

[54] ESCAPE SLIDE ASSEMBLY

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[22] Filed: July 24, 1972

[21] Appl. No.: 274,500

[52] U.S. Cl.: 182/48, 193/25, A62b/1/20

[58] Field of Search: 182/48, 49; 193/25 B, 16, 193/21, 2 R, 7

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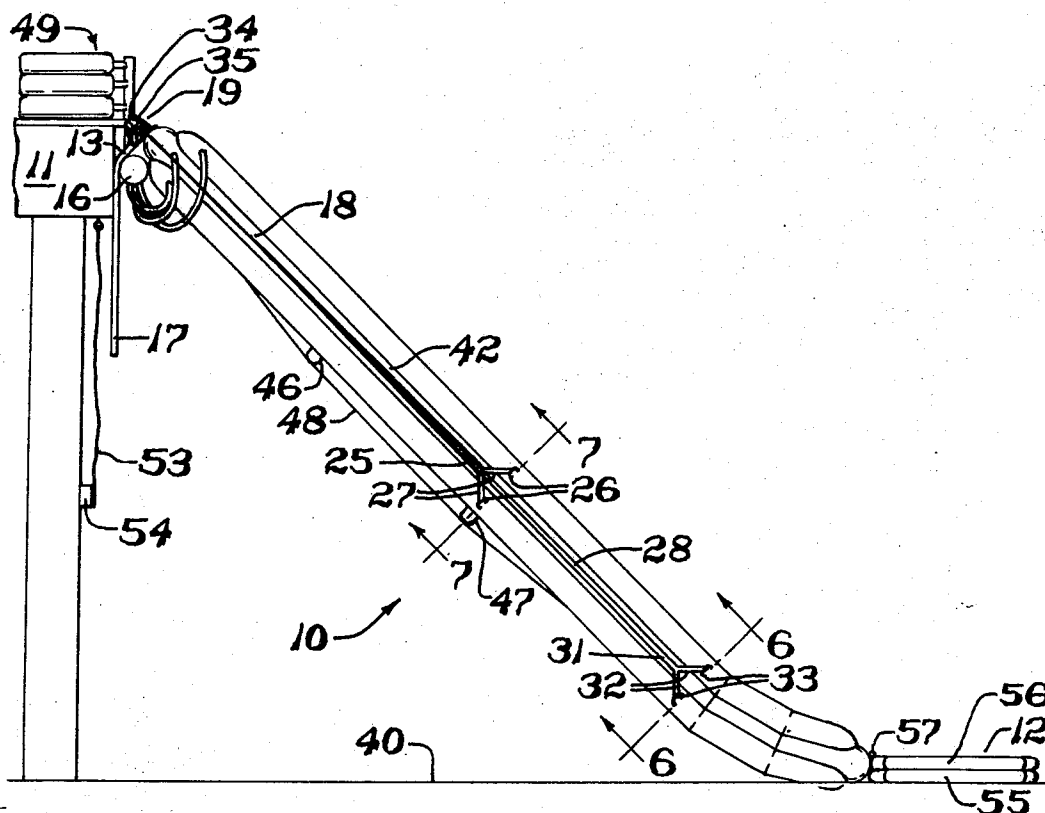
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[57] ABSTRACT

An escape slide assembly having a long inflatable ramp which is inflated from the folded condition to an extended condition for evacuating people from an elevated platform to a lower surface. The slide is hinged to the platform for swinging movement about a horizontal axis and upper and lower guy straps attached to both sides of the slide are connected to outrigger tripods on the platform at positions on the horizontal hinge axis and laterally spaced from the slide providing resistance to lateral displacement of the slide during inflation and after it is fully extended.

9 Claims, 8 Drawing Figures



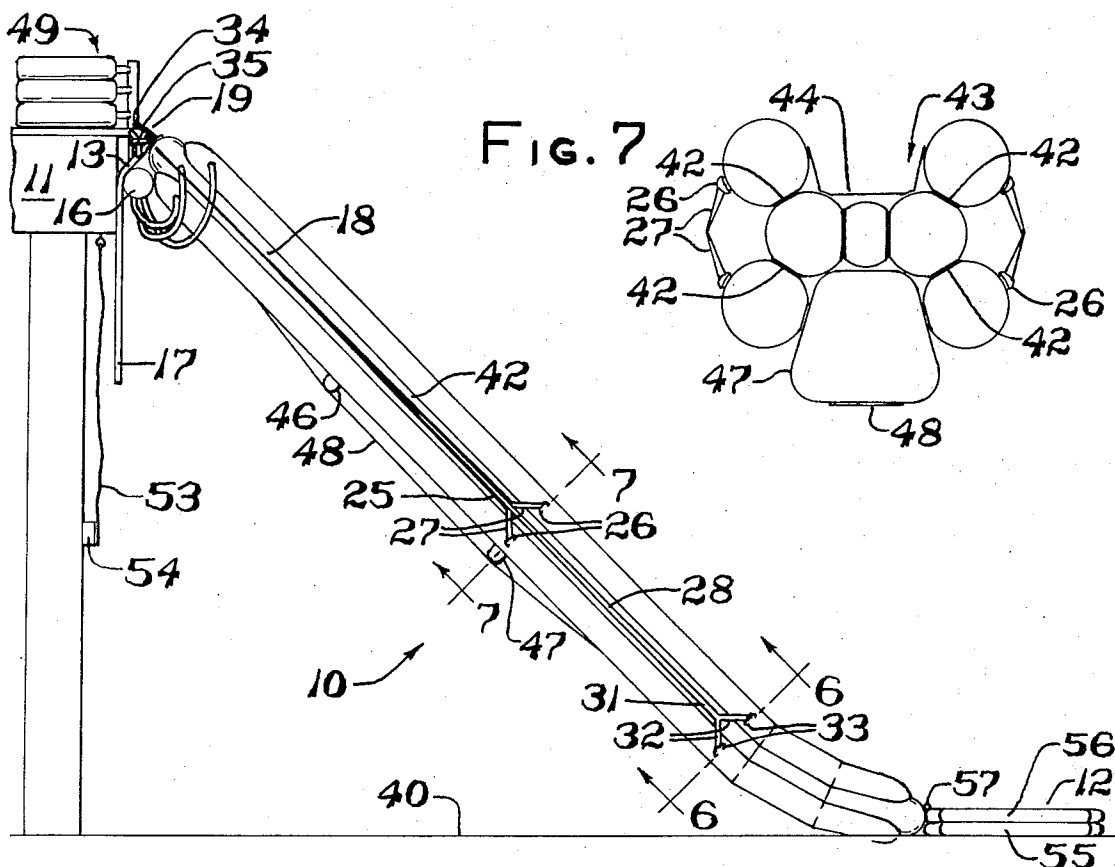
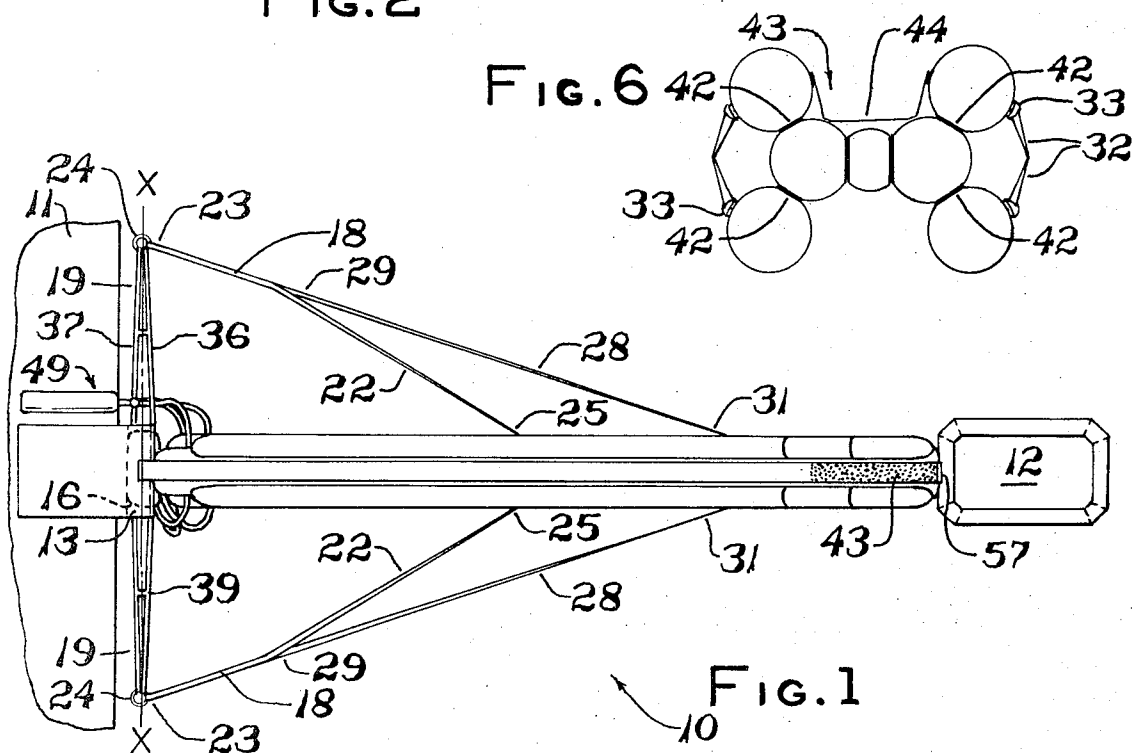
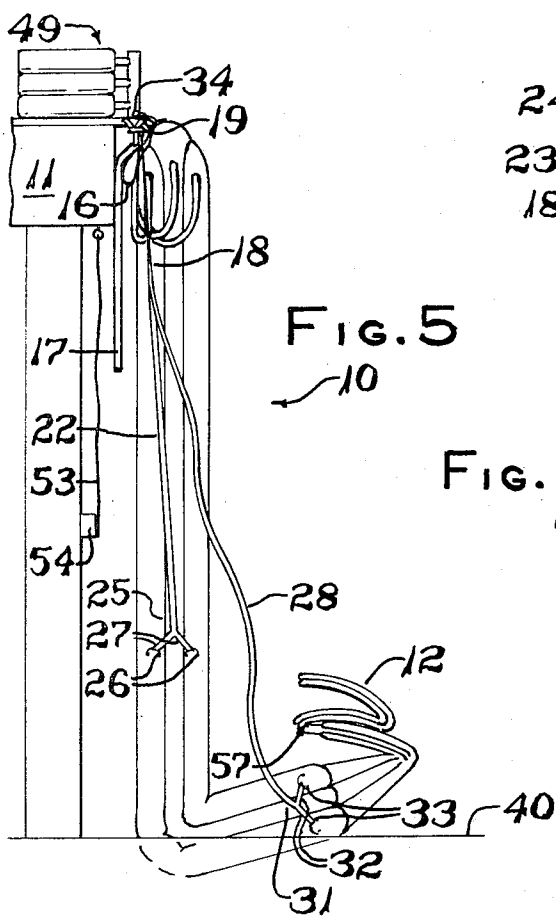
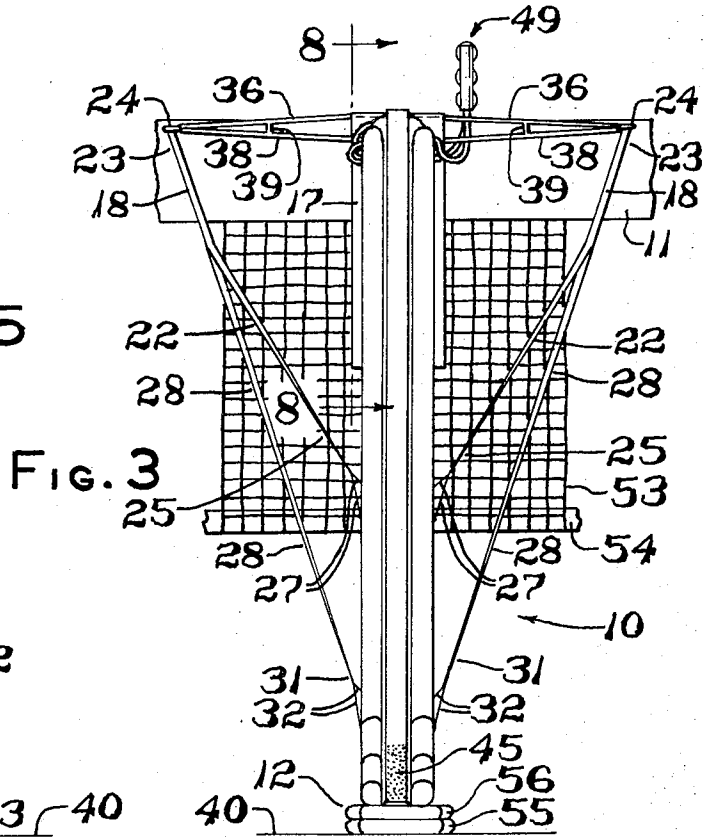
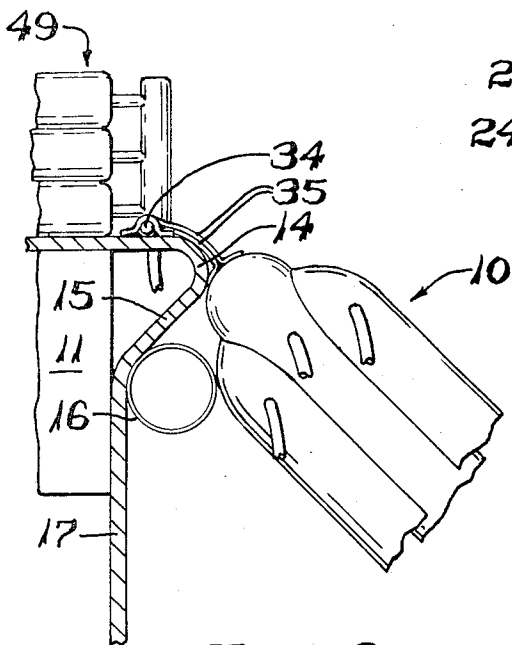
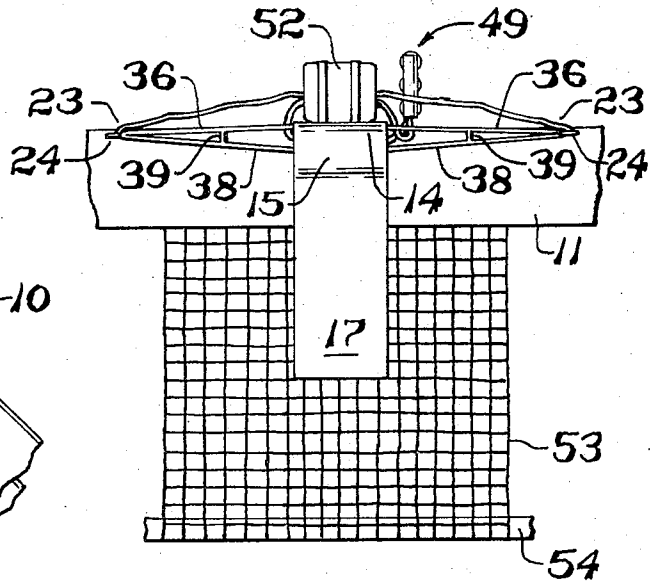


FIG. 2





ESCAPE SLIDE ASSEMBLY

BACKGROUND OF THE INVENTION

This invention relates to an inflatable escape slide for evacuating personnel from offshore oil production platforms in the event of fire and particularly to the lateral guy system which maintains the slide in position after it is deployed protecting the slide from the forces exerted by high winds and heavy seas. The escape slide is folded in a compact package and stowed on the deck of the oil production platform ready for use. In the event of fire the slide is deployed from the deck and unfolded as it is inflated. The ejection of the slide and the inflation to a deployed condition takes place in a matter of seconds and therefore it is critical that the lateral position of the slide during deployment is controlled as well as after it is completely extended.

One of the problems encountered with an installation of this type has been the high winds which tend to blow the slide to one side twisting it and making it unusable. Another problem occurs when the slide contacts the sea and the waves which may be 10 to 12 feet high lift and drop the end of the slide. These problems are compounded by the length of the slide which may be over 75 feet for a slide serving an oil production platform having a height of 50 feet or more over the surface of the water.

The need for a reliable escape slide for oil production platforms has been demonstrated during fires which involve gas explosions and there has not been sufficient time for evacuation of the personnel. As a result the persons not injured by the explosion have jumped from the platform fifty or more feet into the water and a very high injury and death rate has been experienced. This also includes those persons injured by the explosion who could not be evacuated from the platform.

SUMMARY OF THE INVENTION

According to this invention lateral displacement of the slide is resisted by guy straps fastened to the sides of the slide and to laterally extending rods fastened to the apron mounted on the deck at the upper end of the slide. On each side of the slide there is an upper and lower guy strap member with the lower guy strap member being connected to the upper guy strap member at a position close to the supporting rods. With this construction the upper guy strap provides lateral stability to the slide during the initial inflation process and then supplements the lower guy strap members in maintaining lateral stability of the fully inflated slide. The slide is hinged at the upper end to accommodate the rise and fall of the lower end with the ocean surface on which it rests. The guy straps are connected to the supporting rods at positions on the axis of the hinged connection to accommodate the swinging characteristics of the slide for this application.

During the inflation of the slide which takes place in a matter of seconds there is considerable strain on the slide and slide assembly members. This strain and shock is absorbed by the rods of resilient metal and by the guy straps of resilient fabric material. This resiliency of the lateral guy system also absorbs the forces imposed on the fully inflated slide by rough seas and high winds. An inflatable raft may be carried by the slide for simultaneous inflation with the slide or slightly thereafter and is fastened to the lower end of the slide for receiving persons from the slide. The connection

between the raft and the slide may be quickly disconnected so that the persons in the raft can paddle it away from the dangerous area of the burning oil production platform.

The accompanying drawings show one preferred form made in accordance with and embodying this invention and which is representative of how this invention may be practiced.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a plan view of an inflatable slide extending from an oil production platform deck to the surface of the water with the slide being in the fully inflated condition and parts being broken away.

FIG. 2 is a side elevation of the slide shown in FIG. 1, parts being broken away.

FIG. 3 is a front elevation of the fully inflated slide shown in FIGS. 1 and 2, parts being broken away.

FIG. 4 is a front elevation of the slide in the storage container prior to being inflated shown on the deck of the oil production platform, parts being broken away.

FIG. 5 is a side elevation of the slide shown in a partially inflated condition illustrating the action of the upper guy straps.

FIG. 6 is a sectional view of the inflated slide taken along the plane of line 6—6 of FIG. 2.

FIG. 7 is a sectional view of the slide in the inflated condition taken along the plane of line 7—7 of FIG. 2.

FIG. 8 is an enlarged fragmentary detailed view of the mounting of the inflated slide on the apron taken along the plane of line 8—8 of FIG. 3, parts being broken away.

DETAILED DESCRIPTION

Referring to FIGS. 1, 2 and 3 a multitubular inflatable escape slide 10 is shown in the inflated condition in position for evacuating personnel from an oil production platform 11. At the lower end of the escape slide 10 an inflatable raft 12 is releasably connected to the slide for receiving the evacuees from the slide and carrying them to a place of safety. The platform 11 has an apron 13 of sheet steel or other structural material extending outwardly at the edge of the platform to provide a rounded lip 14 over which the upper end of the escape slide 10 may hang. The apron 13 has a sloping surface 15 extending from the lip 14 downward and toward the platform 11 to form a recess under the apron for receiving a positioning tube 16 between a lower supporting wall 17 of the apron and the upper portion of the escape slide 10.

As shown in FIGS. 1, 2 and 3 flexible guide members such as guy straps 18 are fastened to the sides of the escape slide. The guy straps 18 are attached to supporting members such as outrigger tripods 19 extending laterally outward from the apron 13 for resisting lateral displacement of the escape slide 10.

Because the lateral guy strap system on one side of the escape slide is identical with the system on the other side the following detailed description will only refer to the system on one side of the slide. The guy straps 18 may be of resilient flexible material such as nylon capable of absorbing shock and resiliently resisting lateral movement and include an upper member such as upper guy strap 22 having an upper end 23 fas-

tened to the vertex 24 of the tripod 19 as by a hook and eye connection. The upper guy strap 22 has a lower end 25 fastened to the side of the slide 10. The connection to the slide may be by a hook in a D ring fastened to the side of the slide or as shown in FIG. 2 two fastening D rings 26 may be fastened to two of the tubular members of the escape slide 10 and connected to the lower end 25 of the upper guy strap 22 by a pair of connecting straps 27 fastened to the upper guy strap 22 at a Y connection. The connection of the upper guy strap 22 to the side of the escape slide 10 is preferably at a position near the midpoint between the ends of the slide.

The guy straps 18 also include a lower member such as lower guy strap 28 having an upper end 29 fastened to the upper guy strap 22 at a position between the upper end 23 and lower end 25 of the upper guy strap. The lower guy strap 28 also has a lower end 31 fastened to the side of the escape slide 10 at a position near the swingable end of the slide as by connecting straps 32 connected to D rings 33 mounted on tubular members of the escape slide.

The upper end of the escape slide 10 is connected to the apron 13 by a rod 34 mounted on the apron and extending through a loop 35 formed by the material of the slide. The loop 35 hangs over the lip 14 with the result that there is a hinged connection between the platform and slide with the axis of the hinge extending substantially along a line indicated by the letter X—X in FIGS. 1, 3 and 8. This is necessary because the lower end of the slide 10 is supported by the surface of the ocean which may have waves of ten to twelve feet and will accordingly lift and drop the end of the slide. Each of the tripods 19 have rods 36, 37 and 38 extending from the vertex 24 laterally towards the apron 13 where they are mounted as by welding to the apron. Braces 39 may extend between the rods 36, 37 and 38 to provide the desired stability of the tripods 19. The tripods 19 are mounted so that the vertex 24 to which the upper guy strap 22 is connected is located along the hinged axis X—X so that during swinging movement of the slide about the hinged axis the guy straps 18 will provide a continuous steady resistance to lateral movement. Preferably the vertex 24 of the tripod 19 is at a distance from the side of the slide at least one-fifth the height of the platform over the water level 40 to provide the desired stability.

As shown in FIGS. 6 and 7 the slide 10 which may be of fabric is multitubular in shape and coated with an elastomer to make it air tight. Several internal fabric bulkheads 42 may be utilized for the purpose of obtaining the desired cross section which in this application is an X shape with the groove at the top of the X forming a slide 43. A special fabric liner 44 may be used to line the slide 43 and may have an elastomeric coating providing a substantially unchanging coefficient of friction under both wet and dry conditions. As shown in FIG. 2 a curved shape is built into the lower end of the slide 10 to decelerate evacuees prior to entering the raft 12. A material having a surface 45 with an extremely high coefficient of friction is used at this curved area on the liner 44 to provide additional deceleration and controlled transfer of personnel into the raft 12. As shown in FIGS. 2 and 7 an inflatable truss having inflatable supporting members 46 and 47 mounted in the groove at the bottom of the X construction and a fabric tension member 48 provide increased

stiffening of the slide 10 to resist any tendency of the slide to bend and sag under large loads.

Inflation of the escape slide 10 is accomplished by using gaseous nitrogen stored in a three tank reservoir 49 at 2,000 pounds per square inch and retained by a quick acting ball type valve. The valve is connected through a pressure regulator to six aspirator pumps located in the wall of the slide 10. When the valve is opened the high pressure air passing through the aspirator pumps creates a low pressure area in the pump barrels and causes ambient air to be drawn into the inflatable slide 10. A set of check doors in each aspirator close after inflation is completed to prevent air escaping from the slide.

Referring to FIG. 4 the escape slide 10 and raft 12 as shown in the deflated condition are compactly wrapped in a fiberglass reinforced plastic cover 52 with the upper guy strap 22 leading into the cover but in the connected position to the vertex 24 of the tripods 19. Beneath the supporting wall 17 of the apron 13 a further supporting surface such as a rope cargo net 53 is suspended between the platform 11 and a horizontal structural member 54 of the platform to prevent movement of the slide under the platform during inflation. The cover 52 is mounted on the apron 13 with a suitable release device to automatically remove the cover from the slide as it is deployed over the lip 14 of the apron 13.

Referring to FIG. 5 the slide 10 is shown in the partially inflated condition and it will be noted that the upper guy strap 22 is operative to guide the slide 10 and maintain it in the desired lateral position. The lower guy strap 28 at this point is not extended and performs no particular function. It will also be noted that the raft 12 is not inflated. Inflation of the raft 12 is accomplished by the use of gaseous nitrogen stored in a single tank reservoir attached to the raft itself. The gas is retained in the reservoir by a combination valve and regulator assembly. Once the valve is tripped the gas is passed through two aspirator pumps located in the wall of the inflatable raft 12. One aspirator is located in each of two raft chambers 55 and 56. By use of a check valve in each air line the two chambers 55 and 56 of the raft are maintained in the inflated condition independent of each other so that after the inflation cycle is completed damage to one of the chambers would not deflate both chambers. Actuation of the raft inflation system is accomplished automatically by a lanyard attached to the upper end of the slide 10 so that as the slide drops from the platform 11 the weight of the raft assembly will trip the lanyard causing the raft 12 to inflate while being thrown outward and downward to the surface of the water. The inflation of the raft 12 is approximately 90 percent complete by the time it strikes the surface of the water and is fully inflated before the first evacuee can possibly reach it sliding down the slide. A connection 57 between the raft 12 and the slide 10 is of a type which is easily and quickly disconnected so that the raft may be paddled away after receiving the evacuees from the slide.

With the slide assembly described hereinabove the escape slide 10 and platform 11 can be inflated in approximately 10 seconds to a usable configuration. This can be done even in high winds and with a high sea because the guy straps 18 and tripods 19 are disposed in such a configuration that lateral displacement of the slide 10 is resisted effectively. The tripod rods 36, 37

and 38 are of a resilient steel construction and this coupled with the resiliency of the guy straps 18 cushion the lateral forces exerted upon the slide 10 and thereby prevents tearing and damage to the slide. The disposition of the connection between the upper guy straps 22 and the tripods 19 at the vertex 24 which is located on the hinged axis X—X accommodate the up and down movement of the slide around the hinged axis due to the action of the ocean waves. Accordingly an escape slide assembly is provided which does not take up valuable space on the platform 11 and interfere with normal operations of the oil production platform but is immediately operational to evacuate personnel from the platform in case of explosion and fire. It should be noted that even injured personnel can be slid down the slide 10 without undue danger to them and thereby it is possible to save not only the able bodied survivors but also the injured. Although the preferred embodiment is directed to an escape slide for an oil production platform it is obvious that this invention is not confined to this one application but may also be used in other applications such as on ships, aircraft or for other elevated working locations where the danger of fire, explosion or other unexpected hazards requires a means for evacuating the area in a matter of seconds.

I claim:

1. An escape slide adapted to be folded and inflated to extend from an elevated platform to a lower surface, said slide being hinged to said platform for swinging movement about a substantially horizontal axis, said escape slide being multitubular and having tubular members at each side of said slide with a slide member interposed between said tubular member, supporting members mounted on each side of said platform and extending outwardly in the direction of said horizontal axis, flexible guide members attached to said tubular members at opposite sides of an extensible portion of said slide at positions spaced along the sides of said slide and fastened to said supporting members mounted on said platform at positions laterally spaced outward from opposite sides of said slide whereby said guide members resist lateral displacement of the slide in the partially inflated and extended condition and permit unobstructed movement of people down said slide member.

2. An escape slide according to claim 1 wherein said supporting members are located with the guide mem-

bers fastened at positions along said horizontal axis to maintain the resistance to lateral displacement of the slide during swinging movement of the slide about said axis.

3. An escape slide according to claim 1 wherein each of said guide members includes a single upper member between one of said supporting members and one of said tubular members of said slide and a lower member fastened to the tubular member at a position on the other side of said upper member from said platform and joining said upper member at a position spaced from the ends of said upper member whereby said upper member resists lateral displacement during initial extension of said slide and said lower member resists lateral displacement upon further extension of said slide.

4. An escape slide according to claim 3 wherein said upper member is fastened to said slide at a position near the midpoint between the ends of the tubular member of said slide and said lower member is fastened to the tubular member at a position near the swingable end of the slide.

5. An escape slide according to claim 1 wherein said guide members are of a resilient material to absorb the shock of inflating and extending said slide and resiliently resist lateral displacement.

6. An escape slide according to claim 1 wherein said laterally spaced positions of attachment to the supporting members on opposite sides of said slide are at a distance from said slide not less than one-fifth the height of said platform from said lower surface.

7. An escape slide according to claim 1 wherein said supporting members include rod members attached to said platform in the proximity of said slide and extending laterally away from said slide to said laterally spaced positions.

8. An escape slide according to claim 7 wherein said rod members form tripods with the vertex ends connected to said guide members and the other ends attached to said platform.

9. An escape slide according to claim 2 wherein said supporting members include rod members attached to said platform in the proximity of said slide and extending laterally away from said slide to said positions laterally spaced along said horizontal axis where the guide members are fastened to the rod members.

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