edges 19, 20 in such a manner that, in a direction
25 perpendicular to the bottom 36 of the underlying section, the distance a from the rotating joints 17, 17', 18, 18' to the bottom 36 of the underlying section is greater than the distance b2 from the rotating joints 17, 17', 18, 18' to an outer side of lateral edges 19 of the overlying section, thus enabling the underlying section 15 to be rotated without hindrance from the overlying
30 section's lateral edges from an unfolded position where the bottom 36 of the underlying section is parallel to and in extension of the bottom 35 of the overlying section, to a folded position rotated approximately 180° in relation to the unfolded position, inside the overlying section.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



Fig. 11 illustrates the slide in fig. 10 from above. Here the slide consists of sections with a constant width from the first end 107 to the second end 108, where an underlying section is accommodated inside an overlying section. Even though it is not shown, it is obvious, however, that the slide according to the embodiment illustrated in fig. 10 can also consist of sections with decreasing width from the first end 107 to the second end 108.

As opposed to the embodiment illustrated in fig. 1, the lateral edges 105 in an overlying and an underlying section in the embodiment illustrated in fig. 10 will not cross one another when the slide is folded up. The lateral edges' height (c in fig. 5) can therefore be constant along the length of the section, thus increasing the safety for the user.

The distance a from the rotating joints to the bottom in the underlying section can be greater than the distance b1 from the rotating joints to the bottom of the overlying section, thus forming a gradual reduction at the transition from the overlying to the underlying section and thereby preventing the user of the slide from becoming stuck in the transitions between the sections.

The bottom of the first end of the underlying section and/or the second end of the overlying section can also have lips, arranged in such a manner that in an unfolded position of the slide the bottom of the second end of the overlying section is located over the bottom of the first end of the underlying section.

The lips are illustrated in figs. 12 - 14. Fig. 12 illustrates an embodiment where the bottom of the second end 14 of the overlying section is equipped with a straight extremity, while the bottom of the first end 16 of the underlying section is equipped with a straight lip, which, when the slide is unfolded, remains lying under the bottom of the second end 14 of the overlying section.

Fig. 13 illustrates an embodiment where the bottom of the second end 14 of the overlying section is equipped with an inwardly bent extremity, while the bottom of the first end 16 of the underlying section is equipped with a straight lip, which, when the slide is unfolded, remains lying under the bottom of the second end 14 of the overlying section.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced


Fig. 14 illustrates an embodiment where the bottom of the second end 14 of the overlying section is equipped with a straight extremity, while the bottom of the first end 16 of the underlying section is equipped with an outwardly bent lip, which, when the slide is unfolded, remains lying under the bottom of the second end 14 of the overlying section.

The lips can also be designed in other ways, e.g. by placing them on the overlying section. In addition the slide illustrated in figures 10 - 14 can, of course, also be provided with snap locks as illustrated in fig. 7.

In the above the invention has been explained with reference to slides with three sections. However, the number of sections can vary, and the number of sections and the length of the sections will be chosen on the basis of the required total length of the slide.

Furthermore it is clear that a number of variants are possible within the scope of the invention. Thus the attachment of the slide to the vessel can be implemented in several ways. By securing the slide in a universal joint an advantageous design is obtained, the slide thereby being capable of being steered to reach receivers, e.g. in the form of rafts, located in different positions. This universal joint can be freely movable, thus enabling the slide to be steered by means of wires from one or two davits, or the universal joint can be controlled by electrical or hydraulic motors.

Other advantageous designs can be achieved by attaching a handrail to the lateral edges, for example in the form of a tube or a profile.

The transition between an overlying and an underlying section is preferably implemented with a slight decrease, thus ensuring that users do not become caught in the transition.

In the described embodiments the sections are unfolded from a folded position by means of the force of gravity alone. This is an inexpensive and reliable solution, since the unfolding of the slide is not dependent on stored or supplied energy. In another embodiment the joints can be designed in such a manner that the rotating movement is obtained by means of supplied or stored energy, for example in the form of prestressed springs or hydraulic pressure.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



Furthermore the tunnel can be designed in several ways. Instead of being folding it can, e.g., be made of steel or fibre-reinforced artificial material, and supplied with a door facing the vessel. Moreover the decelerator can also be designed in several ways, e.g. as an inflatable cushion or a friction coating.

- 5 In the described embodiments the lateral edges are at an angle in relation to the bottom, thus forming a channel profile. It is also possible to design the slide with a continuous transition between bottom and lateral edges, thus forming a U-profile.

- 10 The slide can be made of steel, aluminium, titanium, composite materials or another suitable material. On account of corrosion problems with steel, aluminium, titanium or a corrosion-proof composite material are preferred.

- 15 Compared with the solution mentioned in the introduction, where an inflatable slide is employed, a slide is provided here which will not require recertification when used. Thus it is possible to perform exercises with the slide without incurring increased costs in the form of recertification. The invention will also substantially reduce the investment costs compared with the slide mentioned in the introduction, as well as increasing the value of the investment, since a slide according to the invention has a considerably longer working life than an inflatable slide.

- 20 In the described embodiments the slide has been described in connection with an application related to a vessel. It is clear, however, that the slide will be able to be used in any context related to the transfer of people, animals or objects.

- 25 The above-mentioned and similar variations can be implemented by a person skilled in the art, and they will all lie within the scope of the invention.

THIS SHEET HAS BEEN
REPLACED

This Sheet Has Been Replaced



PATENT CLAIMS

1. A slide (1) for transfer of persons, animals or objects, comprising a bottom (6) and two lateral edges (5, 19, 20) arranged on each side of the bottom (6) at an angle in relation to the bottom, wherein during use the slide (1) is attached at a highest located upper end (9) to an exit location (21), and at a lowest located lower end (10) is releasably connected to a receiver (22), wherein the slide (1) consists of several adjacent sections (2, 3, 4, 12, 15) whose first ends (7) face the slide's upper end (9) and second ends (8) face the slide's lower end (10), characterized in that the slide's sections (2, 3, 4, 12, 15) are rotatably connected to one another by rotating joints (11, 17, 17', 18, 18').
2. A slide according to claim 1, characterized in that the axes of the rotating joints (11, 17, 17', 18, 18') are parallel to the slide's bottom (6) and are located perpendicular to the slide's longitudinal direction.
3. A slide according to claim 1 or 2, characterized in that the sections (2, 3, 4, 12, 15) decrease in width from the first end (7) to the second end (8).
4. A slide according to one of the preceding claims, characterized in that the internal distance between the lateral edges of the first end (16) of an underlying section is greater than the external width of the second end (14) of an overlying section, that the second end (14) of an overlying section is provided between the lateral edges of the first end (16) of an underlying section and that the rotating joints (17, 17', 18, 18') are provided in the sections' lateral edges (19, 20) in such a manner that in a direction perpendicular to the bottom (36) of the underlying section, the distance (a) from the rotating joints (17, 17', 18, 18') to the bottom (36) of the underlying section is greater than the distance (b, b1, b2) from the rotating joints (17, 17', 18, 18') to an outer side of the lateral edges (19) of the overlying section, thus enabling the underlying section (15) to be rotated from an unfolded position in which the bottom (36) of the underlying section (15) is parallel to and in extension of the bottom (35) of the overlying section, to a folded position rotated approximately 180° in relation to the unfolded position, inside the overlying section.



5. A slide according to one of the preceding claims,
characterized in that the external width of the first end (16) of an underlying
section is less than the internal distance between the lateral edges of the
second end of a section which is located two sections above the overlying
5 section, with the result that when folded up the sections are accommodated
inside one another.
6. A slide according to one of the preceding claims,
characterized in that the first end (16) of an underlying section and the
second end (14) of an overlying section are provided with cooperating contact
10 surfaces (26, 27) arranged in such a manner that they abut with each other
and stop the sections' rotating movement when the slide is completely
unfolded.
7. A slide according to one of the preceding claims,
characterized in that the first end (16) of an underlying section and the
15 second end (14) of an overlying section are provided with cooperating snap
lock members (28, 29) arranged in such a manner that they engage with each
other and lock the sections in relation to one another after the completion of
the rotating movement when the slide is being unfolded.
8. A slide according to one of the preceding claims,
20 characterized in that the slide's uppermost section in the slide's attachment
area is provided with a lateral protector (31), for example in the form of an
unfoldable material.
9. A slide according to one of the claims 1-7,
characterized in that the slide's uppermost section in the slide's attachment
25 area is provided with an entrance tunnel (33).
10. A slide according to one of the preceding claims,
characterized in that the slide's bottom section is provided with a decelerator
(32), for example in the form of a cushion.
11. A slide according to one of the preceding claims,
30 characterized in that the joints (11, 17, 17', 18, 18') are designed in such a
manner that the rotating movement is achieved by means of supplied or

This Sheet Has Been Replaced

THIS SHEET HAS BEEN
REPLACED

stored energy, for example in the form of prestressed springs or hydraulic pressure.

12. A slide according to claims 1-3 or 6-11,
characterized in that the external width of the first end (16) of an underlying
5 section is less than the internal distance between the lateral edges of the
second end (14) of an overlying section, that the first end (16) of the
underlying section is provided between the lateral edges of the second end
(14) of the overlying section, and that the rotating joints (17, 17', 18, 18') are
provided in the sections' lateral edges (19, 20) in such a manner that, in a
10 direction perpendicular to the bottom (36) of the underlying section, the
distance (a) from the rotating joints (17, 17', 18, 18') to the bottom (36) of the
underlying section is greater than the distance (b2) from the rotating joints
(17, 17', 18, 18') to an outer side of the lateral edges (19) of the overlying
section, with the result that the underlying section (15) can be rotated from an
15 unfolded position in which the bottom (36) of the underlying section is
parallel to and in extension of the bottom (35) of the overlying section, to a
folded position rotated approximately 180° in relation to the unfolded
position, inside the overlying section.

13. A slide according to claim 12,
20 characterized in that the distance (a) from the rotating joints (18, 18') to the
bottom (36) of the underlying section is greater than the distance (b1) from
the rotating joints (17, 17') to the bottom (35) of the overlying section, thus
forming a gradual reduction at the transition from the bottom (35) of the
overlying section to the bottom (36) of the underlying section.

25 14. A slide according to claim 12 or 13,
characterized in that the bottom of the first end (16) of the underlying section
and/or the bottom of the second end (14) of the overlying section are
provided with lips which overlap the bottom of the second end (14) of the
overlying section or the first end (16) of the underlying section respectively,
30 thus forming a gradation from the overlying section to the underlying section.

This Sheet Has Been Replaced



THIS SHEET HAS BEEN
REPLACED

