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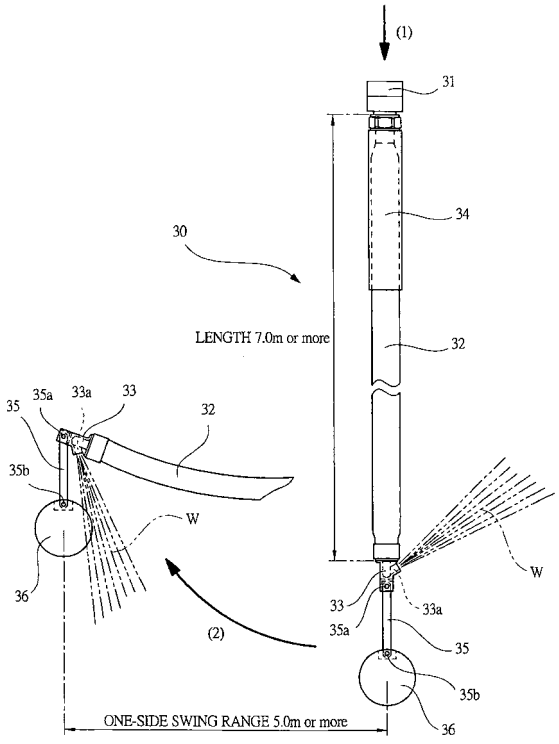
(54) Invasion preventing apparatus for ship

(57) An invasion preventing apparatus for ship has a flexible hose (32)having a base end connected to a guiding branch (21a) of a T-shaped pipe (21) provided at the upper deck and a front end drooped toward the sea surface, a nozzle (33) which is provided at the front end of the hose, a spraying hole (33a) which is provided at the nozzle and sprays seawater to generate a thrust force causing the front end of the hose to swing, and a weight member (36) which is provided at the nozzle to determine a swing range of the front end of the hose in longitudinal and lateral directions while keeping a balance with the thrust force. It is possible to expose pirates to the threat of an irregular swing motion of the front end of the hose in the longitudinal and lateral directions at a freeboard portion of a ship.

FIG. 4



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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority from Japanese Patent Application No. 2011-148990 filed on July 5, 2011, the content of which is hereby incorporated by reference into this application.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates to an invasion preventing apparatus for ship which is provided in the periphery of an upper deck of a ship and is operated in accordance with a supply of fluid so as to prevent an entry of an illegal intruder.

BACKGROUND OF THE INVENTION

[0003] In recent years, pirates (illegal intruders) appearing frequently in the Indian Ocean or the like emerge as an object of public concern, and the appearance of the pirates become a great barrier in safe navigation of a ship. The pirates approach a ship which is an attack target, using a small boat sailing at a high speed, throw an anchor with rope from a port-side, a starboard-side, a stern or the like of a pirate ship to an upper deck of a targeted ship, the anchor is hooked on the upper deck, and then the pirates intrude into the ship using a ladder or the like installed based on the rope. Then, the pirates intruding into the ship may demand an expensive ransom for crew taken as a hostage.

[0004] It may be supposed that such an attack of the pirates is deterred by plural crews, but it is not preferable to expose the crews to danger in this case. Therefore, there is developed an apparatus capable of driving the pirates back without exposing the crews to the pirates, that is, an apparatus capable of preventing the invasion of the pirates into the ship. For example, a method using sound, beam, and electricity, or a method using a barbwire or a large invasion preventing wall which prevent the invasion physically, may be exemplified. However, the former may be comparatively easily handled by earplugs, sunglasses, rubber gloves or the like, and the latter may be damaged due to strong shaking generated during navigation. As a result, both countermeasures are not sufficient as decisive means. Therefore, there has been a strong demand for the development of an apparatus capable of more effectively preventing the invasion of the pirates and being easily installed in the existing ship.

[0005] Incidentally, in a cargo ship or the like, a seawater pump such as a fire-extinguishing pump or an emergency fire-extinguishing pump is installed according to the Regulations for Equipment of Ships and others. Further, in a large cargo ship or the like, a large amount of seawater is injected into a ballast tank using a large seawater pump (ballast pump), whereby the posture of the ship is stabilized by the weight when the ship sails in ballast. That is, since the ship has an environment in which the seawater may be freely used, when an apparatus using seawater (water) is devised, the apparatus may be comparatively easily installed at an existing ship.

[0006] As such an apparatus using seawater, for example, a technique is disclosed in Japanese Patent Application Laid-Open Publication No. 2002-037179 (hereinafter simply referred to as "Patent Document 1"). An illegal boarding preventing apparatus (invasion preventing apparatus for ship) disclosed in Patent Document 1 includes a trigger which is operated when pirates throw an anchor with rope from the outside of the ship onto an upper deck. Then, hot water (seawater) produced in an engine room is sprayed toward the outside of the ship in accordance with the operation of the trigger. Accordingly, the pirates attempting to intrude from the outside of the ship are driven back.

[0007] However, the invasion preventing apparatus for ship disclosed in the Patent Document 1 employs a structure which is operated when the pirates approach the ship and throw the anchor with rope onto the upper deck. Therefore, the pirates may easily approach the ship, and the ship may thus be threatened by the pirates. For this reason, it is desirable to study a structure capable of preventing the pirates from approaching the ship. For example, if it is possible to make the pirates recognize that the countermeasure for the pirates is taken in the ship when the pirates see the ship from a long distance, the motivation of the pirates can be degraded and further the possibility that the ship is threatened by the pirates can be reduced.

[0008] It is an object of the invention to provide an invasion preventing apparatus for ship which can be easily installed in an existing ship and further threatens illegal intruders.

SUMMARY OF THE INVENTION

[0009] An invasion preventing apparatus for ship according to the present invention is provided in the periphery of an upper deck of a ship and is operated in accordance with a supply of fluid so as to prevent an entry of an illegal intruder, the invasion preventing apparatus for ship comprises: a flexible hose having a base end connected to a fluid pipe provided at the upper deck and a front end drooped toward a surface of water; a swing nozzle which is provided at the front end of the hose; a spraying hole which is provided at the swing nozzle and sprays the fluid so as to generate a thrust force causing the front end of the hose to swing; and a weight member which is provided at the swing nozzle and determines a swing range of the front end of the hose in longitudinal and lateral directions while keeping a balance with respect to the thrust force.

[0010] In the invasion preventing apparatus for ship according to the present invention, a connection rod having one end rotatably connected to the swing nozzle and

the other end rotatably connected to the weight member is provided between the swing nozzle and the weight member.

[0011] In the invasion preventing apparatus for ship according to the present invention, a plurality of hoses are provided at a predetermined interval in the fluid pipe extending along the periphery of the upper deck and a drainage nozzle having a spraying hole spraying water toward the surface of the water is provided between the hoses.

[0012] In the invasion preventing apparatus for ship according to the present invention, the spraying hole of the drainage nozzle is formed into a rectangular shape which extends in the longitudinal direction of the ship.

[0013] According to the present invention, an invasion preventing apparatus for ship comprises: a flexible hose having a base end connected to a fluid pipe provided at the upper deck and a front end drooped toward a surface of water; a swing nozzle which is provided at the front end of the hose; a spraying hole which is provided at the swing nozzle and sprays the fluid so as to generate a thrust force causing the front end of the hose to swing; and a weight member which is provided at the swing nozzle and determines a swing range of the front end of the hose in the longitudinal and lateral directions while keeping a balance with respect to the thrust force. Therefore, the front end of the hose can be made to irregularly swing in the longitudinal and lateral directions at the freeboard portion of the ship. Since the irregular swing motion of the hose can be recognized from a long distance and the weight member also irregularly swings, the illegal intruders are threatened. Accordingly, the motivation of the illegal intruders can be degraded so that the illegal intruders cannot approach the ship, and further the ship can be protected from the threat of the illegal intruders. Further, since the seawater pump or the like installed in advance in the ship is used as a driving source for causing the hose to swing, a dedicated driving source may not be further installed and the invasion preventing apparatus can be easily installed in the existing ship at a comparatively low cost.

[0014] According to the present invention, since a connection rod having one end rotatably connected to the swing nozzle and the other end rotatably connected to the weight member is provided between the swing nozzle and the weight member, the weight member can be made to swing in a more complex and irregular manner in accordance with the irregular swing motion of the hose.

[0015] According to the present invention, since a plurality of hoses are provided at a predetermined interval in the fluid pipe extending along the periphery of the upper deck and a drainage nozzle having a spraying hole spraying water toward the surface of the water is provided between the hoses, the freeboard portion of the ship can be covered by the curtain of the seawater and the illegal intruder can be further prevented from approaching the ship.

[0016] According to the present invention, since the spraying hole of the drainage nozzle is formed into a rectangular shape which extends in the longitudinal direction of the ship, even when the pirate ship approaches the ship along the longitudinal direction of the ship, the seawater can be assembled in the pirate ship with high efficiency, so that the illegal intruder may be threatened by the rollover.

BRIEF DESCRIPTIONS OF THE DRAWINGS

[0017]

FIG. 1A is a plan view showing a starboard-side of a ship provided with an invasion preventing apparatus;
FIG. 1B is a top view of the ship shown in FIG. 1A;
FIG. 2 is a front view of the ship shown in FIGS. 1A and 1B;
FIG. 3 is a partially enlarged view for explaining a detail structure of the invasion preventing apparatus;
FIG. 4 is a view for explaining a detail structure and an operation state of a jumping hose;
FIG. 5 is a view for explaining operation states of a connection rod and a weight member;
FIG. 6A is a plan view showing a large-volume drainage nozzle;
FIG. 6B is a plan view showing a large-volume drainage nozzle;
FIG. 7 is a partial cross-sectional view for explaining coupling structures of the large-volume drainage nozzle and a swivel joint;
FIG. 8 is a view for explaining an operation state of the large-volume drainage nozzle;
FIG. 9 is a partially enlarged view for explaining a detail structure of an invasion preventing apparatus according to the second embodiment; and
FIG. 10 is a view for explaining a detail structure and an operation state of a jumping hose in the second embodiment.

DESCRIPTIONS OF THE PREFERRED EMBODIMENTS

[0018] Hereinafter, the first embodiment of the present invention will be described in detail with reference to the accompanying drawings.

[0019] FIG. 1A is a plan view showing a starboard-side of a ship provided with an invasion preventing apparatus, FIG. 1B is a top view of the ship shown in FIG. 1A, and FIG. 2 is a front view of the ship shown in FIGS. 1A and 1B.

[0020] A ship 10 shown in FIGS. 1A, 1B, and 2 is a large cargo ship with plural cargo holds 11, and plural cargoes 12 are stacked on each cargo hold 11. The ship 10 is provided with an upper deck 13, and a bridge 14 is provided near the stern (left side portion in FIGS. 1A and 1B) of the upper deck 13. A radar 14a, a radio antenna 14b, and the like are installed on the top of the bridge 14.

Further, an engine room (not shown) having a diesel engine (not shown) received therein is provided below a draft line "DL", and located under the bridge 14 of the ship 10, and a screw propeller 15 and a rudder 16 are provided near the engine room.

[0021] As shown in FIG. 1B, the upper deck 13 of the ship 10 is provided with plural seawater discharge valves 17a to 17f (six valves are shown in the drawings) serving as fireplugs. A seawater pump (not shown) such as a fire-extinguishing pump is connected to the upstream of each of the seawater discharge valves 17a to 17f, and the seawater discharge valves 17a to 17f are configured to discharge seawater outside the ship to respective positions on the upper deck 13 by the operation of the seawater pump. Accordingly, the fire-extinguishing activity or the like may be performed on the upper deck 13. Here, the seawater pump is not limited to the fire-extinguishing pump or the like, and a ballast pump may be also used in the case of a ship with a ballast tank and a ballast pump.

[0022] The upper deck 13 is provided with plural invasion preventing apparatuses (invasion preventing apparatuses for ship) 18a to 18f respectively corresponding to the seawater discharge valves 17a to 17f. As shown in FIGS. 1B and 2, the invasion preventing apparatuses 18a to 18f are provided along the periphery of the upper deck 13. The respective seawater discharge valves 17a to 17c and the respective invasion preventing apparatuses 18a to 18c are disposed near the port-side portion of the ship 10, and the respective seawater discharge valves 17d to 17f and the respective invasion preventing apparatuses 18d to 18f are disposed near the starboard-side portion of the ship 10.

[0023] The respective invasion preventing apparatuses 18a to 18f are disposed at the port-side portion, the starboard-side portion, and a stern portion where pirates (illegal intruders) may easily intrude into the ship except for a bow side portion (right side portion in FIG. 1) of the upper deck 13. Here, as shown in FIGS. 1A and 2, a flare 19 having a shape which is widely opened upward is provided in the bow side, and the bow side may be largely moved by a steerer of the ship 10. That is, since the pirates hardly intrude into the ship while aiming at the bow side, the bow side is not provided with the invasion preventing apparatus.

[0024] Then, the detail structure of each of the invasion preventing apparatuses 18a to 18f will be described hereinafter in detail with reference to the drawings. Here, since the invasion preventing apparatuses 18a to 18f are the same as each other in configuration, only the invasion preventing apparatus 18a will be described hereinafter in detail with reference to the drawings.

[0025] FIG. 3 is a partially enlarged view for explaining a detail structure of the invasion preventing apparatus, FIG. 4 is a view for explaining a detail structure and an operation state of a jumping hose, FIG. 5 is a view for explaining operation states of a connection rod and a weight member, FIGS. 6A and 6B are plan views each showing a large-volume drainage nozzle, FIG. 7 is a partial cross-sectional view for explaining coupling structures of the large-volume drainage nozzle and a swivel joint, and FIG. 8 is a view for explaining an operation state of the large-volume drainage nozzle.

[0026] As shown in FIG. 3, the invasion preventing apparatus 18a includes plural I-shaped pipes (fluid pipes) 20 having two connection portions and plural T-shaped pipes (fluid pipes) 21 having three connection portions. Each I-shaped pipe 20 and each T-shaped pipe 21 are connected to each other by fastening a nut member 22 which may be manually operated. One end of the I-shaped pipe 20 and the T-shaped pipe 21 connected to each other is connected to the seawater discharge valve 17a, and the other end is blocked by an end cap (not shown).

[0027] Each T-shaped pipe 21 is provided with a branch 21a. A plug-in joint 21b is attached to each branch 21a, and each plug-in joint 21b is connected to one end of a supply hose 23 in a plug-in manner, where the supply hose 23 supplies seawater (water) "W" (refer to FIGS. 4 and 8) as a fluid to a jumping hose 30 and a large-volume drainage nozzle 40 to be described later.

[0028] A pressure adjusting valve 24, a pressure gauge 25, an angle adjusting elbow 26, and a swivel joint 27 are provided between the base end of the jumping hose 30 (the large-volume drainage nozzle 40) and the other end of the supply hose 23 in an order from the supply hose 23. The pressure adjusting valve 24 is used to adjust the amount and the pressure of the seawater "W" sprayed from the jumping hose 30 (the large-volume drainage nozzle 40), and an operator may operate the pressure adjusting valve 24 while seeing the pressure gauge 25.

[0029] The angle adjusting elbow 26 is used to change the direction of the supply hose 23 and the direction of the jumping hose 30 (the large-volume drainage nozzle 40) by substantially 45 degrees, whereby the jumping hose 30 (the large-volume drainage nozzle 40) is directed from the periphery of the upper deck 13 toward the freeboard portion of the ship 10. The swivel joint 27 is used to rotatably support the base end of the jumping hose 30 (the large-volume drainage nozzle 40).

[0030] As shown in FIGS. 1A, 1B, and 2, the front end of the jumping hose 30 is drooped from the periphery of the upper deck 13 to the freeboard portion, so that it is directed toward the surface of the sea (the surface of the water). The jumping hose 30 is configured to irregularly swing (jump) in the longitudinal and lateral directions at the freeboard portion of the ship 10 (refer to the bold curves in FIGS. 1A, 1B, and 2) by spraying the seawater "W" at the amount of 5 m^3/h and the pressure of 0.2 Mpa through the seawater discharge valve 17a (refer to FIG. 3).

[0031] As shown in FIG. 4, the jumping hose 30 includes a flexible hose 32, and the base end (upper side portion in FIG. 3) of the hose 32 is provided with an attachment 31 which is rotatably connected to the swivel joint 27 (refer to FIG. 3). Further, the front end of the hose

32 is provided with a swing nozzle 33 having a spraying hole 33a.

[0032] In the embodiment, the length of the hose 32 is set to 7.0 m, and the length of the hose 32 is set to be shorter than 8.0 m corresponding to the height of the freeboard portion of the ship 10. Accordingly, the jumping hose 30 can irregularly swing in the longitudinal and lateral directions at the freeboard portion of the ship 10. Here, as the hose 32, for example, a fire-extinguishing hose formed by interweaving polyester fiber and coating its inside surface with polyester resin is used. Accordingly, the hose 32 having both flexibility and durability can be obtained while realizing a decrease in cost of the jumping hose 30.

[0033] A protection member 34 is attached to the base end of the hose 32 so as to protect a connection portion with the attachment 31 in the hose 32. The protection member 34 is formed into a cylindrical shape by, for example, a resin such as plastic, and is slightly deformed with a spring property in accordance with the swing motion of the hose 32. Accordingly, it is possible to suppress an excessive force (large bending force) from being exerted on the connection portion with the attachment 31 in the hose 32. Here, the swing range of the hose 32 may be adjusted by appropriately adjusting the length of the protection member 34.

[0034] A weight member 36 is provided to the swing nozzle 33 through a connection rod 35. One end of the connection rod 35 is rotatably connected to the swing nozzle 33 through a pin 35a, and the disk-like weight member 36 is rotatably connected to the other end of the connection rod 35 through a pin 35b. That is, the connection rod 35 is provided between the swing nozzle 33 and the weight member 36 so as to be swingable, whereby the weight member 36 swings in a more complex and irregular manner with respect to the irregular swing motion of the hose 32.

[0035] The weight member 36 is formed by cutting, for example, a block-shaped rigid material into a disk shape with a diameter of 7.0 cm and a weight of 1.0 kg. Further, the weight member 36 can be recognized from a long distance, and may be painted in white, yellow, fluorescent color, or the like so as to be more easily recognized from a long distance.

[0036] Here, the weight member 36 has a function of adjusting (regulating) the swing range of the front end of the hose 32 in the longitudinal and lateral directions by keeping a balance with respect to a thrust force generated by the seawater "W" sprayed from the spraying hole 33a in addition to a function of easily recognition from a long distance. If the weight member 36 is not provided, the front end of the hose 32 is not easily controlled, and as a result, there may be the case where the front end of the hose 32 swings with a large swing range and is vigorously lifted onto the upper deck 13 of the ship 10.

[0037] As shown in FIG. 5, the base end of the swing nozzle 33 is provided with a hose connection portion 33b to be connected to the front end of the hose 32, and the front end of the swing nozzle 33 is provided with a pin attachment hole 33c to which the pin 35a is attached. The spraying hole 33a to spray the seawater "W" (refer to FIG. 4) flowing from the hose 32 is provided between the hose connection portion 33b and the pin attachment hole 33c in the longitudinal direction (the vertical direction of the drawing) of the swing nozzle 33.

[0038] The inclination angle of the spraying hole 33a with respect to the swing nozzle 33 is set to about 60 degrees so that the spraying angle of the seawater "W" is directed toward the attachment 31 (the upside of the drawing) in the longitudinal direction of the swing nozzle 33. Accordingly, the thrust force generated by the seawater "W" sprayed from the spraying hole 33a acts in the direction in which the hose 32 drooped at the freeboard portion of the ship 10 is made to swing. Here, the inclination angle of the spraying hole 33a is set to an angle at which a thrust force for causing the front end of the hose 32 to swing can be generated. In the swing nozzle 33 with the structure, the front end of the hose 32 can be made to satisfactorily swing by setting an inclination angle of the spraying hole 33a so that the spraying angle is substantially within the range from 15 degrees to 90 degrees.

[0039] Here, when the spraying angle is set to be smaller than 15 degrees, the seawater "W" sprayed from the spraying hole 33a collides with the hose 32, so that the thrust force according to the design can not be obtained, and the hose 32 can not be made to swing in accordance with the reference swing range, that is, one-side swing range of 5.0 m or more in the longitudinal and lateral directions with an amount of 5 m^3/h and a pressure of 0.2 Mpa. On the other hand, when the spraying angle is set to be larger than 90 degrees, a thrust force is generated at the front end of the hose 32 upward in the drawing, whereby the hose 32 can not be made to swing in accordance with the reference swing range.

[0040] The large-volume drainage nozzle (the drainage nozzle) 40 is used to spray a large amount of seawater "W" toward the surface of the sea, and includes a body cylinder portion 41 and a nozzle head 42 as shown in FIGS. 6A, 6B, and 7. A female screw portion 41a, which is threaded into a male screw portion 27a of the swivel joint 27, is provided at one end side (right side portion in FIG. 7) of the body cylinder portion 41 in the longitudinal direction, and a fixed portion 41b, to which the nozzle head 42 is fixed, is provided at the other end side (left side portion in FIG. 7) of the body cylinder portion 41 in the longitudinal direction.

[0041] The nozzle head 42 is formed to have a diameter larger than that of the body cylinder portion 41, a fluid introducing chamber 42a is provided in the nozzle head 42, and the seawater "W" (refer to FIG. 8) flowing into the swivel joint 27 and the body cylinder portion 41 is introduced into the fluid introducing chamber 42a. Then, the seawater "W" introduced into the fluid introducing chamber 42a is sprayed to the outside through a first opening 43a and a second opening 43b provided in

the nozzle head 42. Furthermore, each of the openings 43a and 43b constitutes the spraying hole of the drainage nozzle of the invention.

[0042] As shown in FIG. 6A, each of the openings 43a and 43b is formed into a rectangular shape which extends along the longitudinal direction (the left and right directions of the drawing) of the ship 10. Further, the opening angle of each of the openings 43a and 43b is set to about 120 degrees about the nozzle head 42 as shown in FIG. 6B, and plural uneven grooves 44a and 44b extending radially are provided between the fluid introducing chamber 42a and each of the openings 43a and 43b. Each of the uneven grooves 44a and 44b radially guides the stream of the seawater "W" from the fluid introducing chamber 42a, whereby the seawater "W" can be sprayed without irregularity to the outside in a substantially fan-like shape from each of the openings 43a and 43b (refer to FIG. 8).

[0043] As shown in FIG. 7, the first opening 43a is formed to have an inclination angle of about 3 degrees in the longitudinal direction of the nozzle head 42, and the second opening 43b is formed to have an inclination angle of about 8 degrees in the longitudinal direction of the nozzle head 42. Accordingly, the seawaters "W" sprayed from the openings 43a and 43b are assembled to intersect with each other without dispersion on the lower side of the large-volume drainage nozzle 40, that is, the lower portion of the freeboard portion of the ship 10.

[0044] Specifically, as shown in FIG. 8, when the seawater "W" sprayed from each of the openings 43a and 43b (refer to FIGS. 6A, 6B, and 7) is set to have an amount of 20 m^3/h and a water pressure of 0.2 Mpa, the seawater "W" sprayed from each of the openings 43a and 43b falls while drawing a substantially fan-like shape. Then, the seawater "W" draws a substantially rectangular shape at the lower portion of 8.0 m corresponding to the height of the freeboard portion of the ship 10, where the substantially rectangular shape is set to be 10.0 m or more in the longitudinal direction of the ship 10 and be from 1.0 m to 2.0 m in the lateral direction of the ship 10. That is, when the shape of the seawater "W" is formed into a substantially rectangular shape of 10.0 m or more by 1.0 m to 2.0 m, the seawater "W" can be highly efficiently assembled at, for example, a small boat (pirate ship) with a length of 7.0 m.

[0045] In this manner, when the shape or the inclination angle of each of the openings 43a and 43b is set and the uneven grooves 44a and 44b are further provided, the shape of the seawater "W" is formed into a substantially rectangular shape of 10.0 m or more by 1.0 m to 2.0 m at a position of the pirate ship approaching the ship 10 in parallel to the pirate ship as shown in FIGS. 1A, 1B, and 2, whereby it is possible to put the pirates under the threat of rollover of their boat. Further, since the seawater "W" sprayed from each of the openings 43a and 43b draws a substantially fan-like shape as shown in FIG. 8 and covers the ship 10 like a curtain, the seawater "W" can be easily recognized from a long distance as well as the jumping hose 30.

[0046] As shown in FIGS. 1A, 1B, and 3, the plural jumping hoses 30 and the plural large-volume drainage nozzles 40 are alternately provided at the interval of 5.0 m or more with each I-shaped pipe 20 and each T-shaped pipe 21 interposed therebetween. That is, the large-volume drainage nozzle 40 is provided between the adjacent hoses 32. The interval between the adjacent hoses 32 and the interval between the adjacent large-volume drainage nozzles 40 are respectively set to 10.0 m, whereby the jumping hoses 30 swinging in the longitudinal and lateral directions are not entangled with each other as shown in FIG. 1. Further, the starboard-side portion, the port-side portion and the stern portion of the ship 10 can be continuously covered without any gap therebetween by the curtain (a portion depicted as a mesh in the drawing) formed by the seawater "W" from each large-volume drainage nozzle 40.

[0047] Then, an operation of the invasion preventing apparatus 18a formed as mentioned above will be described hereinafter in detail with reference to the drawings.

[0048] First, the operator opens the seawater discharge valve 17a shown in FIG. 3. Then, the seawater "W" is pressure-fed from the seawater pump to the I-shaped pipe 20 and the T-shaped pipe 21 through the seawater discharge valve 17a. Here, the invasion preventing apparatus 18a is designed to be sufficiently operated by the amount and the pressure of the water in accordance with the operation of opening the seawater discharge valve 17a.

[0049] The seawater "W" pressure-fed to the I-shaped pipe 20 and the T-shaped pipe 21 is supplied to the hose 32 of the jumping hose 30 as depicted by the arrow (1) of FIG. 4 through the branch 21a of the T-shaped pipe 21, and is supplied to the large-volume drainage nozzle 40 as depicted by the arrow (5) of FIG. 8. As shown in FIG. 4, the seawater "W" supplied to the hose 32 reaches the spraying hole 33a of the swing nozzle 33, and then is radially spayed outward from the spraying hole 33a.

[0050] The seawater "W" sprayed from the spraying hole 33a generates a thrust force, whereby the front end of the hose 32, that is, the swing nozzle 33 starts to swing as depicted by the arrow (2) of FIG. 4. Here, since the hose 32 has flexibility, the hose 32 may be easily bent in all directions. Accordingly, the front end of the hose 32 irregularly swings (jumps) by 5.0 m or more on one side of the swing range in the longitudinal and lateral directions.

[0051] The weight member 36 irregularly swings through the connection rod 35 so as to be positioned at the downside of the swing nozzle 33 at all times as depicted by the arrows (3) and (4) of FIG. 5 in accordance with the irregular swing motion of the front end of the hose 32. Here, since each of the weight member 36 and the front end of the hose 32 irregularly swings, the weight member 36 present at the most front end of the jumping hose 30 swings in a more complex and irregular manner.

Such irregular swing motions of the weight member 36 and the front end of the hose 32, that is, the unexpected swing motions of the weight member 36 and the front end of the hose 32 threaten the pirates, and further degrade the motivation of the pirates.

[0052] On the other hand, the seawater "W" supplied to the large-volume drainage nozzle 40 is sprayed in a substantially fan-like shape as depicted by the arrow (6) of FIG. 8, and forms a curtain at the starboard-side portion, the port-side portion, and the stern portion of the ship 10 as shown in FIGS. 1A and 1B. At this time, since the seawater "W" is uniformly dispersed within a substantially fan-like shaped range (the portion depicted as a mesh of FIG. 8), the thickness of the curtain may be made to be substantially constant along the periphery of the ship 10. That is, any gap permitting easy invasion of the pirates is not formed in the periphery of the ship 10.

[0053] Further, even when the pirate ship approaches and runs parallel to the ship 10, since the large-volume drainage nozzle 40 discharges (sprays) a large amount (20 m^3/h) of the seawater "W", the pirate ship can be immersed in the water level of about 5.0 cm within about 3 minutes in the case of the pirate ship having an entire length of about 7.0 m. That is, the stability of the pirate ship can be greatly degraded (unbalanced) in about 3 minutes, and it is possible to put the pirates under the threat of the rollover without any hurry before the pirates intrude into the ship 10.

[0054] As described above in detail, the invasion preventing apparatus 18a of the first embodiment includes the flexible hose 32 in which the base end is connected to each branch 21a of each T-shaped pipe 21 provided at the upper deck 13 and the front end is drooped toward the surface of the sea, the swing nozzle 33 which is provided at the front end of the hose 32, the spraying hole 33a which is provided in the swing nozzle 33 and sprays the seawater "W" to generate a thrust force for causing the front end of the hose 32 to swing, and the weight member 36 which is provided in the swing nozzle 33 and determines the swing range of the front end of the hose 32 in the longitudinal and lateral directions while keeping a balance with respect to the thrust force.

[0055] Therefore, the front end of the hose 32 can be made to irregularly swing in the longitudinal and lateral directions at the freeboard portion of the ship 10. Since the irregular swing motion of the hose 32 can be recognized from a long distance and the weight member 36 also irregularly swings, the pirates are threatened. Accordingly, the motivation of the pirates can be degraded so that the pirates cannot approach the ship 10, and further the ship 10 can be protected from the threat of the pirates. Further, since the seawater pump or the like installed in advance in the ship 10 is used as a driving source for causing the hose 32 to swing, a dedicated driving source may not be further installed and the invasion preventing apparatus can be easily installed in the existing ship 10 at a comparatively low cost.

[0056] Furthermore, according to the invasion preventing apparatus 18a of the first embodiment, since the connection rod 35 having one end rotatably connected to the swing nozzle 33 and the other end rotatably connected to the weight member 36 is provided between the swing nozzle 33 and the weight member 36, the weight member 36 can be made to swing in a more complex and irregular manner in accordance with the irregular swing motion of the hose 32.

[0057] Further, according to the invasion preventing apparatus 18a of the first embodiment, since the plural hoses 32 are provided at the interval of 10.0 m in each of the pipes 20 and 21 extending along the periphery of the upper deck 13, and the large-volume drainage nozzle 40 having the openings 43a and 43b spraying the seawater "W" toward the surface of the sea is provided between the hoses 32, the freeboard portion of the ship 10 can be covered by the curtain of the seawater "W" and the pirates can be further prevented from approaching the ship 10.

[0058] Furthermore, according to the invasion preventing apparatus 18a of the first embodiment, since each of the openings 43a and 43b is formed into a rectangular shape extending in the longitudinal direction of the ship 10, even when the pirate ship approaches the ship along the longitudinal direction of the ship, the seawater "W" can be assembled in the pirate ship with high efficiency, it is possible to put the pirates under the threat of rollover of their ship.

[0059] Then, the second embodiment of the present invention will be described hereinafter in detail with reference to the drawings. Additionally, portions having the same function as those of the first embodiment are denoted by the same reference numbers as those of the first embodiment and the detail descriptions thereof are omitted here.

[0060] FIG. 9 is a partially enlarged view for explaining a detail structure of an invasion preventing apparatus of the second embodiment, and FIG. 10 is a view for explaining a detail structure and an operation state of a jumping hose according to the second embodiment.

[0061] As shown in FIGS. 9 and 10, the invasion preventing apparatus 50 according to the second embodiment is different from that of the first embodiment in that an air pipe 60 is further provided and in each shape of a protection member 71 and a weight member 72 which constitute a jumping hose 70.

[0062] The air pipe 60 includes plural air pipes 61, T-shaped pipes 62, and branch pipes 63, and each air pipe 61 and each branch pipe 63 are both formed of a rubber tube or the like which has flexibility. Here, the air pipe 61, the T-shaped pipe 62, and the branch pipe 63 constitute the fluid pipe of the invention.

[0063] One end of the air pipe 60 is connected to an air discharge valve 64, and the other end of the air pipe 60 is blocked by an end cap (not shown). An air compressor (not shown) is connected to the upstream of the air discharge valve 64, and for example, an engine activating air compressor for activating a diesel engine may

be used as the air compressor. Therefore, the air pipe 60 can also be easily installed in the existing ship 10 at a comparatively low cost.

[0064] One end of the branch pipe 63 is fixed to the T-shaped pipe 62 in a plug-in manner, and the other end of the branch pipe 63 is fixed to an air introduction and connection portion 65a provided to a swivel joint 65 in a plug-in manner. A pressure gauge 66 and an air pressure adjusting valve 67 are provided to the other end of the branch pipe 63 in order from the air introduction and connection portion 65a, and the air pressure adjusting valve 67 is configured to adjust the amount and the air pressure of air to be supplied to the swivel joint 65. Here, in order to adjust the air pressure, the operator operates the air pressure adjusting valve 67 while seeing the pressure gauge 66.

[0065] In this manner, in the invasion preventing apparatus 50 according to the second embodiment, air is introduced from the air introduction and connection portion 65a of the swivel joint 65, and a predetermined amount of air (fluid) "A" is mixed with the seawater "W" passed through the hose 32 of the jumping hose 70 (refer to FIG. 10). Accordingly, the front end of the hose 32 can be made to swing (jump) in the longitudinal and lateral directions with a small amount of water compared to the first embodiment.

[0066] As shown in FIG. 10, the protection member 71 is attached to the base end of the hose 32 so as to protect the connection portion with the attachment 31 in the hose 32. The protection member 71 is formed as a coil spring which is obtained by forming a linear rigid material into a spiral shape, and is deformed with a spring property in accordance with the swing motion of the hose 32. Accordingly, it is possible to suppress an excessive force which tends to be exerted on the connection portion with the attachment 31 in the hose 32. Here, the swing range of the hose 32 can be also adjusted by appropriately adjusting the length of the protection member 71.

[0067] The weight member 72 is provided to the swing nozzle 33 through the connection rod 35. The weight member 72 is formed by cutting, for example, a block-shaped rigid material into a substantially square shape in which the length of one side is 6.0 cm and the weight is 1.0 kg. The weight member 72 can be also recognized from a long distance, and may be painted in white, yellow, fluorescent color, or the like so as to be more easily recognized from a long distance.

[0068] Then, when the seawater discharge valve 17a and the air discharge valve 64 are operated to be opened, the air "A" is mixed with the seawater "W" at the portion of the swivel joint 65, that is, the upstream portion of the jumping hose 70 as depicted by the arrows (7) and (8) of FIG. 10. Subsequently, a mixed fluid "WA" made of the seawater "W" and the air "A" is sprayed from the spraying hole 33a of the swing nozzle 33, whereby the front end of the hose 32 swings as depicted by the arrow (9) of FIG. 10.

[0069] As described above in detail, also in the invasion preventing apparatus 50 according to the second embodiment, the same effect as that of the above-described first embodiment can be obtained. In addition, in the second embodiment, since the air A is mixed with the seawater "W" supplied to the jumping hose 70, the jumping hose 70 can be made to swing with a smaller amount of the seawater "W" and further the invasion preventing apparatus can be easily provided at a low cost in a small ship equipped with a small seawater pump or the like.

[0070] It is needless to mention that the invention is not limited to the above-described embodiments and may be modified into various forms within the scope without departing from the spirit of the invention. For example, in the above-described embodiments, the invasion preventing apparatuses 18a and 50 are provided with both the jumping hoses 30 and 70 and the large-volume drainage nozzle 40, but the invention is not limited thereto. Since the pirates can be sufficiently threatened only by the jumping hoses 30 and 70, the large-volume drainage nozzle 40 may be omitted.

[0071] Further, in the above-described embodiments, a configuration has been described in which the seawater "W" is supplied to the jumping hoses 30 and 70 so as to cause the front end of the hose 32 to irregularly swing in the longitudinal and lateral directions, but the invention is not limited thereto. For example, a configuration may be adopted in which only air is supplied to the jumping hoses 30 and 70 so as to cause the front end of the hose 32 to irregularly swing in the longitudinal and lateral directions in accordance with the control of the air supply amount.

[0072] Moreover, in the above-described embodiments, a configuration has been described in which the weight members 36 and 72 are respectively formed into a circular shape and a substantially square shape, but the invention is not limited thereto. For example, the weight members 36 and 72 may be formed into other shapes such as a triangular shape, a pentagonal shape, and a spherical shape, and the material, the size, or the like thereof may be freely set. What matters is to determine the shape, the size, or the like which generates the irregular swing motion of the weight member capable of threatening the pirates and further degrading the motivation of the pirates.

Claims

1. An invasion preventing apparatus for ship which is provided in the periphery of an upper deck of a ship and is operated in accordance with a supply of fluid so as to prevent an entry of an illegal intruder, the invasion preventing apparatus for ship comprising:

   a flexible hose having a base end connected to a fluid pipe provided at the upper deck and a front end drooped toward a surface of water;
   a swing nozzle which is provided at the front end

of the hose;
a spraying hole which is provided at the swing nozzle and sprays the fluid so as to generate a thrust force causing the front end of the hose to swing; and
a weight member which is provided at the swing nozzle and determines a swing range of the front end of the hose in longitudinal and lateral directions while keeping a balance with respect to the thrust force.

2. The invasion preventing apparatus for ship according to claim 1, wherein a connection rod having one end rotatably connected to the swing nozzle and the other end rotatably connected to the weight member is provided between the swing nozzle and the weight member.

3. The invasion preventing apparatus for ship according to claim 1 or 2, wherein a plurality of hoses are provided at a predetermined interval in the fluid pipe extending along the periphery of the upper deck and a drainage nozzle having a spraying hole spraying water toward the surface of the water is provided between the hoses.

4. The invasion preventing apparatus for ship according to claim 3, wherein the spraying hole of the drainage nozzle is formed into a rectangular shape which extends in the longitudinal direction of the ship.

FIG. 1A

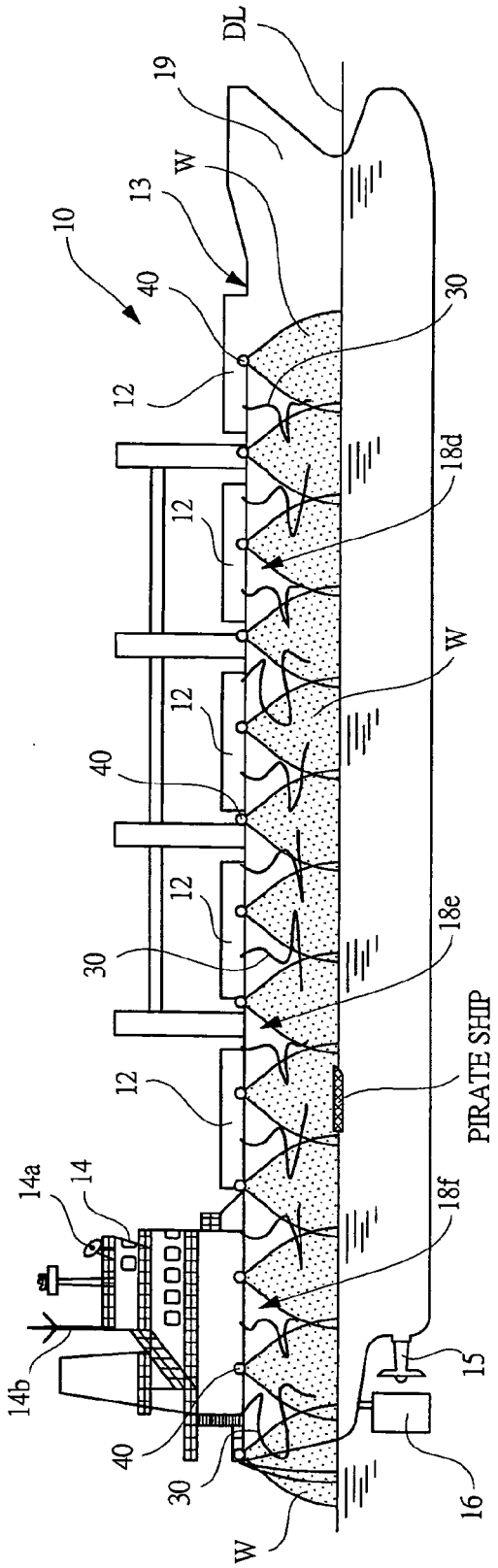

DL
19
W
13
10
40
12
30
18d
W
18e
PIRATE SHIP
18f
15
16
14a
14
14b

FIG. 1B

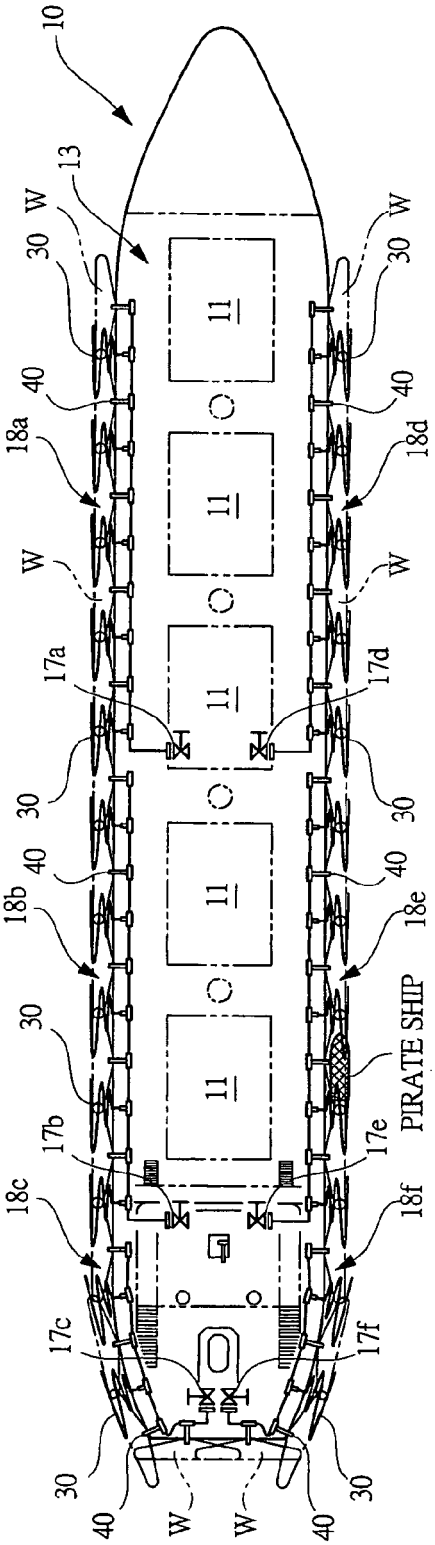

10
13
W
30
40
18a
17a
17d
18b
18e
PIRATE SHIP
17b
17e
18c
18f
17c
17f
11

FIG. 2

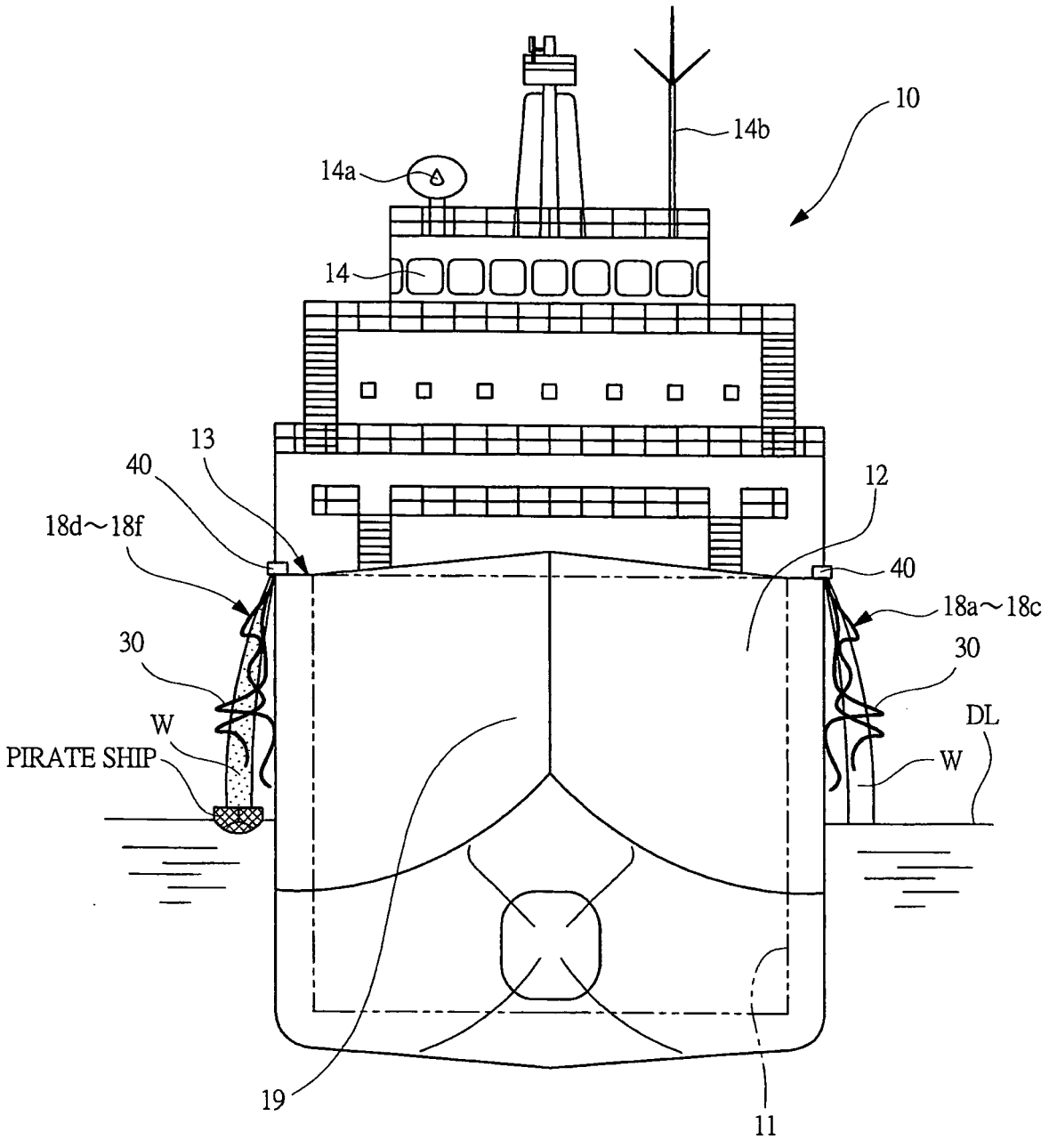

10
14a
14b
14
13
40
18d~18f
12
40
18a~18c
30
30
W
PIRATE SHIP
DL
W
19
11

FIG. 3

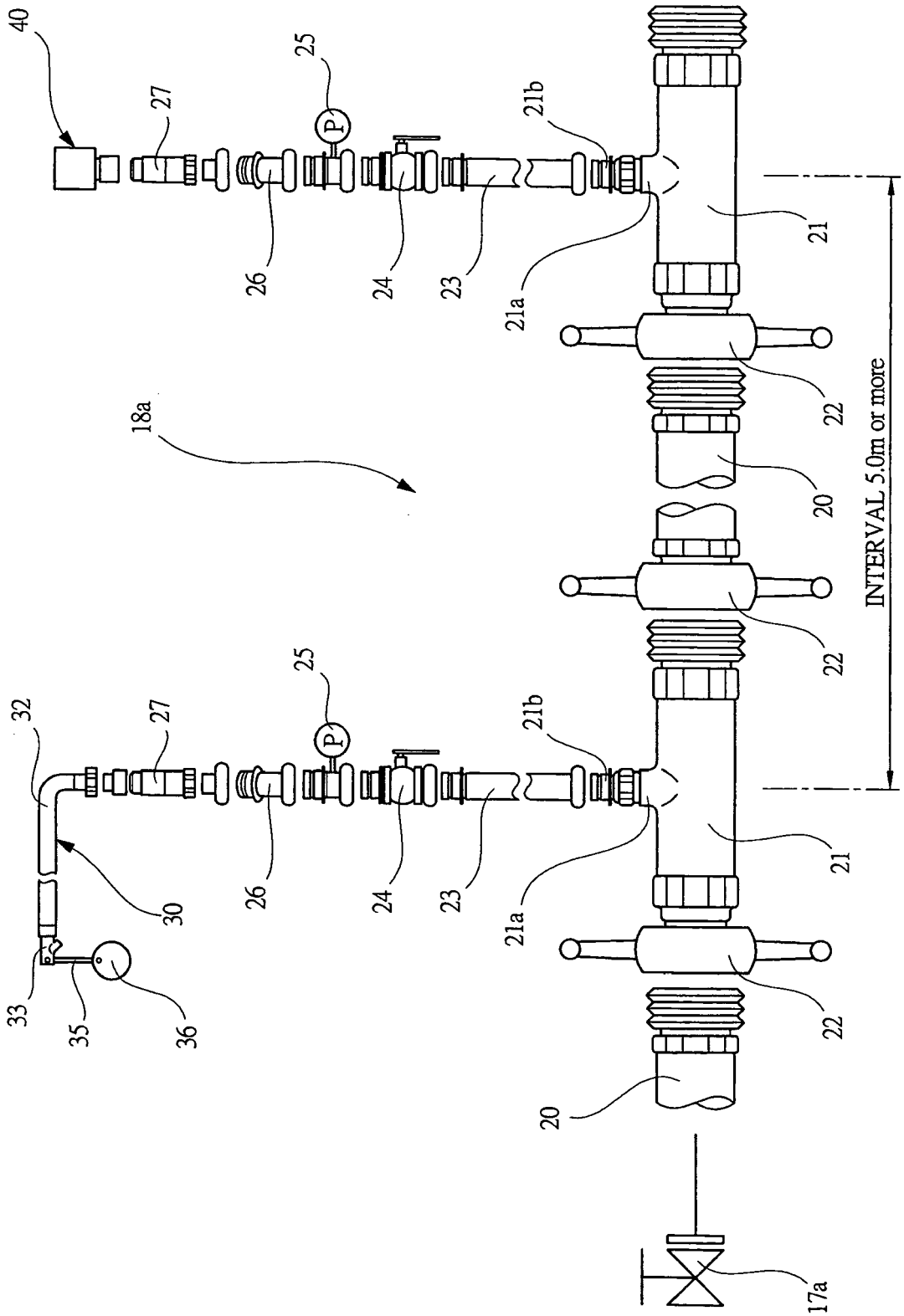

40
27
25
P
21b
26
24
23
21a
21
22
18a
20
INTERVAL 5.0m or more
32
30
33
35
36
17a

FIG. 4

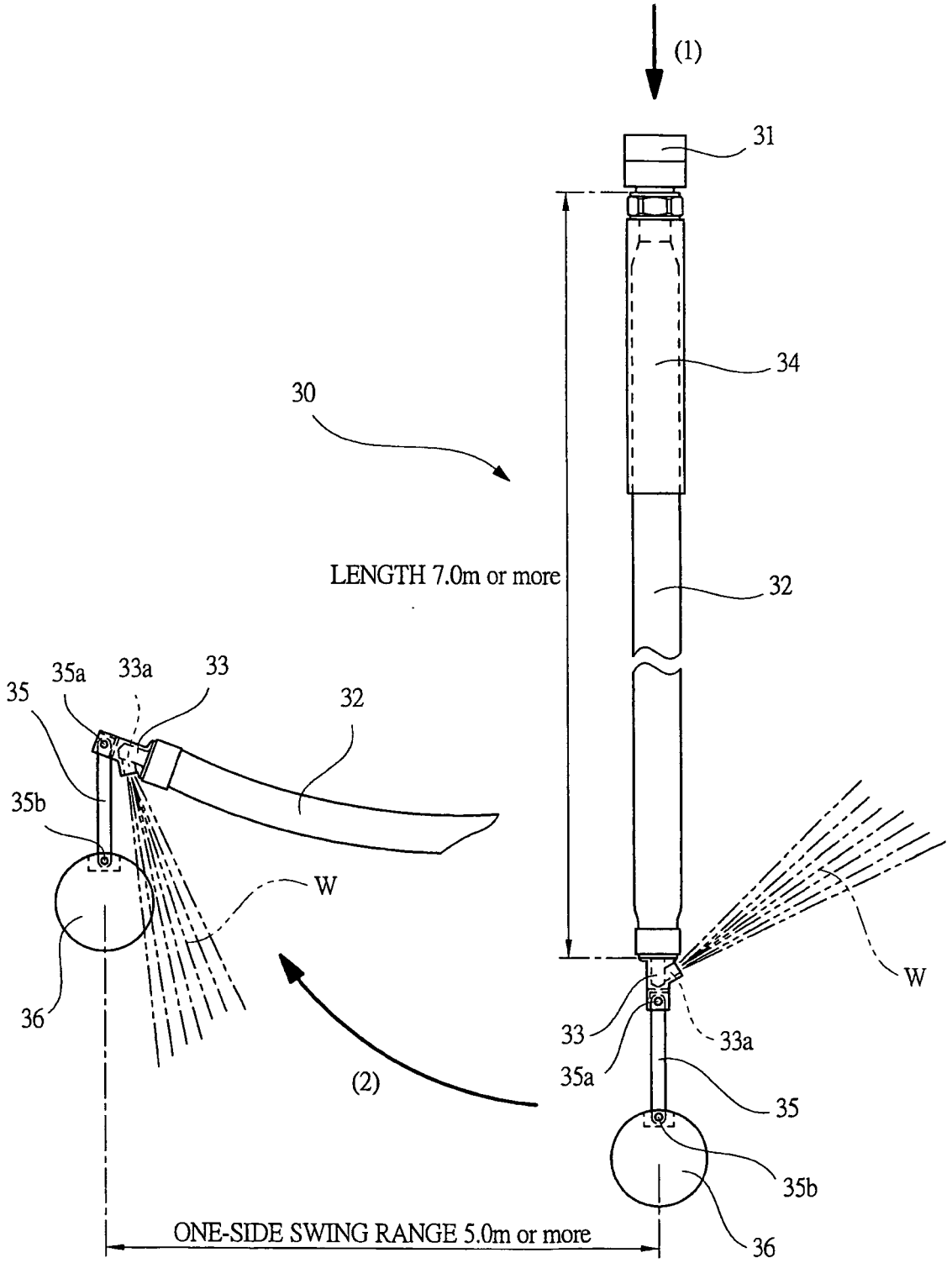

(1)
31
34
30
LENGTH 7.0m or more
32
35
35a
33a
33
32
35b
W
36
(2)
W
33
33a
35a
35
35b
36
ONE-SIDE SWING RANGE 5.0m or more

FIG. 5

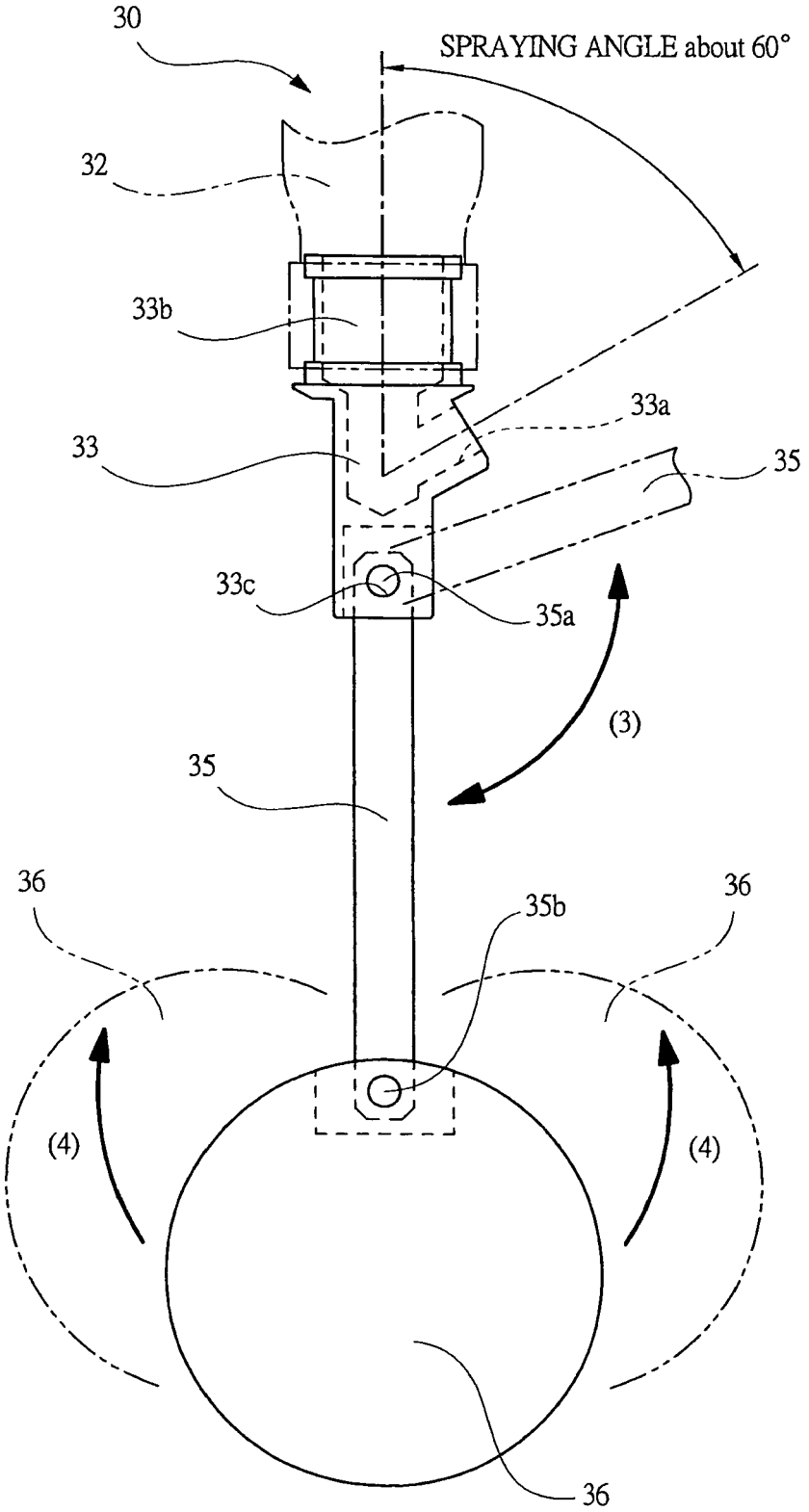

30
SPRAYING ANGLE about 60°
32
33b
33a
33
35
33c
35a
(3)
35
36
35b
36
(4)
(4)
36

FIG. 6A

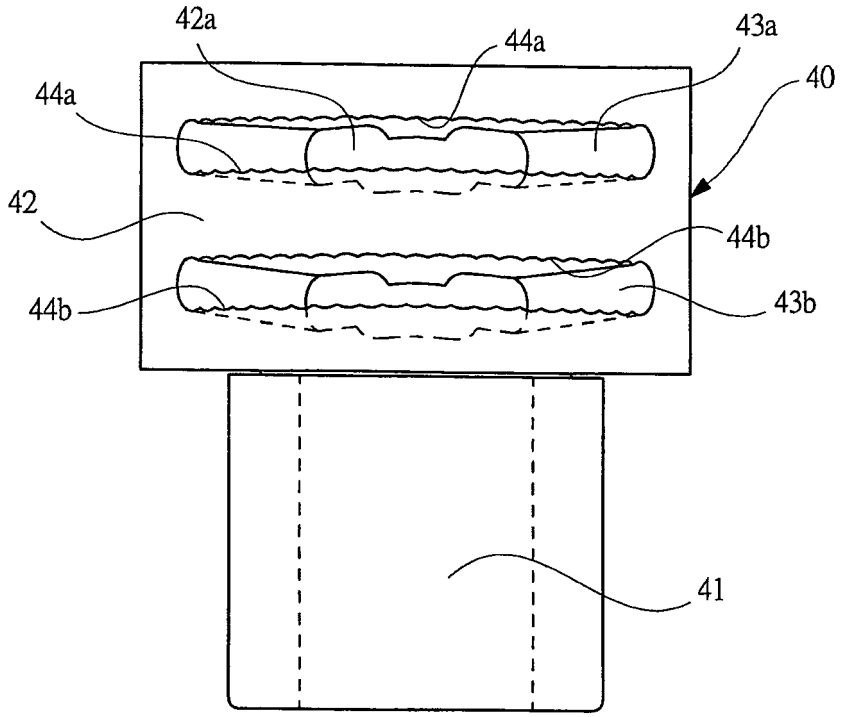

42a
44a
43a
40
44a
42
44b
44b
43b
41

FIG. 6B

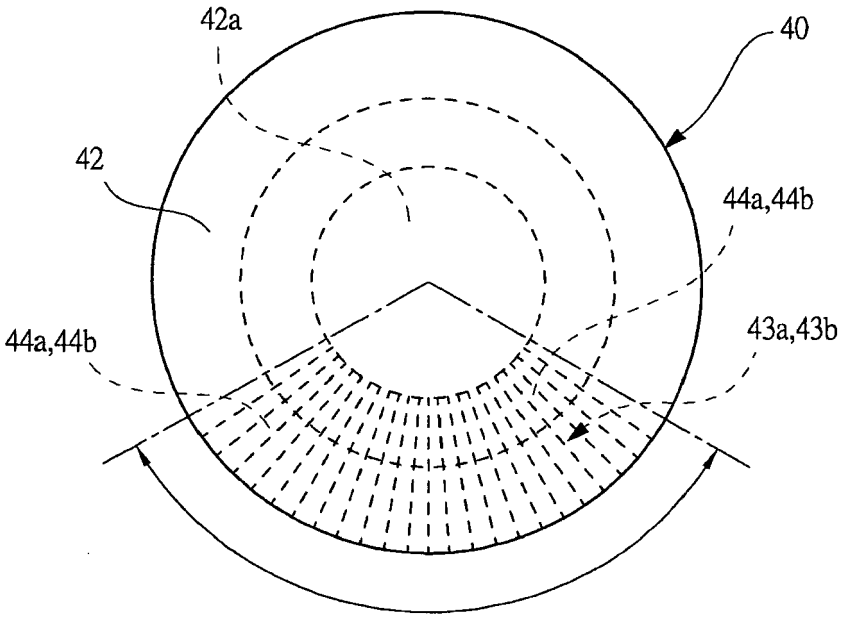

42a
40
42
44a,44b
44a,44b
43a,43b
OPENING ANGLE about 120°

FIG. 7

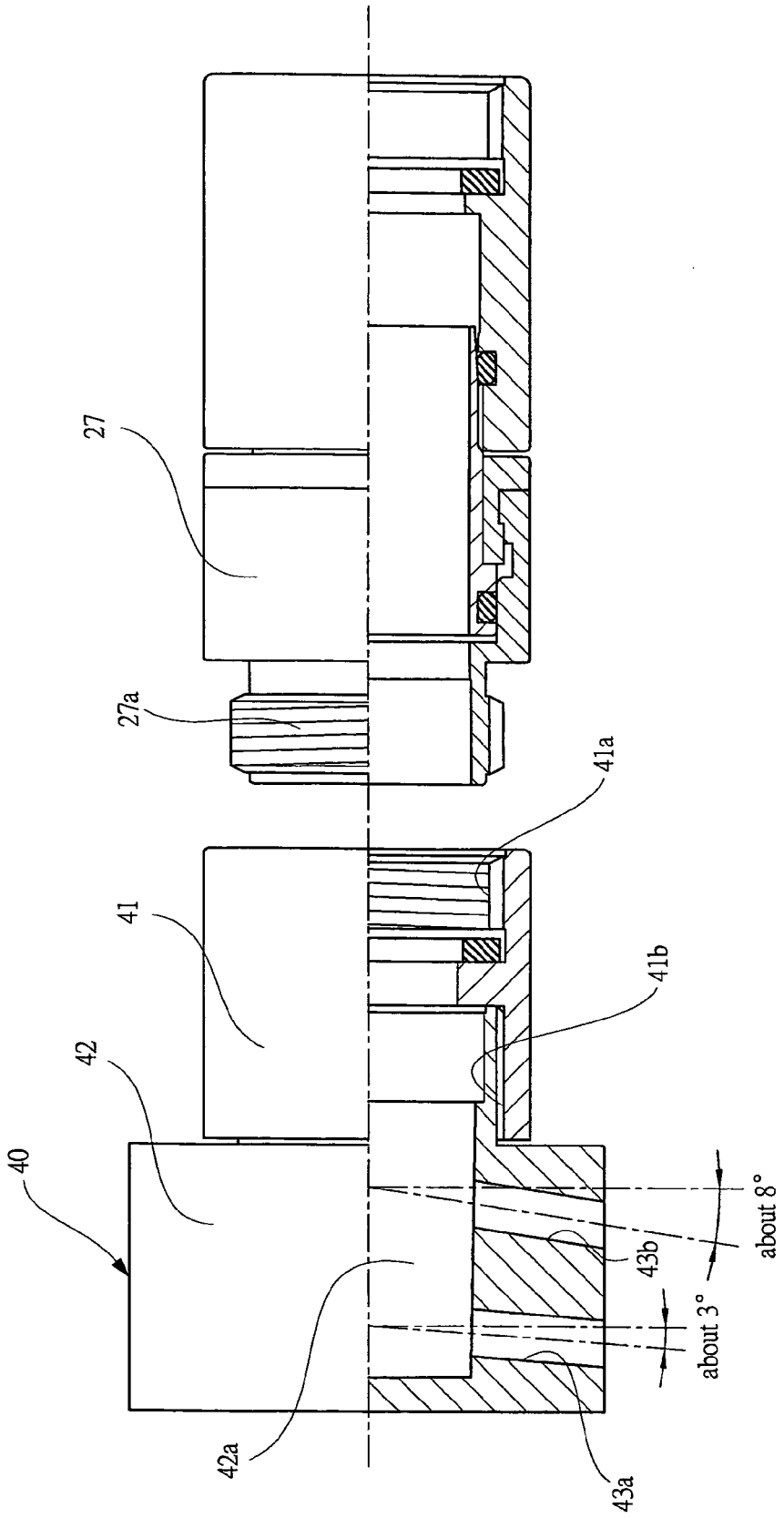


FIG. 8

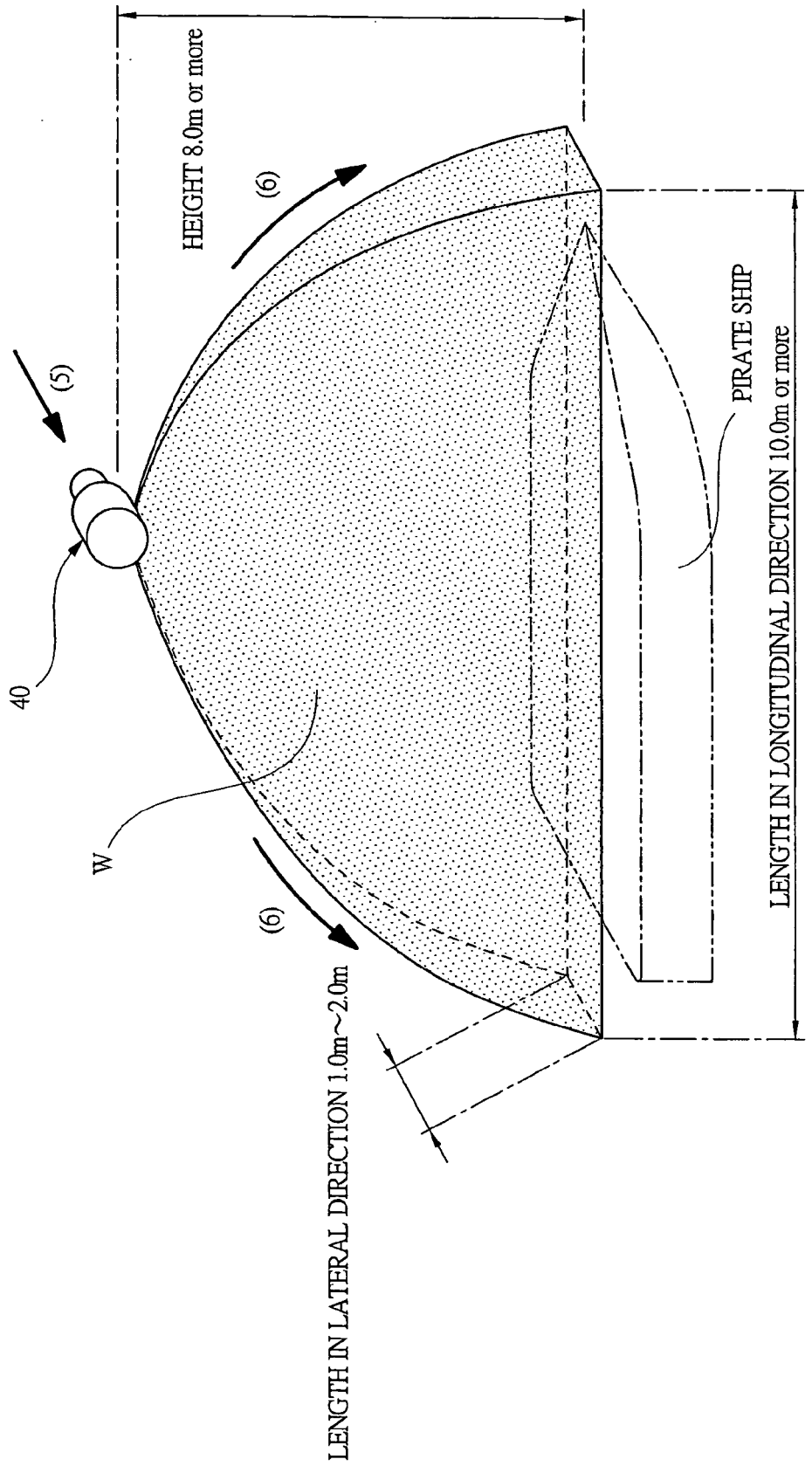

HEIGHT 8.0m or more
(6)
(5)
40
W
(6)
LENGTH IN LATERAL DIRECTION 1.0m~2.0m
PIRATE SHIP
LENGTH IN LONGITUDINAL DIRECTION 10.0m or more

FIG. 9

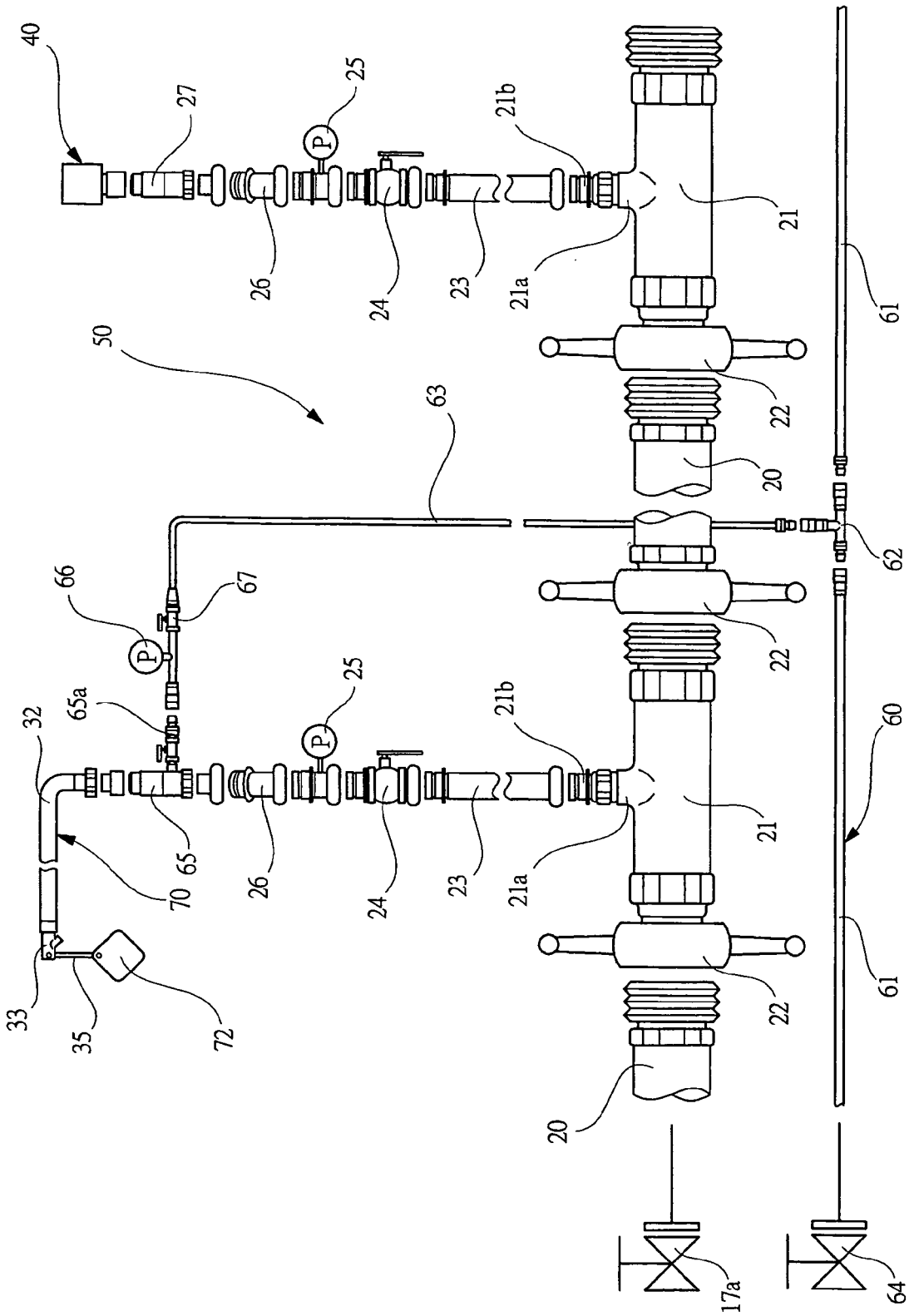
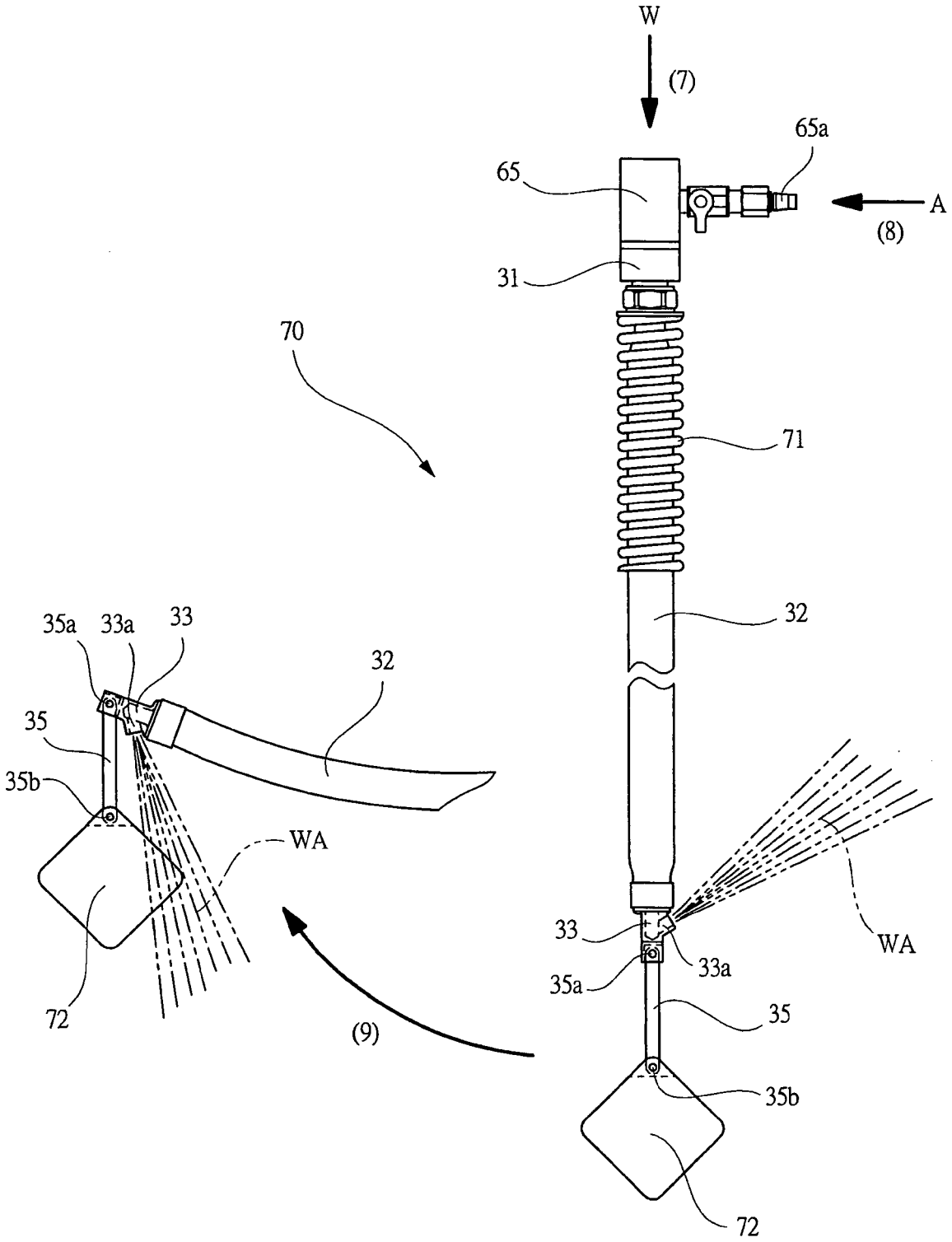

40
27
25
P
21b
26
24
23
21a
21
61
50
63
22
20
62
66
67
P
22
65a
25
P
21b
60
32
65
26
24
23
21a
21
70
22
61
33
35
72
20
17a
64

FIG. 10


W
(7)
65a
65
A
(8)
31
70
71
32
35a
33a
33
32
35
35b
WA
72
(9)
33
33a
35a
35
35b
WA
72

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EUROPEAN SEARCH REPORT

Application Number
EP 11 29 0520

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X	US 4 684 066 A (UZRAD MORDECHAI [IL]) 4 August 1987 (1987-08-04) * columns 22-43; figures 1-4 *	1	INV. B63G13/00
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B63G
F41B
F41H
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	29 October 2012	Vermeulen, Tom

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1

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