

BLADELESS FAN IN THE FLUID PIPE

Technical field

The present invention relates to physics and engineering, equipment in particular bladeless fan in the fluid pipe.

5 Background

Nowadays the designation of piping systems and increasing speed and velocity retention in the various fluid pipe, such as air pipes, oil pipes, rejected pipes, etc, which are designed by using engineering calculations to suit the specific work by selecting the pipeline size, pipe installation system, pressure and velocity retention device or power that enough to push from
10 source to destination. There will be a difference in the work created, which has the weakness point. It is suitable for the specific work, but it is not for general. The additional solution is to increase the number of liquid sources at various points for reducing the length of the pipe that can control the pressure easily, but this method is more expensive for using in industrial. Another popular method is to use liquid pressure boosting devices, but there are disadvantages. The
15 pressure at the source is strong. But the pressure at the destination drops. The problem is solved by adding some device inside a pipe such as a turbine fan to speed up or maintain speed constantly. By using the fan inside the pipe to increase the movement or increase the speed inside the pipe, the disadvantage is that uses a lot of devices, more noise and uses more energy.

Patent WO 2010/109169 A2 disclosed the apparatus with a turbine or bladeless fan and
20 power generator. The turbine is located inside a channel that like a pipe to send fluid, such as water, air, etc. And flow out in a spiral pattern. This is different from the present invention. The characteristic of the fluid that flow out in a continuous spiral pattern. And when used in the pipeline, it requires a higher energy than the fluid flowing straight. Unlike the present inventions, the direction of the fluid will flow forward.

Patent EP 2623328 B1 disclosed the dry blower. It consists of a long tube with an internal fan to speed up and install it throughout the line. The air flow, air passages and internal heating devices. This is different from the present invention. This patent has the internal heating apparatus and the single layer pipe type. The installation of the inside fan cannot be used in the pipeline system in the building because it is difficult to maintenance when one of the fans defect.
30 That is difficult to change because the pipe inside the building and the wall closed.

Patent WO2006 / 078434 A2 disclosed the fluid motion and water movement in cavity. By using the device with fan and motor inside the cavity. This is different from the present invention. Because this patent uses more equipment and uses a fan with propeller that is more energy costs and difficult to maintenance.

5 The present invention will be show in the description which need less energy and easy to maintenance due to less equipment and fan with bladeless and no sound or light sound. That is suitable for using in the construction industry and pipeline system in the buildings or pipeline in the oil and gas industry.

Summary of Invention

10 According to the present invention there is provided the bladeless fan in the fluid pipe disclosed,

 The purpose of the present invention is to create a special pipe with bladeless fan inside the pipe and to allow the fan to increase the speed of fluid flow within the pipe, such as air or liquid, at constant or nearby velocities along the pipeline.

15 The characteristic of the present invention is equipment with bladeless fan fixed to the pipe and placed periodically or created in a double-walled manner. The inner layer is a pipe used in general fluid industrial. The outer layer is attached to the inside layer with fluid pipe that flow in the same direction for adding fluid to the inner layer that keep the fluid velocity constant or closely. The present invention also adds a fluid sorting apparatus that control the flow movement
20 in the inner tube to the shape as needed.

Brief description of the drawings

 For a more complete understanding of the present invention and its advantages, reference is now made to the following description taken in conjunction with the accompanying drawings, in which like reference numeral represent like parts:

25 Figure 1 illustrates a bladeless fan and fluid pipe of form 1 in accordance with the embodiment of the present invention.

 Figure 2 illustrates a bladeless fan, fluid pipe and fluid sorting apparatus of form 2 in accordance with the embodiment of the present invention.

Figure 3 illustrates composite the hollow tube (1), the top of bladeless fan (2) and the lower bladeless fan (3) according to the present invention.

Figure 4 illustrates the inner views or the cross-sectional of the hollow tube (1) and the top of bladeless fan (2) according to the present invention.

5 Figure 5 illustrates views of the attachment components of the hollow tube (1) and the lower bladeless fan (3) according to the present invention.

Figure 6 illustrates the inner views or the cross-sectional of the lower bladeless fan (3) according to the present invention.

10 Figure 7 illustrates a fluid sorting apparatus (16) with pipe according to the present invention.

Figure 8 illustrates the inner views or the cross-sectional view of the top bladeless fan (3) and a fluid sorting apparatus (16) are attached according to the embodiment of present invention.

Figure 9 illustrates the bladeless fan on the fluid pipe of form 3 in accordance with the embodiment of the present invention.

15 Figure 10 illustrates a schematic block diagram of fluid movement process embodiment in the present invention.

Detailed description

According to aspect of the present invention bladeless fan in the fluid pipe comprising,

20 The two-layer hollow tube is divided into outer and inner layers. There is the fluid intake form outer layer (8) and the fluid release to inner layer (9). To place the hollow tube around the perimeter of the pipe in horizontal position at least one position. In addition, it is possible to create a welding pipe at the fluid outlet to the inner layer by spacing it periodically that likes small hollow tube or blocked pipe. At this position where the fluid intake point from the outer layer and the fluid release to the inner layer that place the hollow tube around the perimeter of
25 the pipe in horizontal which is called the bladeless fan.

The invention of two-layer hollow tubes can design the fan in the fluid pipe in three forms: 1. As a bladeless fan separate the components attached to the pipe. 2. As a bladeless fan attached to the tube. 3. The two hollow tubes melt to the one piece tube.

Form 1: Build the device that like the bladeless fan is attached to the pipe as shown in figure 1, and can be placed the fluid sorting devices as shown in figure 2, that including of,

From figure 3 the bladeless fan attached at the pipe consist of the hollow tube (1), that is characterized by two hollow tubes, the outer layer and the inner layer attached at the top of bladeless fan (2) with a split pipe (4), which acts to transfer the fluid along the pipe, that is depend on each of engineering field. The upper bladeless fan is attached to the lower bladeless fan (3), which has characteristic design for splitting and then there is the fluid from the outer layer and release the fluid to the inner layer. To place the hollow tube around the perimeter of the pipe in horizontal at least one position.

To consider the attachment of hollow tube (1) and the top of bladeless fan (2) shows in figure 4. The upper view of figure 4 shows the top view when turn the split pipe (4) to upper and turn the hollow tube (1) to the left. The top of bladeless fan is in the middle (2) and the lower bladeless fan (3) is on the right. The cross section on the axis A (6) is (7). The special characteristic is the hollow tube that be protrude and open end that locate same axis to the split tube (4). When considering the circle B, it will be seen the details as follows: The outer layer fluid intake (8) and the inner layer fluid release (9) becomes a bladeless fan that consisting of a part of hollow tube (1) and a part of lower bladeless fan (3) at the area of top bladeless fan (2), that maintain the fluid velocity in the pipe and split pipe (4) at constant or closely.

To consider the attachment components of the hollow tube (1) and the top bladeless fan (2) as shown in figure 5. The top image of figure 5 describes the top view when the turn split pipe (4) to upper and the lower bladeless fan (3) is on the right hand side. The cross section of axis C (11) is (12) that show the wall of the components. When consider the circle D, the wall of the lower bladeless fan (3) protrude like a beak. The shape of the curve and the tallest (10) are waiting to be assembled into a bladeless fan here. It is possible to install a welded pipe at the fluid release to the inner layer periodically. Its characteristic is both a small hollow tube or block pipe. The one end is attached to (10).

To consider the lower bladeless fan (3) as shown in figure 6, the top left image show the lower bladeless fan (3) and the right hand show the top view of the lower bladeless fan (3). When the lower bladeless fan (3) cuts along the symmetry axis E (13), the image is E-E (14) that be the inside view. To consider the circle F by case, there is the ending hollow tube (15) and at the surface of the ending hollow tube (15) can install the welded pipe at the fluid release to the inner layer periodically. Its characteristic is both a small hollow tube or block pipe. The other

side of both a small hollow tube or block pipe is attached to (10) by placing one line. In case placing more than one line, the condition is periodically location. The appropriate spacing is each spacing line that has the equally or similar spacing as measured from the perimeter of area (10) and / or (15) one or the other. The installation of a small hollow tube or block pipe can be made by attaching to one inner layer of the top or lower bladeless fan, then connect it to the opposite side later, or bring a small hollow tube or block pipe to attach one or the other.

Figure 7 shows the fluid sorting apparatus in various views as shown in the figure and describes the installation of the fluid sorting apparatus (16). The installation of a fluid sorting apparatus (16) suitable for installed below the lower bladeless fan (3). Its characteristic is solid attach to the pipe. There is hollow tube inside various sizes tube like honeycomb (or closely) for flowing the fluid thoroughly. That can be designed in any form. The appropriate form depends on the usage that take into account the length of the fluid sorting apparatus (16) and the installation of internal hollow tube. The length of the arrangement apparatus varies with the pressure drop and to increase the friction inside the pipe. If the design is too short, it will not be possible to arrange the fluid line. It must be relatively calculated to the velocity and pressure inside the flow pipe and the hollow tube size. The appearance of the arrangement that occur from the inside hollow tube (17), which can be seen in the top view of the bottom image in figure 7. The designation must be careful of the design in polygons form, such as triangles and square, etc. Because the polygons cause heat when the fluid move high speed that not suitable as it should be.

When the lower bladeless fan is attached to the fluid sorting apparatus along the symmetry axis J, it shows the image of the fluid flow through the channel as shown in the low left hand. When the top bladeless fan is attached at the symmetry axis G, the image is in the top right hand. To see the bladeless fan in the circle H, which enlarges the circle H to the right image below.

The process of the bladeless fan in the fluid pipe is divided into 2 cases, that including of,

Case 1: When hollow tube (1), the top bladeless fan (2) and the lower blade fan (3) are assembled together, the process will occur. The fluid flows from the hollow tube (1) which has two parts: the outer layer and the inner layer. The inner fluid is the fluid used in the piping system. The fluid in the outer layer flows into the assembled bladeless fan to maintain the flow velocity of the fluid constant or closely. When the two fluids layer flow from the hollow tube (1) directional to the placement of top bladeless fan at the area that the top and lower bladeless fan

be assembled to a bladeless fan. The fluid from the outer layer hollow tube (1) through the outer layer fluid intake (8) then the fluid flow to the inner layer fluid release (9). That cause the fluid movement directional to the lower bladeless fan. The pressure in this area is decreased. As a result, the fluid from the inner layer hollow tube (1) flows instead. That cause the continuous flow in the entire area. At the upper bladeless fan section has a split pipe (4), the fluid from the inner layer hollow tube (1) has two direction that one flow to the split pipe (4) and the other passes both section bladeless fan through the hollow tube that be attached it. That cause the velocity of the fluid in the hollow tube (1) constant or closely along the path, even with a split pipe (4).

Case 2, when hollow tube (1), the top bladeless fan (2), the lower bladeless fan (3) and the fluid arrangement device (16) are assembled together. The operation is similar to case 1 and when the fluid flows through the lower bladeless fan and flow into the fluid sorting apparatus (16) that installed next to the hollow tube or in the lower bladeless fan both or one and other one, the fluid is arranged in the shape of the inner hollow tube of the bladeless fan (17). That cause the fluid flow out articulately in line. The installation of the fluid sorting apparatus (16) can be installed in all areas of the hollow tube (1), except the outer layer fluid intake (8) and the inner layer fluid release (9). That is, the appropriate location are before or after the inner layer fluid release (9) or both. The most appropriate location is nearby the split pipes (4).

Form 1 can reduce the split pipe (4) at the upper bladeless fan for using in areas where there are no split pipes in the system. The top bladeless fan (2) and the lower bladeless fan (3) can be divided into two or more components and then assembled in the same manner as the assembled top bladeless fan (2) and the lower bladeless fan (3) together.

Form 2 is a bladeless fan that attached or melt to the pipe. As shown in figure 9, that is, the implement of a bladeless fan (19) which has the same characteristics as the bladeless fan from Form 1 assembled already. That can be attached to a hollow tube (1) or for some path to a hollow tube (1) or both with both sides of the bladeless fan as in figure. The hollow tube (18) has the base or not. Form 2 is suitable for installation without split pipe (4). It can maintain the fluid velocity in the pipe to be constant or closely. The more high pressure transmit at the beginning from the fluid source. There will be high pressure in the beginning and less pressure in the pipe end. It also saves more energy.

Form 3 creates a two-layer hollow tube into a single tube. It looks as same as figure 9. The difference is the mold implementation of the bladeless fan and hollow tube together. That become a long pipe with the same process.

In addition to the three form above, they can also be applied to one single hollow tube.

5 Form 4 is the single hollow tube that attach to the bladeless fan with above process, that is, it has the outer layer fluid intake (8) and the inner layer fluid release (9) wherein the fluid from the inner layer fluid release (9) flow through the single hollow tube instead of the inner layer of two hollow tube. And the outer layer fluid intake (8) will not receive the fluid from the outer layer of the two hollow tubes, but will receive the fluid from the split pipe that is not a
10 single hollow tube. The fluid from the bladeless fan will flow through the fluid intake and pass to the fluid release point into a single hollow tube. So the fluid inside a single hollow tube moves forward. That cause the pressure at area decrease. When the density is lower, the fluid from the high pressure region flow displacement. The fluid dynamics occur at constant speed or close to the single hollow tube.

15 Figure 10 is a schematic block diagram of fluid movement process embodiment that describe the process of the whole system comprising;

The fluid flow from the fluid source (100) through the pipe (101), where the line image in the diagram is represented as a whole pipe. When the fluid enters the pipe (101), it will have a constant velocity or close to the fluid velocity from the fluid source (100). When the fluid passes
20 through the bladeless fan installation point (201), the bladeless fan will work as the fluid density changes. The Fluid passed (201) will travel along the pipeline to the point where the bladeless fan installation point (202) and pass to the split pipe that make the fluid move in two directions: to the bladeless fan installation point (203) and to the end point (304), which causes the area near the bladeless fan (202) change densities. This allows the bladeless fan (202) to release additional
25 fluid to accelerate and make the fluid from block pipe flow faster to maintain the velocity of the two split pipes to be constant or closely. Therefore, the pipe that split to the end point (304) has a constant velocity or close to the fluid velocity from the fluid source (100). The fluid flowing through the pipe to the bladeless fan installation point (203) will travel further along the pipe (203). The fluid in the pipe will have a constant or closely velocity and travel to the bladeless fan
30 installation point (204). The fluid flow through the pipeline to the split pipe 2 ways. There is the end point (301) and a separate to the bottom of the diagram. The fluid that split to the end point (301) will have a constant or closely speed. The bladeless fan (201), (202), (203) and (204)

keep the speed constant or closely in the pipeline. The other way fluid flow into the split pipe and travels to the bladeless fan installation point (205), and when the fluid passes (205) to the split pipe that formed into a two-way junction. There is the end point (303) and the bladeless fan installation point (206). The split pipe that travels to the end point (303) will have constant speed
 5 throughout the pipeline. Even if the angle of the pipe is split again. Because the bladeless fan installation point (205) will provide additional fluid and fluid before this point of installation is faster to distribute the density constant. The split pipe that travels to the bladeless fan installation point (206) will have a constant or closely speed. The fluid travel from the bladeless fan installation point (205) and flow to the bladeless fan installation point (206) and when it
 10 pass (206) to the end point (302) at constant or closely speed from the fluid source (100).

In case of form 4, the pipe is a single hollow tube. The case of the fluid source (100), that including of,

Case 1 the pipe (101) is a single hollow tube. The fluid source (100) is divided into at least two sources so that the fluid flow to the pipe (101) and the fluid separates to the bladeless fan at
 15 another fluid source.

Case 2 the pipe (101) is a single hollow tube. The fluid source (100) has a single source with a fluid separator pipe (101) and a fluid pipe to the bladeless fan with fluid from the same fluid source.

Table of appropriateness to choose the work pattern. With bladeless fan installation in the
 20 diagram.

Bladeless fan installation number	Appropriate pattern
201	1,2,4
202	1,4
203	1,2,4
204	1,4
205	1,4
206	1,2,4

201,202,203,204,205,206	3
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In the last line of the above table is the melting or forming of form 3 can be done by melting the whole pipe system or make a partial melting. There are more than one bladeless fan location in the melting process. Then each piece is melted and assembled into the pipe system.

- 5 This method is not comfortable at the industry level because it need to change the melting pattern often.

Form 2 has the disadvantage that it only suits for some installation points. Because the split pipes should be in the bladeless fan and far away from the fluid release inside the fan. It is not suitable to use in the split pipe system. There are always split pipes generally.

- 10 Form 4 can be used with all bladeless fan installation numbers. However, it is difficult to make the split pipe for carrying fluid and waste of resources and not suitable in a limited area system. It is necessary to have the fluid storage area to be put into the bladeless fan and it is not suitable.

- 15 The most suitable model is form 1 wherein there are more than 2 pieces of bladeless fan components be designed to combine become the top bladeless fan (2) and the lower bladeless fan (3). But the assembled system that work in the same principle of the present invention or similar. It counts in the field of the present invention.

- 20 The designation of pipe system, pipe size, material for production and the speed of the fluid depending on the various operating conditions. The present invention can be applied to all types of fluids such as air, water, oil, solution, etc. Therefore no size, material, fluid type and fluid type are recorded.

Claims

1. Bladeless fan in the fluid pipe essentially comprising, a single hollow tube which is attached to an outer layer of a fluid intake (8) and an inner layer fluid release (9) wherein fluid from the inner layer fluid release (9) is allowed to flow through the single hollow tube, the outer layer fluid intake (8) being so adapted as to receive fluid from an outer layer of a split pipe that is not a single hollow tube.
2. Bladeless fan in the fluid pipe essentially comprising, a two-layer hollow tube divided into outer and inner layers such that the fluid intake from the outer layer (8) and the fluid release to the inner layer (9) places the hollow tube around the perimeter of the pipe in a horizontal position in at least one position; and a single hollow tube attached the outer layer fluid intake (8) and the inner layer fluid release (9) wherein fluid from the inner layer fluid release (9) will be able to flow through the single hollow tube instead of the inner layer of the two-layer hollow tube and the outer layer fluid intake (8) is so adapted as to not receive fluid from the outer layer of the two-layer hollow tube but will instead receive fluid from a split pipe that is not a single hollow tube.
3. Bladeless fan in the fluid pipe in accordance with claim 1 or 2, wherein create a welding pipe at the fluid outlet to the inner layer by spacing it periodically that likes small hollow tube or blocked pipe, where the fluid intake point from the outer layer and the fluid release to the inner layer that place the hollow tube around the perimeter of the pipe in horizontal.
4. Bladeless fan in the fluid pipe in accordance with any one of claims 1-3, wherein the bladeless fan in the fluid pipe further comprises a fluid sorting apparatus (16) such that its characteristic is solid attachment to the pipe and the hollow tube inside various sizes tube, and the hollow tube is suitably honeycomb in shape.
5. Bladeless fan in the fluid pipe in accordance with any one of claim 2-4, wherein the top of bladeless fan (2) is attached to the lower bladeless fan (3), which has characteristic design for splitting and then there is the fluid from the outer layer and release the fluid to the inner layer such that to place the hollow tube around the perimeter of the pipe in horizontal at least one position.
6. Bladeless fan in the fluid pipe in accordance with any one of claim 1-5, wherein at the top of bladeless fan (2) with a split pipe (4) or the split pipe (4) at the upper bladeless fan for using in areas where there are no split pipes in the system, or both.
7. Bladeless fan in the fluid pipe in accordance with any one of claim 1-6, wherein the installation of a fluid sorting apparatus (16) suitable for installed below the lower bladeless fan (3).
8. Bladeless fan in the fluid pipe in accordance with any one of claim 1-4, wherein by form 2, a bladeless fan that attached or melt to the pipe such that can be attached to a hollow tube (1) or for some path to a hollow tube (1) or both with both sides of the bladeless fan.
9. Bladeless fan in the fluid pipe in accordance with any one of claim 1-4, wherein by form 3, creates a two-layer hollow tube into a single tube.
10. Bladeless fan in the fluid pipe in accordance with any one of claim 4, 8 or 9, wherein the installation of the fluid sorting apparatus (16) is the appropriate location are before or after the inner layer fluid release (9) or both.
11. Bladeless fan in the fluid pipe in accordance with any one of claim 1-7, wherein the hollow tube (1), the top bladeless fan (2) and the lower blade fan (3) are so arranged such that fluid is able to flow from the hollow tube (1) which has two parts, that is, the outer layer and the inner layer; the fluid in the outer layer is able to flow into the assembled bladeless fan to maintain the flow velocity of the fluid constant or closely; and when the two fluids are able to layer flow from

the hollow tube (1) directional to the placement of top bladeless fan at the area that the top and lower bladeless fan be assembled to a bladeless fan; such flow will enable the fluid from the outer layer hollow tube (1) through the outer layer fluid intake (8) to take place, then the fluid flow to the inner layer fluid release (9). With the result that the fluid from the inner layer hollow tube (1) flows instead; such an arrangement causing the continuous flow in the entire area, the upper bladeless fan section having a split pipe (4), where the fluid from the inner layer hollow tube (1) will flow in two directions, one will flow to the split pipe (4) and the other will pass both sections of the bladeless fan through the hollow tube that is attached it; which will cause the velocity of the fluid in the hollow tube (1) to be constant or run closely along the path, even with a split pipe (4).

12. Bladeless fan in the fluid pipe in accordance with any one of claim 1-6, wherein there are more than 2 pieces of bladeless fan components be designed to combine become the top bladeless fan (2) and the lower bladeless fan (3).

13. Bladeless fan in the fluid pipe in accordance with any one of claim 1-12, wherein fluid movement when it occurs comprises;
fluid flow from the fluid source (100) through the pipe (101), and when the fluid enters the pipe (101), it will have a constant velocity or close to the fluid velocity from the fluid source (100); when the fluid passes through the bladeless fan installation point (201), the bladeless fan will work as the fluid density changes; when the Fluid passes the bladeless fan installation point (201) it will travel along the pipeline to the point where the bladeless fan installation point (202) and pass to the split pipe that make the fluid move in two directions: to the bladeless fan installation point (203) and to the end point (304), which causes the area near the bladeless fan (202) change densities; such an arrangement allows the bladeless fan (202) to release additional fluid to accelerate and make the fluid from block pipe flow faster to maintain the velocity of the two split pipes to be constant or closely, thus the pipe that split to the end point (304) has a constant velocity or close to the fluid velocity from the fluid source (100); the fluid flowing through the pipe to the bladeless fan installation point (203) will then travel further along the pipe (203) and the fluid in the pipe will have a constant or closely velocity and travel to the bladeless fan installation point (204), , the fluid that split to the end point (301) will have a constant or closely speed, the bladeless fan (201), (202), (203) and (204) keep the speed constant or closely in the pipeline, and the other way fluid flow into the split pipe and travels to the bladeless fan installation point (205), and when the fluid passes (205) to the split pipe that formed into a two-way junction, the split pipe that travels to the end point (303) will have constant speed throughout the pipeline, even if the angle of the pipe is split again, because the bladeless fan installation point (205) is so adapted as to provide additional fluid and fluid before this point of installation is faster to distribute the density constant, the split pipe that travels to the bladeless fan installation point (206) will have a constant or closely speed, and the fluid travel from the bladeless fan installation point (205) and flow to the bladeless fan installation point (206) and when it pass (206) to the end point (302) will do so at constant or close to the speed from the fluid source (100).

14. Bladeless fan in the fluid pipe in accordance with claim 2 or 13, wherein the pipe (101) is a single hollow tube, and wherein the fluid source (100) is divided into at least two sources so that the fluid flow to the pipe (101) and the fluid separates to the bladeless fan at another fluid source.

15. Bladeless fan in the fluid pipe in accordance with claim 1 or 2 or 13, wherein the pipe (101) is a single hollow tube, and wherein the fluid source (100) has a single source with a fluid separator pipe (101) and a fluid pipe to the bladeless fan with fluid from the same fluid source.

16. Bladeless fan in the fluid pipe in accordance with claim 3 wherein the installation of a small hollow tube or block pipe can be made by attaching to one inner layer of the top or lower bladeless fan, then connect it to the opposite side later, or bring a small hollow tube or block pipe to attach one or the other.

17. Bladeless fan in the fluid pipe in accordance with claim 9, wherein the melting or forming can be done by melting the whole pipe system or make a partial melting whereas there are more than

one bladeless fan location when this melting occurs, then each piece is melted and assembled into the pipe system.