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(54) Heat generator for heating of liquids

(57) Heat-generator for heating of liquid contains a stator (1) with a chamber and a shaft (8), rotor (21), branch pipe (26). The stator (1) contains three walls (2,3,4). The volume of the chamber of stator is limited to the internal surfaces of three walls of stator. The first (2) and second (3) walls of the stator have axial openings (6,7) through which the shaft (8) passes. The housing of the shaft (8) is executed with an axial channel (9) and one or a few radial channels (11). An element (13) is located in the axial channel (9). The housing of the stator contains three housing elements (28,29,30). The first and second housing elements of the stator contains a basic walls (33,37) with an internal surface in form of a truncated cone and a butt end walls (34,38) with an internal surface in form of a ring.

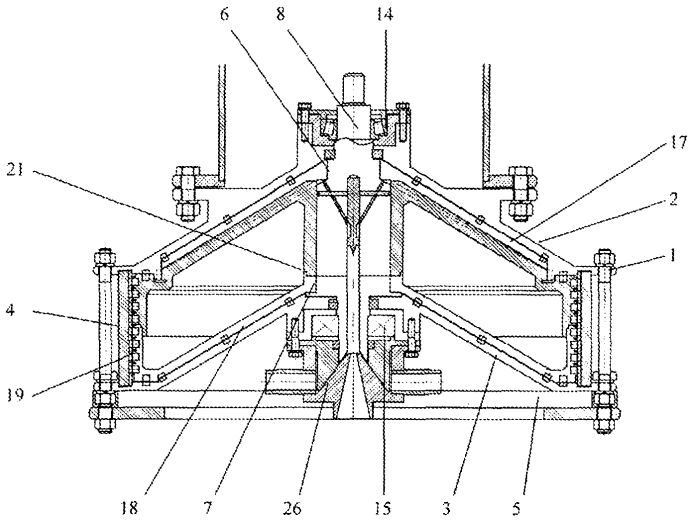


Fig.1

EP 2 119 980 A1

Description

Technical field

[0001] An invention belongs to the heating engineering devices, in particular to the devices for heating the liquid and generating steam which can be used for heat supply.

Background

[0002] For heating the houses and different industrial buildings there already have been used for a long time the heating engineering devices in which the heating of liquid and, at a necessity, generating of steam, is carried out by the transmission of heat from a hot working medium to the liquid. Thus the obligatory condition of such process is a necessity to have a working medium with a temperature more than temperature to which it is necessary to warm a liquid. The use of gases of incineration of fuel such, for example, as natural gas or fuel oil is most widespread for such working medium. The basic lack of the use of such heating engineering devices is a low coefficient of efficiency (CE), which in the best devices does not exceed 40 percents, and in most cases in the conditions of production the real CE makes only 20-25 percents. Gases of incineration of fuel after the use have a temperature far less than temperature of surrounding environments, and this heat is seldom used, the warm gases are simply thrown out in an atmosphere.

[0003] In addition, the use of gases of incineration of fuel creates an ecological problem - these gases contain the harmful oxides of nitrogen, sulphur, carbon, and the emission of unrefined gases results in contamination of atmosphere. Application of facilities and equipment for cleaning of gases of incineration of fuel complicates the installation of heat supply and increases charges for the heat supply.

[0004] As an alternative to the heating engineering devices with a hot working medium there are devices in which the warming of liquid takes place at the terms of creation of motion of liquid with certain hydrodynamic parameters, thus the kinetic energy of motion of liquid changes into thermal energy and the liquid is heated.

[0005] There are known devices for heating liquids, in which a liquid is heated, when it passes through the device, in which there is an immobile element (stator) and mobile element which is revolved (rotor). In literature such devices are often called the heat-generators. And, there is a known device for heating the liquid (the patent of the USA of US 6823820 B2, F22B 3/06, is published 30.11.2004), in which a liquid is heated when it passes through a gap between the internal walls of the housing of stator and external walls of the housing of rotor. The housing of stator consists of two housing elements - the front and back ones, which are united with each other. The axial openings are made in the housing elements through which the shift of a cylinder form passes. The front housing element has an external form o a cylinder with two walls - butt end and lateral. The internal surface of the butt end wall has a form of a ring and the internal surface of lateral wall has a form of a truncated cone. The back housing element has a form of cylinder in which one of surfaces of wall in form of a ring is internal.

[0006] At connection of the housing elements the butt end wall of front the housing element a wall of back the housing element is spatially opposite, the lateral wall of front the housing element is located between them, here an internal surface of butt end wall of front the housing element and internal surface of wall of back the housing element is perpendicular to the conditional longitudinal ax of billow. In the collected housing there is a chamber the volume of which is limited to the internal surfaces of three walls of the housing elements, and which has a form of a truncated cone.

[0007] On the shaft a rotor is fastened which is located in a chamber. A rotor is made with three walls and has a form of a truncated cone, the external surfaces of walls of which are conjugate with a gap in accordance with the internal surfaces of walls of the housing. In the housing of rotor there is the through axial channel made accordingly to the longitudinal axis of the rotor the openings of which go out to two opposite walls of the frame of rotor. The shaft passes through an axial channel in the housing of the rotor. The external surface of the walls of the housing of the rotor is made smooth.

[0008] The two channels are made in the walls of front housing element of stator for an input and output of liquid - the channel of input of stream of liquid passes through the lateral wall of the front housing element, the channel of output of liquid passes through the butt end wall of the front housing element. A liquid which enters in a device under pressure gets in gaps between the internal surfaces of walls of the housing of stator and external surfaces of walls of the housing of rotor. The flow of the liquid at a contact with the walls of rotor which is revolved begins to move in the turbulent mode. On the surface of walls of stator the motion of part of stream of liquid is decelerated and the kinetic energy of motion of liquid changes into thermal energy and the liquid is heated. The efficiency of heating the liquid in a device depends on the degree of turbulence of stream of liquid and degree of decelerating of stream of liquid - the higher degrees of turbulence and decelerating of stream of liquid in the device the more the liquid is heated.

[0009] The lack of the known device is low efficiency of heating the liquid. It is related to the structural features of device: the external surface of basic walls of rotor is made smooth and has a small area - that is why for achievement of the certain value of turbulence of stream of liquid the considerable speeds of rotation of rotor are needed, and accordingly considerable charges of energy are needed; the enter of stream of liquid to the rotor through one channel results in the unevenness of turbulence in the volume of stream of liquid and decline of degree of turbulence stream of liquid; a device can work only in the small range of volume of speed of stream of

liquid - with change of volume speed of stream of liquid the time of contact of stream of liquid with the surface of walls of rotor at the turbulence of stream of liquid and degree of turbulence of stream of liquid which results in diminishing of degree of turbulence of stream of liquid and decline of temperature of heating the liquid.

Essence of invention

[0010] The first task of invention is an improvement of heat-generator for heating the liquid by the change of construction of such elements of heat-generator as stator, shaft and rotor that will enable to speed up the turbulence of the stream of liquid and increase the useful area of surface of heat-generator on which the decelerating of stream of liquid is made.

[0011] The second task of invention is an improvement of the shaft of heat-generator for heating the liquid by the change of construction of the shaft and introduction of new element which will allow to do the serve of stream of liquid even on all of plane of rotor and to increase the turbulence of stream of liquid.

[0012] The third task of invention is an improvement of stator of heat-generator for heating the liquid by the change of form and implementation of elements of the housing which will allow to increase the useful area of surface of the housing and to increase the level of decelerating of motion of stream of liquid.

[0013] The first task is solved by the heat-generator for heating the liquid, which contains stator with a chamber, the volume of which is limited by the internal surfaces of walls of the housing of the stator, at that the housing of stator contains a two or more housing elements, which form walls of the housing of stator, walls of the housing of stator is executed in such way that the first and second walls of the housing of stator are spatially opposite and have the axial openings, the third wall of the housing of stator is located between the first and second walls of the housing of stator, the shaft which passes through the axial openings in the first and second walls of the housing of stator. The rotor, the housing of which is located in the chamber of stator and is firmly connected with the shaft, and the housing of rotor contains three walls and is executed in such way that external surfaces of three walls of the housing of rotor are conjugated with a gap accordingly with the internal surfaces of three walls of the housing of stator, and a generator contains the entrance branch pipe for a liquid, which is located on the housing of stator according to the shaft, the first and second walls of the housing of stator are executed with an internal surface in form of a truncated cone and with identical direction of tapering of internal surfaces of the walls, the third wall of the housing of stator is executed with the internal surface of cylinder form and with a channel for the passage-way of liquid, the first wall of the housing of rotor is executed with one or a few internal channels through which a liquid passes, the shaft is executed in such way which executes the functions of turbulence promoter and distributor of stream of liquid and through it a liquid passes in the internal channels of the first wall of rotor.

[0014] The second task is solved by the shaft of heat-generator for heating the liquid, which has the housing of cylinder or any other comfortable for application form, and a the shaft contains an element for the turbulence of stream of liquid, the housing of the shaft is executed with an axial channel and one or a few radial channels through which a liquid passes, an element for the turbulence of stream of liquid is located in the axial channel of shaft.

[0015] In addition, the radial channels in the housing of the shaft are executed in such way that axes of radial channels are sloping to the conditional axis of rotation of the shaft.

[0016] The third task is solved by the stator of heat-generator for heating the liquid which contains the first and second housing elements, and the housing elements are executed with the axial openings, at that the generator contains the third housing element, the first housing element contains a basic wall and butt end wall, and the basic wall of the first housing element is executed with an internal surface in form of a truncated cone and the butt end wall of the first housing element is executed with an internal surface in form of a ring, the second the housing element contains a basic wall and butt end wall, and the basic wall of the second the housing element is executed with an internal surface in form of the truncated cone and the butt end wall of the second the housing element is executed with an internal surface in form of a ring, the third housing element contains a wall which is executed with the internal surface of cylinder form, in the wall of the third housing element a channel is executed for the passage-way of liquid, the housing elements of stator are united between them so that the third housing element is located between the first and second housing elements, and the basic walls of the first and second housing element have an identical orientation of tapering of internal surfaces of the walls.

[0017] In addition, on the internal surface of basic wall of the first housing element a few rows of the first blind openings are executed so that in every row the first blind openings are spatially located on identical and certain distance for every row from the conditional longitudinal axis of stator.

[0018] In addition, on the internal surface of butt end wall of the first housing element the row of the second blind openings is executed so that the longitudinal axes of all of the second blind openings are located on identical distance from the conditional longitudinal axis of stator.

[0019] In addition, on the internal surface of butt end wall of the first housing element the flange of a ring form is additionally executed, and the surface of flange that faces toward conditional longitudinal axis of stator, has a form of continuous wave with the regular reiteration of hallows and combs.

[0020] In addition, on the internal surface of the third

housing element a few rows of the third blind openings are executed, all of rows have an identical amount of the third blind openings, and the third blind openings in every row are located so that axes of the third blind openings are in the plane of conditional circle at identical distance to each other and are displaced in relation to the axes of the third blind openings in nearby rows at a certain step.

[0021] In addition, on the internal surface of basic wall of the second housing element a few rows of the fourth blind openings are executed so that in every row the fourth blind openings are spatially located on identical and certain distance from the conditional longitudinal axis of stator for every row.

[0022] In addition, on the internal surface of butt end wall of the second housing element the row of the fifth blind openings is executed so that the longitudinal axes of all of the fifth blind openings are located on identical distance from the conditional longitudinal axis of stator.

[0023] New substantial signs in the group of inventions have the following connection with the declared technical result:

a presence in the housing of the shaft of axial channel and radial channels in the housing of the shaft allows to distribute the flow of liquid evenly on the plane of rotor, and a presence of the shaft of element for the turbulence of stream of liquid in the axial channel increases the degree of turbulence of stream of liquid in the heat-generator;

a presence of internal channels in the first wall of the housing of rotor and implementation of the first wall of the housing of rotor in form of a truncated cone allows to increase length of internal channels in the wall, and accordingly to get greater speed of streams of liquid and greater degree of turbulence of streams of liquid;

an implementations of conjugating of the external surface of the first wall of the housing of rotor and internal surface of the first wall of the housing of stator in form of the truncated cones increases surface with which it contacts and at which the stream of liquid is decelerated and accordingly a part of stream of liquid which will be decelerated is increased;

the presence of the blind openings on the internal surfaces of walls of the housing elements of stator considerably increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased;

the presence of flange of a ring form on the internal surface of the butt end wall of the first housing element and the form of surface of this flange increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

List of figures of drafts

[0024]

Fig.1 is a general view of heat-generator for heating the liquid in a cut section.

Fig.2 is a general view of shaft of heat-generator and rotor of generator in a cut section.

Fig.3 is a general view of the heat-generator in a cut section.

Fig.4 is a side-view of the first housing element of stator of heat-generator.

Fig.5 is a view from below of the first housing element of stator of heat-generator.

Fig.6 is a view A of separate area of the first housing element of stator of heat-generator on Fig.5 in an expanded scale.

Fig.7 is a side-view of the third housing element of stator of heat-generator in a cut section.

Fig.8 is a view from above of the third housing element of stator of heat-generator in a cut section.

Information which confirms the possibility of realization of invention

[0025] On figures 1-8, shown as examples, is one of possible variants of implementation of heat-generator for heating the liquid, one of possible variants of implementation of the shaft for this heat-generator and one of possible variants of implementation of stator for this heat-generator.

[0026] The heat-generator for heating the liquid (Fig. 1) contains stator **1,** the housing of which has three walls - the first wall **2,** the second wall **3** and the third wall **4.** The first and second walls of the housing of stator are spatially opposite. The third wall of the housing of stator is located between the first and the second walls of the housing of stator. The housing of stator is located on a supporting plate **5.**

[0027] The first and the second walls of stator are executed with the axial openings **6** and **7,** through which the shaft **8** passes.

[0028] The housing of the shaft has a form of cylinder (Fig.1,2) and is executed with an axial channel **9,** that ends with opening **10** on one of the butt ends of the shaft. In the housing of the shaft a few radial channels **11** are also executed, which walk away from an axial channel and go out on the external surface of the housing of the shaft. Radial channels can be executed in such way that axes of channels can be perpendicular or sloping in relation to the conditional axis **12** of rotation of the shaft. On Fig.2 the variant of implementation of radial channels is shown with sloping in relation to the conditional axis of rotation of the shaft. In an axial channel an element **13** is located for the turbulence of stream of liquid. The shaft is connected with walls of stator by bearings **14** and **15,** located in the axial openings in walls of stator. One end **16** of the shaft goes out outside and it is connected

with an engine (not shown) by which is carried out the rotation of the shaft. As an engine can be used any known engines, for example, electric motors or engines of internal combustion.

[0029] The first and the second walls of the housing of stator are executed with internal surfaces **17** and **18** (Fig. 1), that have a form of a truncated cone and identical direction of tapering of internal surfaces of walls. The third wall of the housing of stator is executed with an internal surface **19** that has a cylinder form. In the third wall of the housing of stator a channel **20** is also executed for the passage-way of liquid (Fig.3). The internal surfaces of walls of the housing of stator limit the volume of chamber into the housing of stator.

[0030] In the volume of chamber a rotor **21** is locate (Fig.1,2), the housing of which is firmly connected with the shaft. The housing of rotor contains three walls - the first **22,** the second **23** and the third **24** (Fig.2). The walls of the housing of the rotor are executed in such way that external surfaces of the first, second and third walls of the housing of the rotor are conjugated with a gap accordingly with the internal surfaces of the first, second and third walls of the housing of stator. In the first wall of the housing of rotor a few internal channels **25** are executed, through which the stream of liquid passes. The internal channels of the first wall of the housing of rotor are executed so that entrances to the internal channels were in places nearest to the conditional axis of rotation of the shaft, and exits from internal channels on the external surface of the first wall of the housing of rotor were in places most remote from the conditional axis of rotation of the shaft. The flow of liquid gets to the internal channels of the first wall of the housing of rotor through radial channels in the housing of the shaft.

[0031] On one of walls of the housing of stator, which has the axial opening, is located spirulate to the axial opening of wall of the housing of stator and the shaft entrance branch pipe **26** for a liquid (Fig.1).

[0032] The heat-generator works as follows. An engine drives the shaft of heat-generator and rotor of heat-generator into rotation. Liquid, for example, water, is given by a pump to the entrance branch pipe for a liquid. By passing through the entrance branch pipe the flow of liquid gets in the axial channel of the shaft. There is the first stage of turbulence of stream of liquid in the axial channel of the shaft - when an element influences the stream of liquid for the turbulence of stream of liquid. Then the general stream of liquid is distributed into few even streams and passes through radial channels in the housing of the shaft, whereupon streams get in the internal channels of the first wall of the housing of rotor. A presence of axial channel and radial channels in the housing of the shaft allows distributing the flow of liquid evenly on the plane of rotor, and a presence of element for the turbulence of stream of liquid in the axial channel of the shaft increases the degree of turbulence of stream of liquid in the heat-generator.

[0033] The streams of liquid move in internal channels in direction from the conditional axis of rotation of the shaft. Because of the rotation of rotor the streams of liquid in internal channels get an additional centrifugal acceleration, due to that there is an increase of speed of streams of liquid and the degree of turbulence of streams of liquid rises. Presence of internal channels in the first wall of the housing of rotor and implementation of the first wall of the housing of rotor in form of a truncated cone allows to increase length of internal channels in a wall and accordingly to get greater speed of streams of liquid and greater degree of turbulence of streams of liquid.

[0034] After passing the internal channels of the first wall of the housing of rotor the streams of liquid go out on the external surface of the first wall and get in a gap between the external surface of the first wall of the housing of rotor and internal surface of the first wall of the housing of stator, where on the walls of stator there is decelerating of part of stream of liquid and heating of the liquid. The implementations of conjugating external surface of the first wall of the housing of rotor and internal surface of the first wall of the housing of stator in form of the truncated cones increases surface with which it contacts and at which the stream of liquid is decelerated and accordingly a part of stream of liquid which will be decelerated is increased.

[0035] Then the flow of liquid passes through the area of gap between the external surface of the third wall of the housing of rotor and internal surface of the third wall of the housing of stator, whereupon the heated liquid goes out from heat-generator through a channel in the third wall of the housing of stator. In a gap between the external surface of the third wall of the housing of rotor and internal surface of the third wall of the housing of stator there is additional turbulence and additional decelerating of stream of liquid which results in the increase of heating the liquid.

[0036] As a variant, in the housing of necessity of generation of steam, it is shown in Fig.3 a possibility of implementation in the second wall of the housing of stator of another channel **27** for the output of steam.

[0037] A little part of stream of liquid gets in a gap between the external surface of the second wall of the housing of rotor and the internal surface of the second wall of the housing of stator which also brings in a certain contribution to efficiency of heating the liquid and increases the temperature of liquid at the exit from the heat-generator.

[0038] As one of possible variants in the heat-generator there can be used stator according to the item of formula 4-10, which contains the first housing element **28,** the second housing element **29** and the third housing element **30.** The first and second housing elements of stator are executed with the axial openings **31** and **32.**

[0039] The first housing element contains a basic wall **33** and the butt end wall **34.** The basic wall of the first housing element is executed with an internal surface **35** in form of the truncated cone. The butt end wall of the

first housing element is executed with an internal surface **36** in form of a ring.

[0040] The second housing element contains a basic wall **37** and the butt end wall **38.** The basic wall of the second housing element is executed with an internal surface 39 in form of the truncated cone. The butt end wall of the second housing element is executed with an internal surface **40** in form of a ring.

[0041] The third housing element contains the wall **41,** which is executed with an internal surface **42** of a cylinder form. In the wall of the third housing element there is a channel for the passage-way of liquid.

[0042] The housing elements of stator are united between them so that the third housing element is located between the first and second housing elements, and the basic walls of the first and second housing elements have an identical orientation of tapering of internal surfaces of the walls.

[0043] In addition, there on the internal surface of basic wall of the first housing element additionally can be executed a few rows of the first blind openings **43** (Fig.4,5) so that the first blind openings are spatially located in every row on identical and certain distance for every row from the conditional longitudinal axis of stator. The presence of the first blind openings increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0044] On the internal surface of the butt end wall of the first housing element there additionally can be executed a row of the second blind openings **44** (Fig.4,5) so that the longitudinal axes of all of the second blind openings are located on identical distance from the conditional longitudinal axis **45** of stator. The presence of the second blind openings increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0045] On the internal surface of the butt end wall of the first housing element additionally the flange **46** of a ring form can be executed (Fig. 4,6), and surface **47** of the flange, that faces the conditional longitudinal axis of stator, it has a form of continuous wave with the regular reiteration of fallows and combs. Presence of the flange of a ring form and the form of surface of this flange increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0046] On the internal surface of the third housing element additionally there can be executed a few rows of the third blind openings **48** (Fig.7,8), all of the rows have an identical amount of the third blind openings, and the third blind openings in every row are located so that the axes of the third blind openings are in the plane of conditional circle at the identical distance to each other and are displaced in relation to the axes of the third blind openings in nearby rows at a certain step. The presence of the third blind openings increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0047] On the internal surface of basic wall of the second housing element additionally there can be executed a few rows of the fourth blind openings so that in every row the fourth blind openings are spatially located at identical and certain distance from the conditional longitudinal axis of stator for every row. These rows of the fourth blind openings are executed like to the rows of the first blind openings **43** on the internal surface of basic wall of the first housing element and that is why not shown on drafts. The presence of the fourth blind openings increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0048] On the internal surface of the butt end wall of the second housing element additionally there can be executed a row of the fifth blind openings so that the longitudinal axes of all of the fifth blind openings are located at identical distance from the conditional longitudinal axis of stator. This row of the fifth blind openings is executed alike to the row of the second blind openings **44** on the internal surface of the butt end wall of the first housing element and that is why it is not shown on drafts. The presence of the fifth blind openings increases the area of surface of stator, with which the stream of liquid contacts and the degree of decelerating of stream of liquid is accordingly increased.

[0049] Examples only illustrate the group of inventions but they do not limit it.

Claims

1. The heat-generator for heating of liquid, which contains the stator with the chamber, the volume of which is limited by the internal surfaces of walls of the housing of the stator, at that the housing of stator contains a two or more housing elements, which form walls of the housing of stator, walls of the housing of stator is executed in such way that the first and second walls of the housing of the stator are spatially opposite and have the axial openings, the third wall of the housing of the stator is located between the first and second walls of the housing of stator, the shaft, which passes through the axial openings in the first and second walls of the housing of stator, the rotor, which housing is located in the chamber of stator and is fixed with the shaft, at that the housing of rotor contains three walls and is executed in such way that the external surfaces of three walls of the housing of rotor are conjugated with a gap accordingly with the internal surfaces of three walls of the housing of stator, **characterized in that** it contains the entrance branch pipe (26) for a liquid, which is located on the housing of the stator (1) in alignment with the shaft (8), the first (2) and second (3) walls

of the housing of stator (1) are executed with an internal surface (17,18) in form of a truncated cone and with identical direction of tapering of internal surfaces of walls, the third wall (4) of the housing of stator is executed with the internal surface (19) of cylinder form and with a channel (20) for the passage-way for liquid, the first wall (22) of the housing of rotor (21) is executed with one or a few internal channels (25) through which a liquid passes, the shaft (8) is executed in such a way which executes the functions of the turbulence promoter and distributor of stream of liquid and through him a liquid passes in the internal channels (25) of the first wall (22) of rotor (21).

2. The shaft of heat-generator for heating of liquid, which has the housing of cylinder or any other comfortable for application form, **characterized in that** the shaft (8) contains an element (13) for the turbulence of stream of liquid, the housing of the shaft (8) is executed with an axial channel (9) and with one or a few radial channels (11) through which a liquid passes, an element (13) for the turbulence of stream of liquid is located in the axial channel (9) of shaft.

3. The shaft of heat-generator for heating of liquid according to claim 2, **characterized in that** radial channels (11) are executed in such way that the axes of radial channels are sloping to the conditional axis (12) of rotation of the shaft.

4. The stator of heat-generator for heating of liquid which contains the first and second housing elements and the housing elements are executed with the axial openings, **characterized in that** it contains the third housing element (30), the first housing element (28) contains a basic wall (33) and butt end wall (34), and the basic wall (33) of the first housing element is executed with an internal surface (35) in form of a truncated cone and the butt end wall (34) of the first housing element is executed with an internal surface (36) in form of a ring, the second housing element (29) contains a basic wall (37) and butt end wall (38), and the basic wall (37) of the second housing element is executed with an internal surface (39) in form the truncated cone and the butt end wall (38) of the second housing element is executed with an internal surface (40) in form of a ring, the third housing element (30) contains a wall (41) which is executed with the internal surface (42) of cylinder form, in the wall (41) of the third housing element (30) is executed a channel (20) for the passage-way for liquid, the housing elements of the stator are united so that the third housing element (30) is located between the first and second housing elements (28,29) and the basic walls (33,37) of the first and second housing elements have an identical orientation of tapering of internal surfaces of the walls.

5. The stator of the heat-generator for heating of liquid according to claim 4, **characterized in that** on the internal surface (35) of basic wall of the first housing element (28) a few rows of the first blind openings (43) are executed so that in every row the blind openings are spatially located on identical and certain distance from the conditional longitudinal axis (45) of stator for every row.

6. The stator of heat-generator for heating of liquid according to claim 5, **characterized in that** on the internal surface (36) of butt end wall of the first housing element the row of the second blind openings (44) is executed so that the longitudinal axes of all of the second blind openings (44) are located on identical distance from the conditional longitudinal axis (45) of stator.

7. The stator of heat-generator for heating of liquid according to claim 6, **characterized in that** on the internal surface (36) of butt end wall (34) of the first housing element (28) appearance of a ring form is additionally executed, and the surface (47) of prominence that faces toward conditional longitudinal axis (45) of stator, it has a form of continuous wave with the regular reiteration of cavities and combs.

8. The stator of heat-generator for heating of liquid according to any claims 4-7, **characterized in that** on the internal surface (42) of the third housing element (30) a few rows of the third blind openings (48) are executed, all of rows have an identical amount of the third blind openings (48), and the third blind openings (48) in every row are located so that axes of the third blind openings (48) are in the plane of conditional circle on identical distance to each other and are displaced in relation to the axes of the third blind openings (48) in nearby rows on a certain distance.

9. The stator of heat-generator for heating of liquid according to any claims 4-8, **characterized in that** on the internal surface (39) of basic wall (37) of the second housing element (29) a few rows of the fourth blind openings (49) are executed so that in every row the fourth blind openings (49) are spatially located on identical and certain distance for every row from the conditional longitudinal axis (45) of stator.

10. The stator of heat-generator for heating of liquid according to any claims 4-9, **characterized in that** on the internal surface (40) of butt end wall (38) of the second housing element (29) the row of the fifth blind openings is executed so that the longitudinal axes of all of the blind openings are located on identical distance from the conditional longitudinal axis (45) of stator.

Amended claims in accordance with Rule 137(2) EPC.

1. The heat-generator for heating the liquid, which contains the stator with the chamber, the volume of which is limited by the internal surfaces of walls of the housing of the stator, at that the housing of stator contains a two or more housing elements, which form walls of the housing of stator, walls of the housing of stator is executed in such way that the first and second walls of the housing of the stator are spatially opposite and have the axial openings, the third wall of the housing of the stator is located between the first and second walls of the housing of stator, the shaft, which passes through the axial openings in the first and second walls of the housing of stator, the rotor, which housing is located in the chamber of stator and is fixed with the shaft, at that the housing of rotor contains three walls and is executed in such way that the external surfaces of three walls of the housing of rotor are conjugated with a gap accordingly with the internal surfaces of three walls of the housing of stator, **characterized in that** it contains the entrance branch pipe (26) for a liquid, which is located on the housing of the stator (1) in alignment with the shaft (8), the first (2) and second (3) walls of the housing of stator (1) are executed with an internal surface (17,18) in form of a truncated cone and with identical direction of tapering of internal surfaces of walls, the third wall (4) of the housing of stator is executed with the internal surface (19) of cylinder form and with a channel (20) for the passage-way for liquid, the first wall (22) of the housing of rotor (21) is executed with one or a few internal channels (25) through which a liquid passes, the shaft (8) is executed in such a way which executes the functions of the turbulence promoter and distributor of stream of liquid and through him a liquid passes in the internal channels (25) of the first wall (22) of rotor (21).

2. The shaft for heat-generator for heating the liquid of claim 1, which has the housing of cylinder or any other comfortable for application form, **characterized in that** the shaft (8) contains an element (13) for the turbulence of stream of liquid, the housing of the shaft (8) is executed with an axial channel (9) and with one or a few radial channels (11) through which a liquid passes, an element (13) for the turbulence of stream of liquid is located in the axial channel (9) of shaft.

3. The shaft for heat-generator for heating the liquid according to claim 2, **characterized in that** radial channels (11) are executed in such way that the axes of radial channels are sloping to the conditional axis (12) of rotation of the shaft.

4. The stator for heat-generator for heating the liquid of claim 1, which contains the first and second housing elements and the housing elements are executed with the axial openings, **characterized in that** it contains the third housing element (30), the first housing element (28) contains a basic wall (33) and butt end wall (34), and the basic wall (33) of the first housing element is executed with an internal surface (35) in form of a truncated cone and the butt end wall (34) of the first housing element is executed with an internal surface (36) in form of a ring, the second housing element (29) contains a basic wall (37) and butt end wall (38), and the basic wall (37) of the second housing element is executed with an internal surface (39) in form the truncated cone and the butt end wall (38) of the second housing element is executed with an internal surface (40) in form of a ring, the third housing element (30) contains a wall (41) which is executed with the internal surface (42) of cylinder form, in the wall (41) of the third housing element (30) is executed a channel (20) for the passage-way for liquid, the housing elements of the stator are united so that the third housing element (30) is located between the first and second housing elements (28,29) and the basic walls (33,37) of the first and second housing elements have an identical orientation of tapering of internal surfaces of the walls.

5. The stator for the heat-generator for heating the liquid according to claim 4, **characterized in that** on the internal surface (35) of basic wall of the first housing element (28) a few rows of the first blind openings (43) are executed so that in every row the blind openings are spatially located on identical and certain distance from the conditional longitudinal axis (45) of stator for every row.

6. The stator for heat-generator for heating the liquid according to claim 5, **characterized in that** on the internal surface (36) of butt end wall of the first housing element the row of the second blind openings (44) is executed so that the longitudinal axes of all of the second blind openings (44) are located on identical distance from the conditional longitudinal axis (45) of stator.

7. The stator for heat-generator for heating the liquid according to claim 6, **characterized in that** on the internal surface (36) of butt end wall (34) of the first housing element (28) appearance of a ring form is additionally executed, and the surface (47) of prominence that faces toward conditional longitudinal axis (45) of stator, it has a form of continuous wave with the regular reiteration of cavities and combs.

8. The stator for heat-generator for heating the liquid according to any claims 4-7, **characterized in that** on the internal surface (42) of the third housing ele-

ment (30) a few rows of the third blind openings (48) are executed, all of rows have an identical amount of the third blind openings (48), and the third blind openings (48) in every row are located so that axes of the third blind openings (48) are in the plane of conditional circle on identical distance to each other and are displaced in relation to the axes of the third blind openings (48) in nearby rows on a certain distance.

9. The stator for heat-generator for heating the liquid according to any claims 4-8, **characterized in that** on the internal surface (39) of basic wall (37) of the second housing element (29) a few rows of the fourth blind openings (49) are executed so that in every row the fourth blind openings (49) are spatially located on identical and certain distance for every row from the conditional longitudinal axis (45) of stator.

10. The stator for heat-generator for heating the liquid according to any claims 4-9, **characterized in that** on the internal surface (40) of butt end wall (38) of the second housing element (29) the row of the fifth blind openings is executed so that the longitudinal axes of all of the blind openings are located on identical distance from the conditional longitudinal axis (45) of stator.

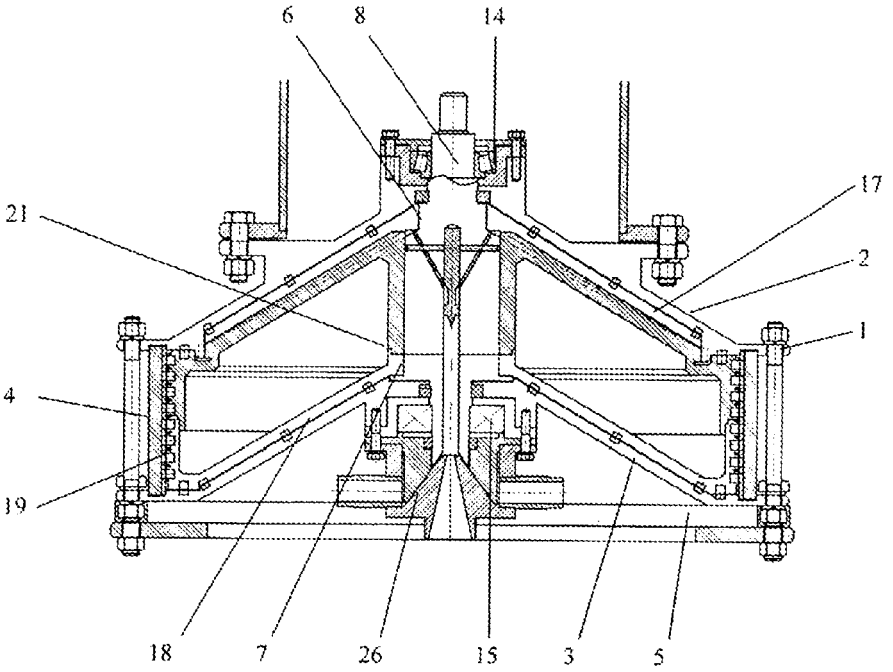


Fig.1

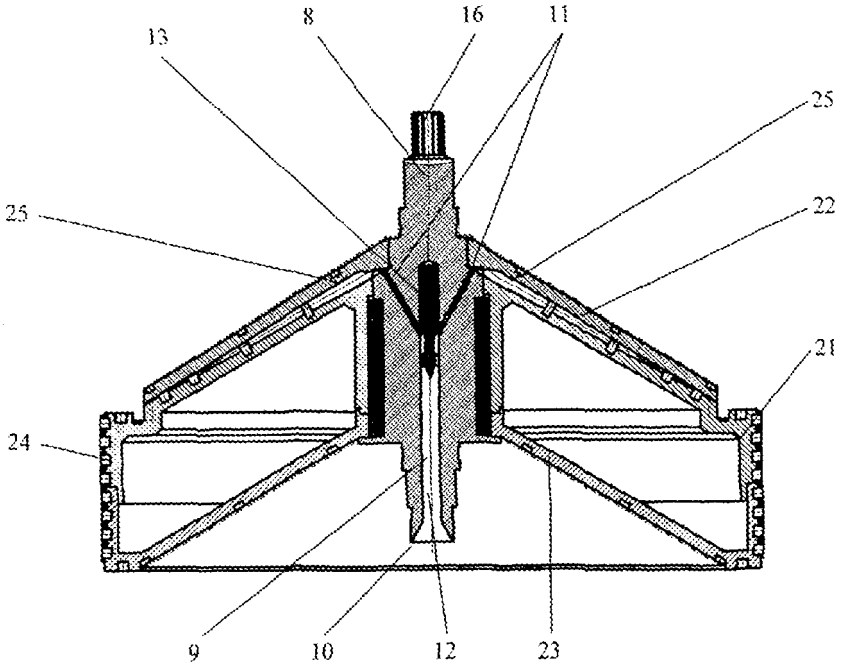


Fig.2

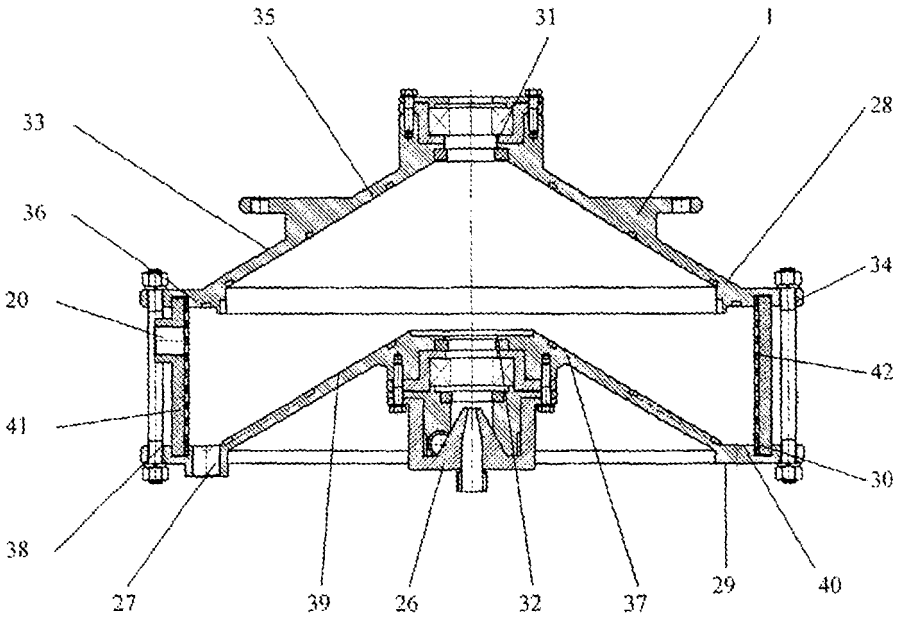


Fig.3

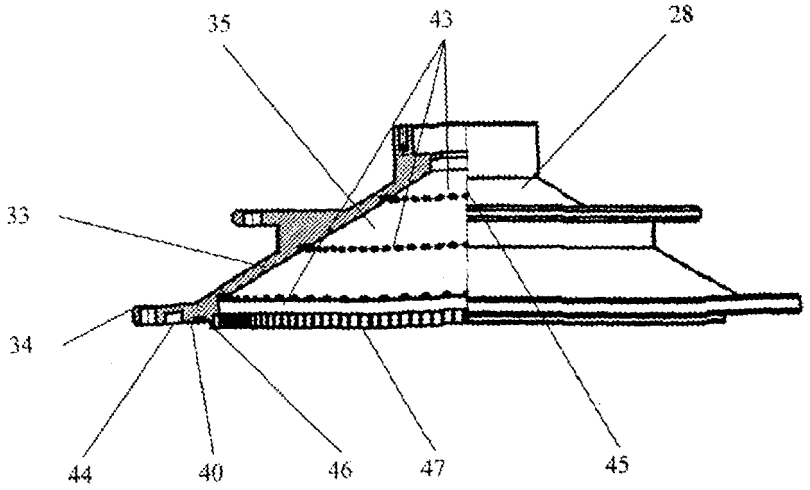


Fig.4

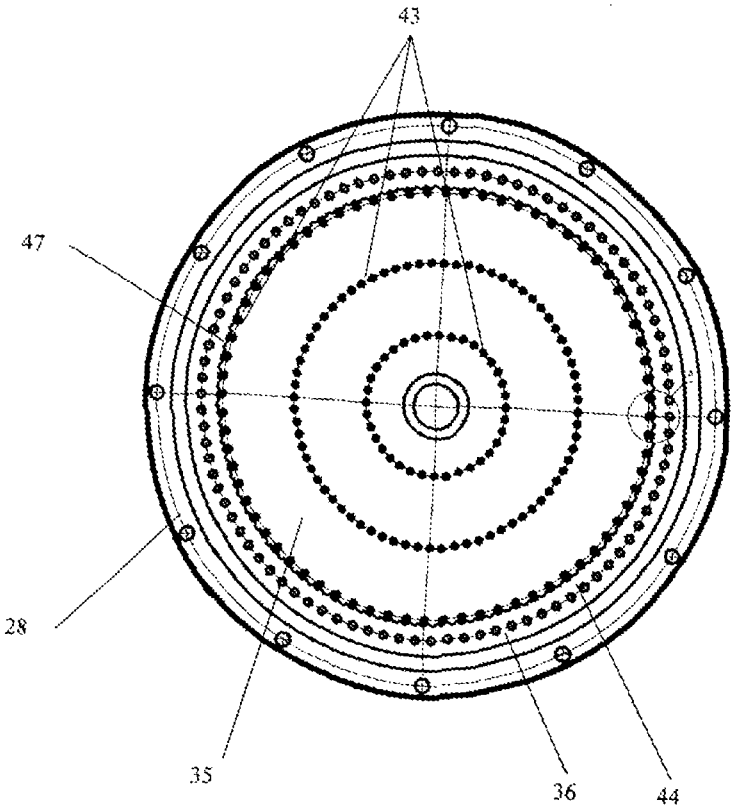


Fig.5

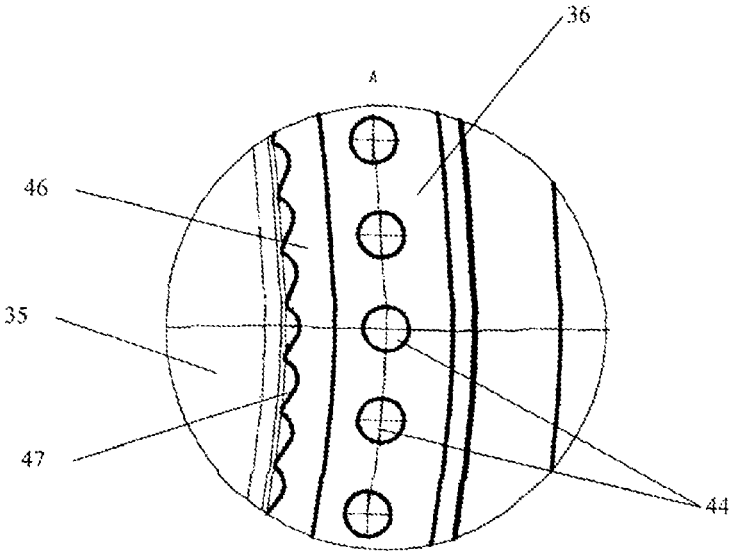


Fig.6

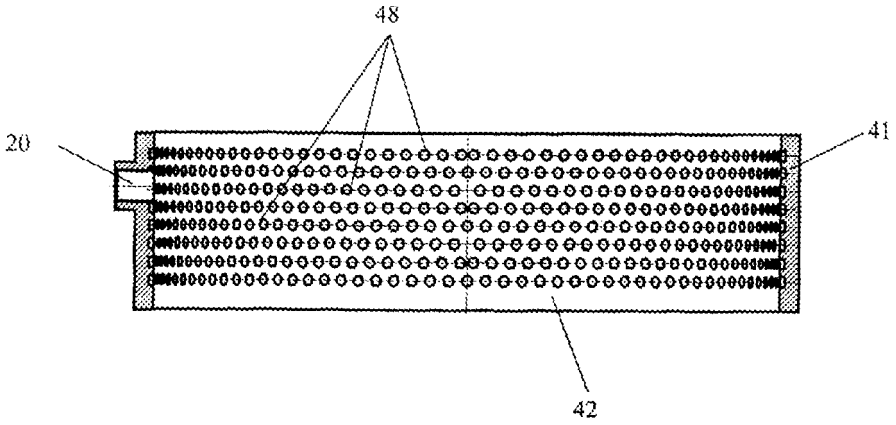


Fig.7

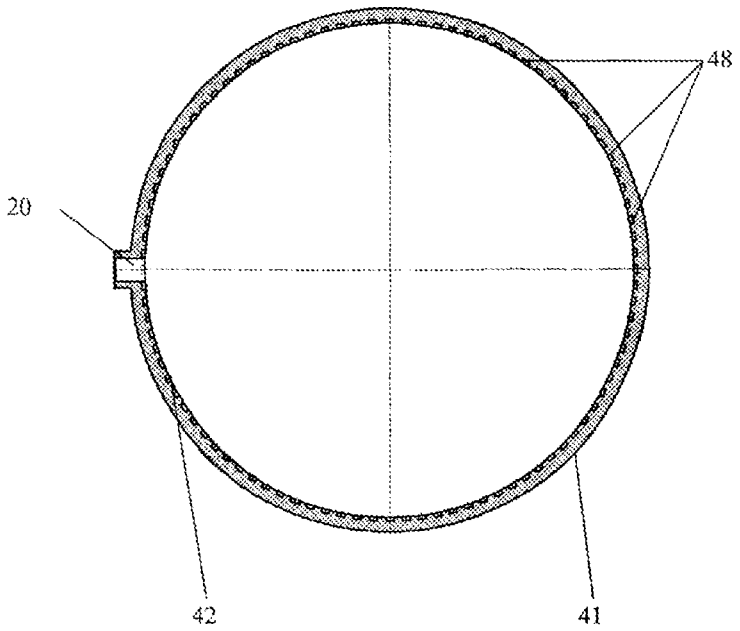


Fig.8

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EUROPEAN SEARCH REPORT

Application Number
EP 08 47 5005

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A	* page 5, paragraph 48 - paragraph 54; figure 10 *	1,4	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 October 2008	Mootz, Frank

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X : particularly relevant if taken alone
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