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Description

The present invention relates to a device for heating a liquid comprising a stationary body member for containing the liquid, and means including a centrifugal energy drum mounted for rotation within said body member and adapted to receive liquid therein and to impart circular rotational movement to that liquid. The invention also relates to an installation comprising such a device and to a method of heating a liquid.

Such a device and method are disclosed by DE—B—24 00 588. However, the heating effect produced by the known device is not particularly noteworthy.

An object of the invention is to improve the known device to allow a greatly enhanced heating effect to be produced without undue mechanical complexity.

According to one aspect of the invention, there is provided a device for heating a liquid comprising a stationary body member for containing the liquid, and means including a centrifugal energy drum mounted for rotation within said body member and adapted to receive liquid therein and to impart circular rotational movement to that liquid, characterized by a stationary channelled guide disc arranged within said drum and by impeller means on said drum and means on said channelled guide disc positioned to cooperate with guide means on said channelled guide disc to force liquid into a channel of said disc, and to exert variable pressure effects on the rotating liquid to heat the liquid.

According to a further aspect of the invention, there is provided a method of heating a liquid comprising providing a body member containing liquid, and providing a centrifugal energy drum containing a portion of said liquid, said drum being mounted for rotation in the body member, characterised by providing a channelled guide disc in the liquid in the drum, rotating the drum, thereby causing the liquid in the drum to rotate, passing a part of the liquid into a channel of said disc, and subjecting the liquid to variable pressure effects in order to heat the liquid by virtue of the cooperation of the drum and the channelled guide disc.

This specification will disclose a device (or pump heater) suitable for application to many kinds of hot water and steam boilers, which avoids pollution, and produces heat energy with minimum electrical energy consumption.

The pump heater which is the subject matter of this invention is generally adaptable to hot water and steam boilers for many purposes.

Accordingly, it can easily be used in the central heating system of houses, and will ensure considerable convenience in heating locations such as cities, districts, and housing collectives.

The device of the invention for generating heat so far as its general appearance is concerned, is a mechanical system analogous to a centrifugal pump.

The device may be filled with any suitable liquid. Suction and pressure pipes are connected to a boiler to be heated or, in the case of indirect heating, to the two ends of the serpentine circuit similar to a pump so as to form a closed circuit.

A device according to the invention, operated by means of engine power, may resemble a motor pump and, subjecting the sucked liquid to a heating process, heats it within its own structure and in a form heated to a higher value than the inlet heat, supplies it to the boiler (or to the serpentine circuit) through the pressure pipe.

The invention will now be described in more detail and by way of example with reference to the accompanying drawings, in which:

Figure 1 shows in vertical cross-section a complete device according to one embodiment of the invention composed of four main groups;

Figure 2 shows in vertical cross-section a centrifugal energy drum and a channelled guide disc within the former, which are the main elements of the device;

Figure 3 shows three-dimensional drawing of closed fins; and

Figure 4 shows three-dimensional drawing of multifunctional head.

The device, so far as its general appearance is concerned, is a mechanical system of the centrifugal pump type, and consists of four main groups, namely body A, centrifugal energy drum B, channelled guide disc C and chassis D.

The body A contains the rotating centrifugal energy drum B and the channelled guide disc C and functions as liquid storage unit.

The centrifugal energy drum B consists of a disc rotatable around the central axis and capable of creating centrifugal energy by rotating the liquid mass by means of closed fins B/2.

The closed fins B/2 arranged within the centrifugal energy drum B for imparting rotational movement to the liquid therein not only rotate the liquid within the pump but also exert a vacuum pressure sequence on the rotating liquid mass and ensure the maintenance of said vacuum pressure sequence throughout the operation of the pump.

The channelled guide disc C consists of a disc arranged in the interior of the centrifugal energy drum B and on the same axis therewith and fixed to the body A by means of a pressure pipe C/10. It is a disc provided externally with a sufficient number of multi-function heads C/2 and internally (as seen in Figure 2) with a tube ring C/1 and various channels and orifices.

Accordingly, the channelled guide disc C also has two functions, namely:

— To separate the liquid to be fed outside the heat pump from the liquid to remain within; and
— To exert a continuous and variable vacuum pressure sequence on the liquid subjected to a rotational movement similar to the one as in the case of the centrifugal energy drum B, also in the channelled guide disc C.

Channelled guide disc C has been designed as follows in order to create its vacuum pressure sequence:

The channelled guide disc C by means of multi-function head C/2 arranged on the external surface thereof simultaneously carries out the following four functions:

a) Separation into three individual rings of the liquid mass rotating within the centrifugal energy drum B);

b) Passing the central ring into the tube ring C/1 through inlet C/3;

c) Compressing the liquid rings remaining on two sides of the inlet C/3 towards fin impellers B/6; and

d) Creating a vacuum area behind the head base C/4.

The chassis D supports the body A of the pump heater and through a main shaft B/1 connects the centrifugal energy drum B arranged within the former to the motive power center E and communicates with a heat boiler or serpentine system as required.

The above-disclosed device which is completely filled with liquid, starts operation by the drive force imparted by the power center E to which it is connected.

Through the effects of the following phenomena taking place within it, the device converts the energy into heat energy as follows:

As seen in Figure 1, the movement of the driving power center E is transmitted to the centrifugal energy drum B attached to the main shaft B/1.

During the rotation of the centrifugal energy drum B the liquid mass also is entrained and starts rotating by means of the closed fins B/2 arranged on the internal surfaces.

As this rotational movement will impart centrifugal energy to the liquid within the centrifugal energy drum B, a pressurized liquid ring is formed within the annular liquid chamber B/3.

The important characteristics of said liquid ring are that, since it is subject to the inertia effects on the one hand and to the braking phenomenon of the friction effect created by the multi-function head C/2 which does not move in the middle section of the centrifugal energy drum B and within the liquid ring on the other hand, it always has to move so as to be slower than the speed of the closed fins B/2.

Therefore, as the movement of the closed fins B/2 located on both sides of the liquid ring, which movement is faster than the movement of the liquid mass, will cause liquid resistance on the inclined fin surfaces, liquid masses within the fin spaces B/8 will be vigorously pushed from both sides of the annular liquid chamber B/3 in a manner to be deflected towards the central section.

This phenomenon of deflecting the liquid masses from the sides towards the central section will create an additional pressure increase in the central section of the liquid ring in addition to the liquid pressure which is produced by the existing centrifugal force.

It is obvious that this deflection phenomenon furthermore, will facilitate the creation near the side surfaces of the liquid ring (and particularly behind the fin ladles B/6) of a low pressure area formed due to the liquid mass being unable to reach the fast moving closed fins B/2.

In line with the above phenomenon, rotational power is transmitted from the centrifugal energy drum B to the liquid ring, and consequently overcoming the braking effect arising from the inertia and friction losses, thus ensuring a stable rotational speed of the liquid ring.

Thus, the liquid mass, which has acquired momentum due to a specific and stable speed, imparts a continuous impelling effect on the front surface of the multi-functional head C/2 staying fixedly therein, and consequently a separate pressure is created in addition to the existing centrifugal pressure on the surfaces on which the liquid impacts.

The liquid rings impacting at high speed on the frontal face of the multi-functional head C/2, which is continuously subject to passage of liquid, will be divided into three liquid rings as if cut by the stroke of a knife.

Of these rings, as the one in the middle section will coincide with the inlet C/3, it will enter forcefully through the permanently open inlet C/3 and penetrate into the tube ring C/1.

Meanwhile, the other liquid rings on either side will continue on their path within the annular liquid chamber B/3 in a gradually diverging manner towards the head base C/4 in conformity with the inclined side surfaces C/20 of the multi-functional head C/2.

However, since the external side surfaces of these two side liquid rings, (two side walls of the annular liquid chamber B/3), are bound by the drum pulley B/4 on the upper surface and by the fin closing ring B/7 on the lower surfaces, the liquid masses forming such rings will be forced into gradually decreasing volumes by the multi-function head C/2.

This decrease of volume will be at its minimum on the level of the head base C/4.

Thus, it has become possible by means of the multi-functional head C/2 to introduce liquid mass into the low pressure regions formed behind the fin ladles B/6 due to their faster movement than the liquid mass.

While these phenomena take place in the front part of the multi-functional head C/2, a large low pressure region forms at the rear part and in front of the head base C/4.

This specially designed large low pressure region, influencing the fin spaces B/8 level therewith and filled with pressurized liquid, instantaneously relieves the pressure of the high pressure liquid in these regions.

Thus, by means of these vacuum regions, arranged both in the sections of fin impellers B/6 and head base C/4, a pressure reducing action is

enforced on the liquid masses passing on their level.

This pressure reducing action, through the aid of multi-function head C/2, has been effected by the high pressure action defined as above, on the fin spaces B/8 passing on the same level.

Thanks to this effect, as long as the device is in operation, the liquid mass in the section of the annular liquid chamber B/3, is subjected to a periodic vacuum-pressure sequence of events.

The same events and results are achieved also within channelled guide disc C but repeated in a different manner.

As a matter of fact, apart from the special functions of the channelled guide disc C such as providing excess air to the system, setting of required internal displacement and discharging the heated liquid from the system are also effected, while realizing the vacuum effect at a pulverizing chamber C/15 and suction inlets C/7. Furthermore, a high pressure effect is achieved at the inlet neck C/5, pressure neck C/9 and double function orifice C/14, on the level of the regulator inlet C/12, whilst within the tube ring C/1 the guide disc C provides a sudden pressure decrease and within the annular liquid chamber B/3 it provides a sudden pressure increase.

Although these events within the channelled guide disc C take place simultaneously, for simplicity, the description of the sequence of events is based on the movement of the liquid first entering through the inlet C/3, namely:

Referring particularly to Figure 2, liquid mass entering the channelled guide disc C through inlet C/3, with the momentum it gained in annular liquid chamber B/3, proceeds along its path by entering the inlet C/5 and thence is channelled through tube ring C/1.

As the movement of liquid mass within tube ring C/1 continues as a result of support on the external periphery thereof, the pressure position of the liquid ring formed within the tube will be high on the external periphery and at minimum level on the internal circle.

This facilitates the pressure decrease action taking place at suction inlet C/7 section through the entraining effect of the liquid flow within the tube ring C/1.

Also, such a pressure drop produces a suction effect on liquid masses both in the tube ring C/1 and suction channels C/6.

The suction effect causing the above phenomena simultaneously displaces the liquid masses within the suction channels into the tube ring C/1.

Thus, while the amount of liquid entering from inlet C/3 to tube ring C/1 is increased, the amount of air dissolved in the liquid within the tube ring C/1 is increased in conformity with its more expanded pattern until the pressure neck C/9.

As this fluid mass, which is continuously pushed from inlet C/3 into tube ring C/1, will be forced into the conically narrowing pressure neck C/9, the flow is subject to considerable constriction in this section, and consequently the speed of the liquid increases considerably.

Sudden pressure drop encountered by the fluid mass progressing under high internal pressure and increased speed at the tension regulating inlet C/12 arranged along its path, will lead, towards the inside of the annular liquid chamber B/3, to a volume expansion in the form of a burst.

This forced and vigorous displacement into the annular liquid chamber B/3, like a sudden shock, will also increase the pressure of the liquid ring.

This action will also cause volume expansion in the tube ring C/1.

Thus, the reverse of the action which takes place in the annular liquid chamber B/3 occurs in this section of the tube ring C/1.

The tension regulator inlet C/12 causing the above phenomena also contributes to the heat production in both sections by performing an important function in the vacuum pressure sequence.

The fluid mass continuing its progress from the tension regulator inlet C/12, with all its speed and power, passes to the double function orifice C/14 located in its direction of movement.

Fluid mass which can pass through the said double function orifice C/14, with its considerably increased speed, is added, with an intensive impact from the rear, to the fluid mass entering in the direction of the inlet neck C/5 and from the inlet C/5.

During this jetting action, a pressure drop takes place in the pulverizing chamber C/15. This effect in turn, sucks the air contained in the carburettor channel C/16 and causes entrainment thereof by the fluid jetting from the double function orifice C/14 and forced introduction into the inlet neck C/5.

Thus, the function of addition of air in a quantity sufficient to saturate the liquid mass subjected to processing in the pump in proportion to the high pressure will have been realized.

This heated fluid mass passing through double function orifice C/14 not only adds excess air and imparts impelling power to the liquid mass entering the tube ring C/1 from inlet neck C/3, but also adds to it heat energy.

While these phenomena take place ahead of the double function orifice C/14, the fluid mass, unable to proceed further, is transferred from the pressure neck C/11 to the pressure channel C/15 and through the pressure pipe C/10 is discharged from the pump.

The centrifugal energy drum B evacuated by the fluid discharged from the pump, is displaced the liquid contained in the body A through external suction channel B/9 and displacement channels B/10.

In this case, as the pressure drop will have been transferred to the body A, liquid is sucked from the suction pipe A/5 into the pump and thus the circuit is completed.

By means of a boiler included within such a formed closed circuit, it is possible to produce heat energy in a most economical manner.

For ease of reference, the following is a list of component parts shown in the drawings:

1. Body	(A)
2. Lid	(A/1)
3. Stop Fins	(A/2)
4. Body Chamber	(A/3)
5. Carburettor Pipe	(A/4)
6. Suction Pipe	(A/5)
7. Centrifugal Energy Drum	(B)
8. Main Shaft	(B/1)
9. Closed Fins	(B/2)
10. Annular Liquid Chamber	(B/3)
11. Drum Pulley	(B/4)
12. Fin Upper Surface	(B/5)
13. Fin Ladle	(B/6)
14. Fin Closing Ring	(B/7)
15. Fin Spaces	(B/8)
16. External Suction Channel	(B/9)
17. Displacement Channel	(B/10)
18. Drum Internal Walls	(B/11)
19. Channelled Guide Disc	(C)
20. Tube Ring	(C/1)
21. Multi-Function Head	(C/2)
22. Inlet Neck	(C/3)
23. Head Base	(C/4)
24. Inlet Neck	(C/5)
25. Suction Channels	(C/6)
26. Suction Necks	C/7)
27. Suction By-Pass	(C/8)
28. Pressure Neck	(C/9)
29. Pressure Pipe	(C/10)
30. Pressure Neck	(C/11)
31. Tension Regulator	(C/12)
32. Pressure Channel	(C/13)
33. Double-Function Orifice	(C/14)
34. Pulverizing Chamber	(C/15)
35. Carburettor Channel	(C/16)
36. Joint Elbow	(C/17)
37. Dividing Ring	(C/18)
38. Central Liquid Chamber	(C/19)
39. Inclined Side Surface	(C/20)
40. Chassis	(D)
41. Motor	(E)
42. Rotor Shaft	(E/1)

Claims

1. A device for heating a liquid comprising a stationary body member (A) for containing the liquid, and means including a centrifugal energy drum (B) mounted for rotation within said body member (A) and adapted to receive liquid therein and to impart circular rotational movement to that liquid, characterised by a stationary channelled guide disc (C) arranged within said drum (B) and by impeller means on said drum (B) positioned to cooperate with guide means on said channelled guide disc (C) to force liquid into a channel of said disc, and to exert variable pressure effects on the rotating liquid to heat the liquid.

2. A device according to claim 1 characterised by a carburettor channel (C/16) within the channelled guide disc (C) for providing additional air for the liquid mass rotating within the device.

3. A device according to claim 1 or 2 characterised in that said guide means on the disc (C) comprises a multifunction head (C/2) which consists of an inlet neck (C/3), a head base (C/4), and an inclined side surface (C/20) extending from the inlet neck (C/3) to the head base (C/4).

4. A device according to claim 3 characterised in that the multi-function head (C/2) is positioned such that when said drum (B) rotates, the liquid mass rotating within the centrifugal energy drum (B) is separated by said head (C/2) into three separate parts, a central part of which passes through said inlet neck (C/3) to form a ring (C/1) within said disc (C).

5. A device according to claim 4 characterised in that the multi-function head (C/2) has side walls which diverge from the inlet neck (C/3) to the head base (C/4) whereby said other liquid parts are outwardly accelerated towards the head base (C/4) to assist in producing a low pressure region behind the head base (C/4).

6. A device according to any one of claims 3 to 5 characterised in that a plurality of multi-function heads (C/2) is located on the channelled guide disc (C).

7. A device according to any one of claims 1 to 6 characterised in that a tube ring (C/1) is arranged ahead of a pressure channel (C/13) in said disc, this tube ring intersecting suction inlets (C/6) provided in the disc and having a diameter which becomes larger in the direction of the liquid movement and again becomes smaller to form a pressure neck (C/9).

8. A device according to claim 7 characterised in that within the tube ring (C/1) on the channelled guide disc after the pressure neck (C/9) and opposite pressure channel (C/13) is located a tension regulator hole (C/12) for creating a pressure drop.

9. A device according to claim 8 characterised in that downstream of the tension regulator hole (C/12) in the channelled guide disc (C) is arranged a double function orifice (C/14) for feeding liquid in a manner to cause an impact behind newly incoming liquid mass from the centrifugal energy drum (B) to channelled guide disc (C).

10. A device according to any one of claims 1 to 9 characterised in that liquid is directly introduced into the channelled guide disc (C) by means of suction by-passes (C/8).

11. A device according to any one of claims 1 to 10 characterised in that the impeller means are formed by closed fins (B/2) arranged on opposite surfaces of the interior of said centrifugal energy drum (B).

12. A device according to claim 11 characterised in that said closed fins (B/2) arranged in the interior of the centrifugal energy drum (B) each comprise: an inclined side surface (B/5), and a concave rear surface (B/6), the fins being closed at their radially inner side by a closing ring (B/7) extending circumferentially of the drum, and the fins (B/2) being circumferentially spaced by fin spaces (B/8).

13. A device according to claim 11 or 12

characterised in that two sets of closed fins (B/2) are located within the centrifugal energy drum (B) on opposite side walls of said drum (B).

14. An installation comprising a device according to any one of the preceding claims and a driving center (E) to which only the centrifugal energy drum (B) is connected on a rotation axis.

15. A method of heating a liquid comprising providing a body member (A) containing liquid, and providing a centrifugal energy drum (B) containing a portion of said liquid, said drum (B) being mounted for rotation in the body member (A), characterised by providing a channelled guide disc (C) in the liquid in the drum (B), rotating the drum (B), thereby causing the liquid in the drum (B) to rotate, passing a part of the liquid into a channel of said disc (C), and subjecting the liquid to variable pressure effects in order to heat the liquid by virtue of the cooperation of the drum (B) and the channelled guide disc (C).

Patentansprüche

1. Vorrichtung zum Erwärmen einer Flüssigkeit mit einem die Flüssigkeit enthaltenden stationären Körperteil (A) und Mitteln, umfassend eine Zentrifugalenergietrommel (B), die für eine Drehung innerhalb des Körperteils (A) angeordnet und geeignet ist, die Flüssigkeit aufzunehmen und der Flüssigkeit eine kreisförmige Drehbewegung zu verleihen, gekennzeichnet durch eine stationäre, mit Kanälen versehene Führungsscheibe (C), die innerhalb der Trommel (B) angeordnet ist und durch auf der Trommel (B) befindliche Impellermittel, die so angeordnet sind, dass sie mit Führungsmitteln auf der mit Kanälen versehenen Führungsscheibe (C) zusammenwirken, um die Flüssigkeit in einen Kanal der Scheibe zu drücken und auf die sich drehende Flüssigkeit eine variable Druckwirkung auszuüben, um die Flüssigkeit zu erwärmen.

2. Vorrichtung nach Anspruch 1, gekennzeichnet durch einen Vergaserkanal (C/16) innerhalb der mit Kanälen versehenen Führungsscheibe (C) zum Vorsehen von zusätzlicher Luft für die innerhalb der Vorrichtung rotierende Flüssigkeitsmasse.

3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, dass die auf der Scheibe (C) befindlichen Führungsmittel eine Mehrfachfunktionskopf (C/2) umfassen, der aus einem Einlasshals (C/3), einer Kopfbasis (C/4) und einer geneigten Seitenfläche (C/20) besteht, die von dem Einlasshals (C/3) zur Kopfbasis (C/4) veräuft.

4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, dass der Mehrfachfunktionskopf (C/2) so angeordnet ist, dass, wenn sich die Trommel (B) dreht, die innerhalb der Zentrifugalenergietrommel (B) rotierende Flüssigkeitsmasse durch den genannten Kopf (C/2) in drei getrennte Teile aufgeteilt wird, von denen ein mittiger Teil durch den Einlasshals (C/3) verläuft, um innerhalb des Scheibe (C) einen Ring (C/1) zu bilden.

5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, dass der Mehrfachfunktionskopf (C/2) Seitenwände hat, die vom Einlasshals (C/3) zur Kopfbasis (C/4) divergieren, wodurch die genannten anderen Flüssigkeitsteile nach aussen in Richtung auf die Kopfbasis (C/4) beschleunigt werden, um die Erzeugung eines Niedrigdruckbereiches hinter der Kopfbasis (C/4) zu unterstützen.

6. Vorrichtung nach einem der Ansprüche 3 bis 5, dadurch gekennzeichnet, dass eine Vielzahl von Mehrfachfunktionsköpfen (C/2) auf der mit Kanälen versehenen Führungsscheibe (C) angeordnet sind.

7. Vorrichtung nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass ein Rohrring (C/1) vor dem Druckkanal (C/13) in der genannten Scheibe angeordnet ist, dass dieser Rohrring Saugeinlässe (C/6) schneidet, die in der Scheibe vorgesehen sind und einen Durchmesser haben, der in Richtung der Flüssigkeitsbewegung grösser wird und dann wieder kleiner wird, um einen Druckhals (C/9) zu bilden.

8. Vorrichtung nach Anspruch 7, dadurch gekennzeichnet, dass innerhalb des Rohrringes (C/1) auf der mit Kanälen versehenen Führungsscheibe hinter dem Druckhals (C/9) und gegenüber dem Druckkanal (C/13) ein Spannungsregulatorloch (C/12) vorgesehen ist, um einen Druckabfall zu erzeugen.

9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, dass stromab des Spannungsregulatorloches (C/12) in der Kanälen versehenen Führungsscheibe (C) eine Doppelfunktionsöffnung (C/14) angeordnet ist, um die Flüssigkeit so zu führen, dass ein Auftreffen hinter einer Flüssigkeitsmasse erfolgt, die erneut von der Zentrifugalenergietrommel (B) zur mit Kanälen versehenen Führungsscheibe (C) eintritt.

10. Vorrichtung nach einem der Ansprüche 1 bis 9, dadurch gekennzeichnet, dass die Flüssigkeit direkt mittels eines Saug-By-Passes (C/8) in die mit Kanälen versehene Führungsscheibe (C) eingeführt wird.

11. Vorrichtung nach einem der Ansprüche 1 bis 10, dadurch gekennzeichnet, dass die Impellermittel durch geschlossene Flossen oder Schaufeln (B/2) gebildet sind, die an entgegengesetzten Seiten des Inneren der Zentrifugalenergietrommel (B) angeordnet sind.

12. Vorrichtung nach Anspruch 11, dadurch gekennzeichnet, dass die geschlossenen Flossen oder Schaufeln (B/2), die im Inneren der Zentrifugalenergietrommel (B) angeordnet sind, jeweils umfassen: eine geneigte Seitenfläche (B/5) und eine konkave hintere Fläche (B/6), wobei die Flossen oder Schaufeln an ihrer radial innenliegenden Seite durch einen Schliessring (B/7) geschlossen sind, der in Umfangsrichtung der Trommel verläuft, und das die Flossen oder Schaufeln (B/2) in Umfangsrichtung durch die Schaufelräume (B/8) beabstandet sind.

13. Vorrichtung nach Anspruch 11 oder 12, dadurch gekennzeichnet, dass zwei Sätze von geschlossenen Flossen oder Schaufeln (B/2) innerhalb der Zentrifugalenergietrommel (B) an

entgegengesetzten Seitenwänden der Trommel (B) angeordnet sind.

14. Anlage mit einer Vorrichtung entsprechend einem der vorhergehenden Ansprüche und einem Antriebszentrum (E), an dem nur die Zentrifugalenergietrommel (B) auf einer Drehachse angeschlossen ist.

15. Verfahren zum Erwärmen einer Flüssigkeit durch Vorsehen eines die Flüssigkeit enthaltenden Körperteils (A) und durch Vorsehen einer Zentrifugalenergietrommel (B), die einen Teil der Flüssigkeit enthält und für eine Drehung im Körperteil (A) angeordnet ist, gekennzeichnet durch Vorsehen einer mit Kanälen versehenen Führungsscheibe (C) innerhalb der in der Trommel (B) befindlichen Flüssigkeit, durch Drehen der Trommel (B), wodurch die Flüssigkeit in der Trommel (B) in Drehung versetzt wird, Führen eines Teils der Flüssigkeit in einen Kanal der Scheibe (C) durch Aufbringen von variablen Druckwirkungen auf die Flüssigkeit, um die Flüssigkeit aufgrund des Zusammenwirkens der Trommel (B) und der mit Kanälen versehenen Führungsscheibe (C) zu erwärmen.

Revendications

1. Dispositif pour chauffer un liquide comprenant un élément formant corps fixe (A) pour contenir le liquide, et des moyens comprenant un tambour (B) à énergie centrifuge monté de façon à tourner à l'intérieur dudit élément de corps (A) et adapté pour recevoir intérieurement un liquide, et à communiquer un mouvement de rotation circulaire à ce liquide, caractérisé par le fait qu'il comprend un disque de guidage fixe (C) pourvu de canaux et disposé à l'intérieur dudit tambour (B), et sur ledit tambour (B) des moyens placés de façon à coopérer avec les moyens de guidage dudit disque de guidage (C) à canaux pour refouler le liquide dans un canal dudit disque, et exercer des effets de pression variables sur le liquide en rotation afin de chauffer le liquide.

2. Dispositif selon la revendication 1, caractérisé par le fait qu'il comprend un canal formant carburateur (C/16) à l'intérieur du disque de guidage (C) à canaux pour appliquer un supplément d'air à la masse liquide en rotation à l'intérieur du dispositif.

3. Dispositif selon la revendication 1 ou 2, caractérisé par le fait que lesdits moyens de guidage du disque (C) comprennent une tête multi-fonction (C/2) qui comprend un étranglement d'entrée (C3), une base de tête (C/4), et une surface latérale inclinée (C/20) s'étendant depuis ledit étranglement d'entrée (C/3) jusqu'à la base (C/4) de la tête.

4. Dispositif selon la revendication 3, caractérisé par le fait que la tête multi-fonction (C/2) est placée de telle façon qu'au moment où ledit tambour (B) tourne, la masse liquide en rotation à l'intérieur du tambour à énergie centrifuge (B) est séparée par ladite tête (C/2) en trois parties distinctes, dont une partie centrale traverse ledit étranglement d'entrée (C/3) pour former un anneau (C/1) à l'intérieur dudit disque (C).

5. Dispositif selon la revendication 4, caractérisé par le fait que la tête multi-fonction (C/2) possède des parois latérales qui divergent à partir de l'étranglement d'entrée (C/3) vers la base (C/4) de la tête, lesdites autres parties de liquide étant accélérées vers l'extérieur en direction de la base (C/4) de la tête pour contribuer à la création d'une région de basse pression derrière la base (C/4) de la tête.

6. Dispositif selon l'une quelconque des revendications 3 à 5, caractérisé par le fait qu'une pluralité de têtes multi-fonction (C/2) sont situées sur le disque de guidage (C) à canaux.

7. Dispositif selon l'une quelconque des revendications 1 à 6, caractérisé par le fait qu'une bague tubulaire (C/1) est disposée en avant d'un canal de compression (C/13) dudit disque, cette bague tubulaire coupant les entrées d'aspiration (C/6) prévues dans le disque et ayant un diamètre qui s'élargit dans la direction du mouvement du liquide et redevient ensuite plus étroite pour former un étranglement (C/9) de compression.

8. Dispositif selon la revendication 7, caractérisé par le fait qu'à l'intérieur de ladite bague tubulaire (C/1) sur le disque de guidage à canaux, après l'étranglement de compression (C/9) et à l'opposé du canal de compression (C/13), est pratiqué un trou régulateur de tension (C/12) pour créer une baisse de pression.

9. Dispositif selon la revendication 8, caractérisé par le fait qu'en aval du trou régulateur de tension (C/12), dans le disque de guidage (C) à canaux, est disposé un orifice (C/14) à double fonction pour appliquer du liquide d'une manière qui crée un choc derrière la nouvelle masse liquide incidente, du tambour (B) à énergie centrifuge vers le disque de guidage (C) à canaux.

10. Dispositif selon l'une quelconque des revendications 1 à 9, caractérisé par le fait que le liquide est directement introduit dans le disque de guidage (C) à canaux par des dérivations d'aspiration (C/8).

11. Dispositif selon l'une quelconque des revendications 1 à 10, caractérisé par le fait que les moyens appliquant une impulsion sont constitués d'ailettes fermées (B/2) disposées sur les surfaces opposées de l'intérieur dudit tambour à énergie centrifuge (B).

12. Dispositif selon la revendication 11, caractérisé par le fait que lesdites ailettes fermées (B/2) disposées à l'intérieur du tambour à énergie centrifuge (B) comprennent chacune: une surface latérale inclinée (B/5), et une surface arrière concave (B/6), les ailettes étant fermées sur leur côté radialement intérieur par une bague de fermeture (B/7) s'étendant sur le pourtour du tambour, et les ailettes (B/2) étant espacées le long de la circonférence par des espaces (B/8) entre ailettes.

13. Dispositif selon la revendication 11 ou 12, caractérisé par le fait que deux jeux d'ailettes fermées (B/2) sont placés à l'intérieur du tambour

à énergie centrifuge (B) sur les parois latérales opposées dudit tambour (B).

14. Installation comprenant un dispositif selon l'une quelconque des revendications précédentes et un centre d'entraînement (E) auquel seul le tambour à énergie centrifuge (B) est relié sur un axe de rotation.

15. Procédé de chauffage d'un liquide comprenant l'installation d'un élément formant corps (A) contenant un liquide, et l'installation d'un tambour à énergie centrifuge (B) contenant une partie dudit liquide, ledit tambour (B) étant monté de façon à pouvoir tourner à l'intérieur de l'élément (A), caractérisé par le fait qu'il est prévu, à l'intérieur du liquide dudit tambour (B), un disque de guidage (C) comportant des canaux la mise en rotation du tambour (B) en faisant ainsi tourner le liquide contenu dans le tambour (B), la transmission d'une partie du liquide dans un canal dudit disque (C), et l'application au liquide d'effets de pression variable afin de chauffer le liquide grâce à la coopération du tambour (B) et du disque de guidage (C) à canaux.

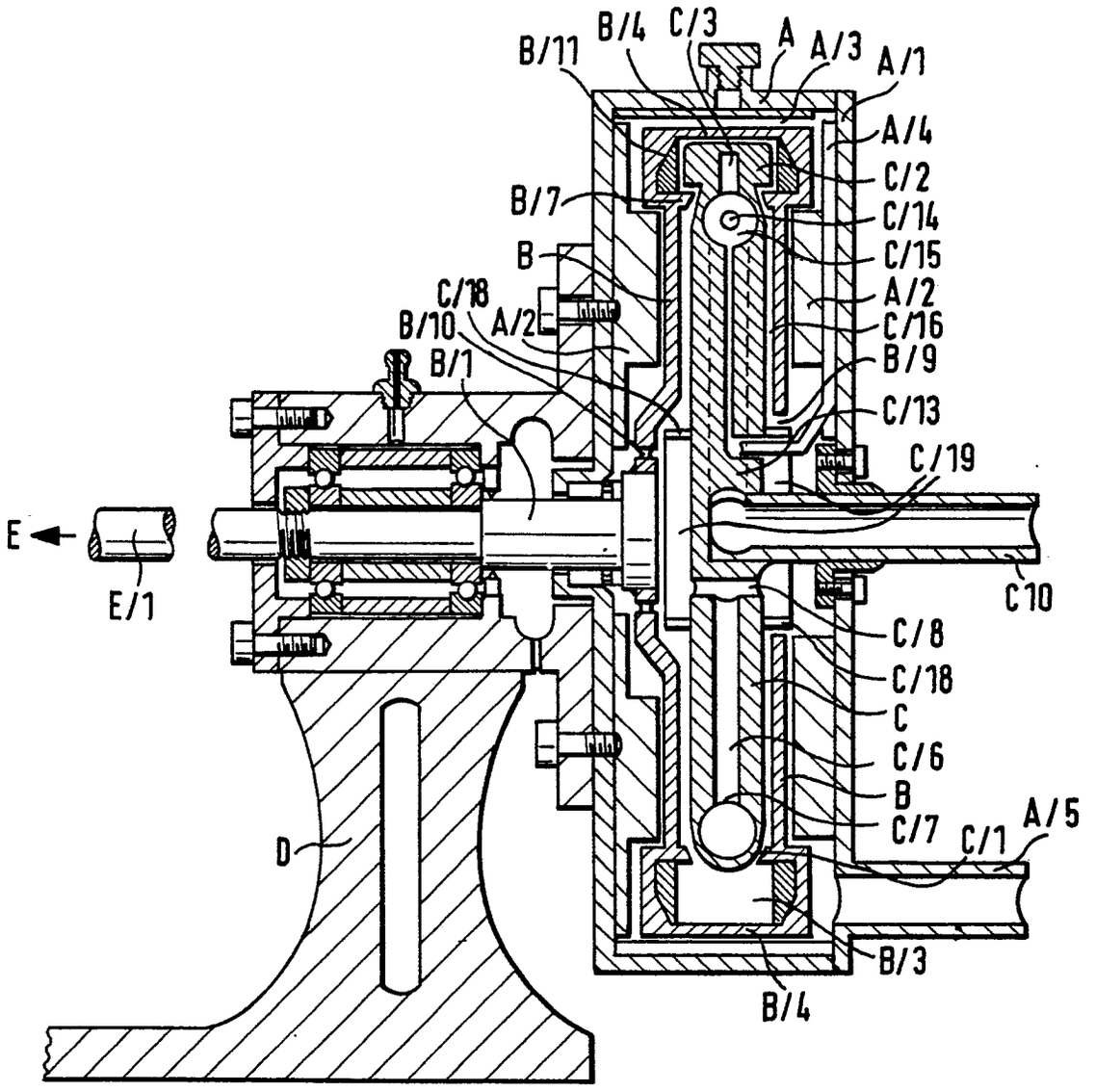

B/11
B/4
C/3
A
A/3
A/1
A/4
C/2
B/7
C/14
B
C/15
C/18
A/2
A/2
B/10
C/16
B/1
B/9
C/13
C/19
E
E/1
C10
C/8
C/18
C
C/6
B
C/7
C/1
A/5
D
B/3
B/4

FIG.1

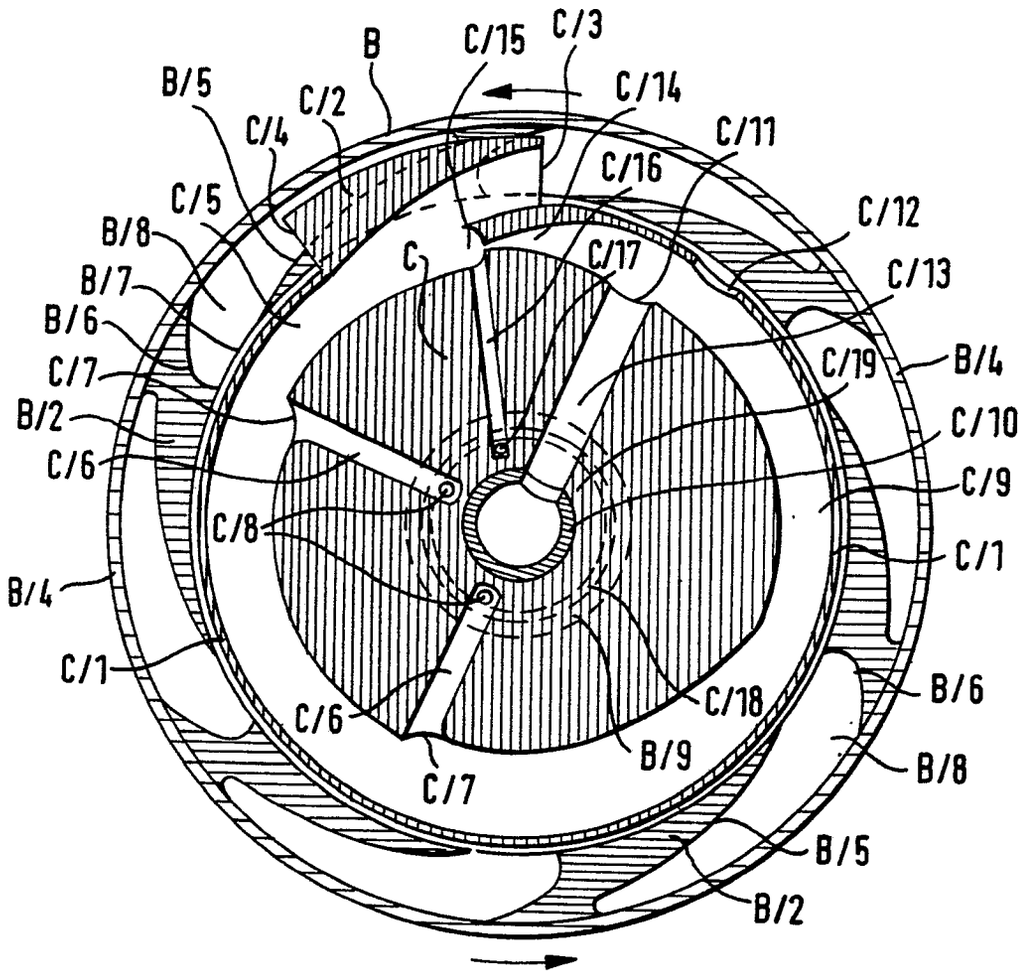

B
C/15
C/3
B/5
C/2
C/14
C/4
C/11
C/16
C/5
C/12
B/8
C
C/17
B/7
C/13
B/6
C/19
B/4
C/7
B/2
C/10
C/6
C/9
C/8
C/1
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C/6
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C/7
B/5
B/2

FIG.2

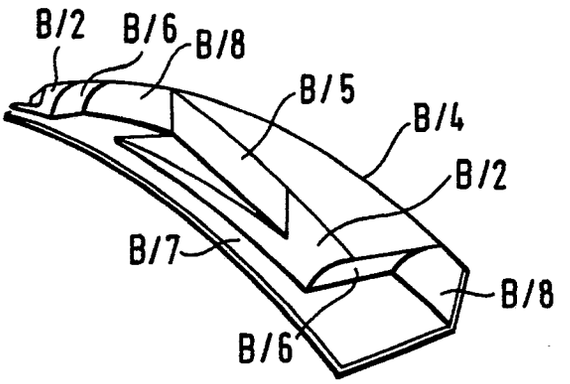


FIG.3

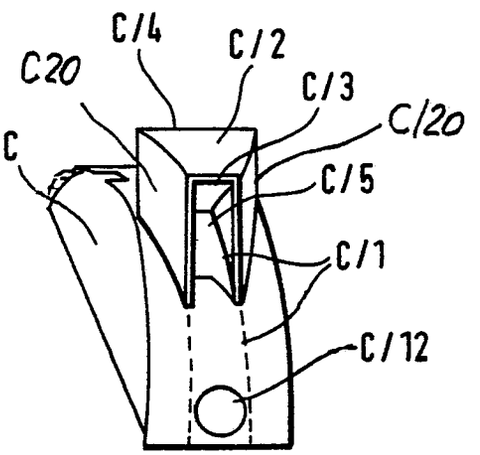


FIG.4