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(54) Titre : PROCÉDE ET APPAREIL DE PULVERISATION DE PLASTIQUE POUR DISPOSITIF DE RETENUE DE ROULEMENT

(54) Title: PLASTIC SPRAYING PROCESS AND EQUIPMENT FOR BEARING RETAINER

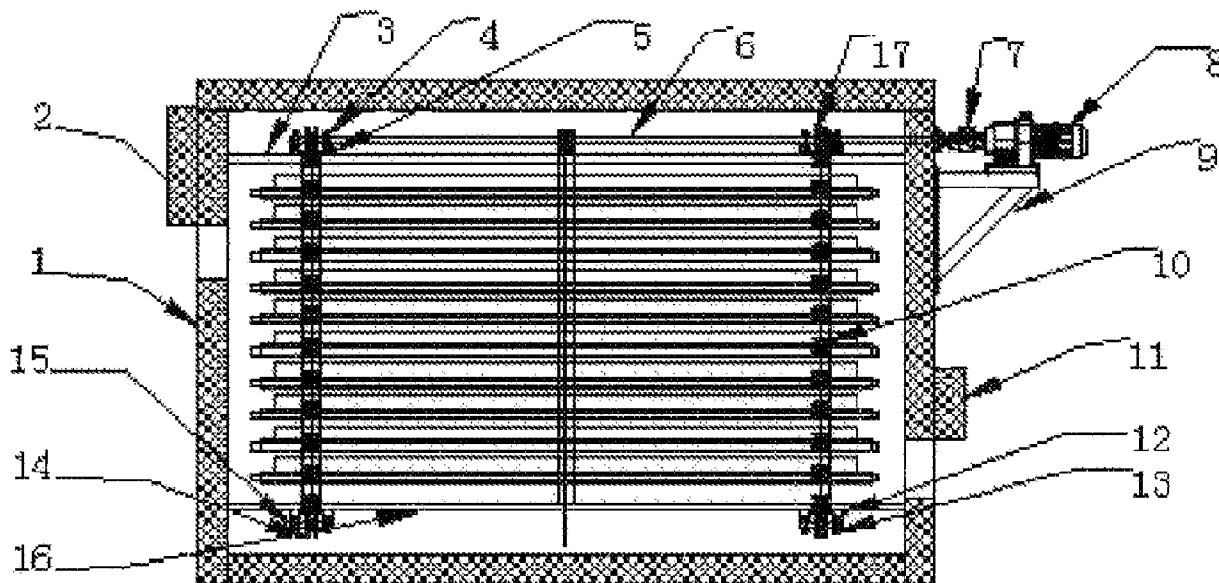


图 1

(57) Abrégé/Abstract:

Disclosed are a plastic spraying process and apparatus for a bearing retainer. The specific steps of the bearing retainer plastic spraying process comprise processes on the bearing retainer, such as pre-processing, plastic spraying, heating and curing, and cooling. The apparatus used by the present invention comprises a heating furnace device and a plastic spraying device, wherein

(57) **Abrégé(suite)/Abstract(continued):**

the heating furnace device comprises a lifting device and a tray for fixing workpieces, and a fixing piece provided on the lifting device can fit with a detachable piece on the tray to fix the tray. A bearing retainer that has undergone plastic spraying has markedly improved wear-resistance and service life, etc., making the bearing retainer have an excellent shock-absorption performance.

Abstract

The present invention discloses a plastic spraying process and equipment for bearing retainer. The specific steps of the plastic spraying process comprise pretreatment of the bearing retainer, plastic spraying treatment, heat-curing
5 treatment, cooling treatment, etc. The equipment used by the invention includes a heating furnace and a plastic spraying device. The heating furnace includes a device of vertical circulation and a tray for fixing a workpiece. A fixing member provided on the device of vertical circulation can fit with a detachable member
10 provided on the tray to fix the tray. A bearing retainer which has undergone plastic spraying has markedly improved wear-resistance and working life, etc., making the bearing retainer has an excellent shock-absorption performance.

PLASTIC SPRAYING PROCESS AND EQUIPMENT FOR BEARING RETAINER

Technical Field

5 The invention relates to processing technology for bearing retainer, especially relates to a plastic spraying process for bearing retainer.

Background Technology

10 The bearing retainer is one of the important components in the bearing. The bearing retainer is used to guide the normal operation of the rolling elements during the running of the bearing. The conventional processing technology of the bearing retainer in the prior art is sheet metal or strip metal--shearing--punching--press forming--shaping and finishing. The finishing refers to a process of trimming the bearing retainer to remove the burrs on the surface of the bearing
15 retainer. The prior art does not perform any treatment on the bearing retainer after the bearing retainer is shaped and finished. The bearing retainer is subjected to the impact and abrasion of the rolling elements during the operation of the bearing, and noise is generated. And the bearing retainer is damaged by corrosion and rusting due to its special working environment.

20 The plastic spraying process has an enormous application range in the prior art, such as automobile industry, mechanical manufacturing field and so on. The corrosion resistance and abrasion resistance of the workpiece will be improved significantly after the plastic spraying process.

25 However, the plastic spraying process is not used in the processing of the bearing retainer in the prior art. The existing bearing retainer usually only relies on its own material and structure to change its performance. And the corrosion resistance, the abrasion resistance and other properties are far from being used,

which affects the service life of the bearing seriously.

Summary of the Invention

The present invention utilizes the characteristics that the workpiece will have excellent properties after being processed by the plastic spraying process. The present invention applies a plastic spraying process to the bearing retainer in combination with the actual working conditions of the bearing retainer to solve the problems of poor abrasion resistance, high noise, poor corrosion resistance, poor impact resistance, etc. of the existing bearing retainer.

The summary of the invention is: plastic spraying process for bearing retainer, using a plastic spraying process to treat a bearing retainer which has been processed by a conventional processing technology. The invention has the advantages of improving the wear resistance of the bearing retainer, reducing the noise caused by the impact between the rolling elements and the bearing retainer, improving the corrosion resistance of the bearing retainer, and providing cushioning effect for collision between the rolling elements and the bearing retainer.

The present invention makes specific improvements to the above technical solutions, and the specific improvements are the plastic spraying process for bearing retainer comprises the following process steps:

step 1: pretreatment to the bearing retainer: carrying out rust removal and decontamination treatment on the bearing retainer;

step 2: plastic spraying treatment on the bearing retainer: putting the bearing retainer treated in the step 1 into a plastic spraying device to carry out plastic spraying treatment on the bearing retainer, a thickness of the coating obtained by the spraying treatment is no less than 10 microns;

step 3: heat-curing treatment on the bearing retainer: putting the bearing retainer treated in the step 2 into a heating furnace for heating and curing, a heating

temperature is not lower than 80 °C, and a heating time period is no less than 5 minutes;

step 4: cooling treatment on the bearing retainer: cooling the bearing retainer down after taking the bearing retainer treated in the step 3 out of the heating furnace, and a cooling temperature is not higher than 80 °C.

The invention has the following advantages: pretreatment of the bearing retainer to remove the dirt on the surface of the bearing retainer; and then spray the bearing retainer with a plastic spraying device; after the plastic spraying process is completed, put it into a heating furnace for heating and curing; and finally, the bearing retainer is cooled and packaged, and the plastic spraying process for bearing retainer is completed.

The present invention makes specific improvement to the above technical solutions, and the specific improvement is a shot blasting machine is used to perform the rust removal treatment on the bearing retainer in the step 1. The invention has the following advantages: it can remove the dirt on the surface of the bearing retainer after the bearing retainer is rust-removed, thereby facilitating the subsequent plastic spraying treatment on the bearing retainer.

The present invention makes specific improvement to the above technical solutions, and the specific improvement is the thickness of the coating obtained by the plastic spraying treatment in the step 2 is from 30 microns to 300 microns.

The present invention makes specific improvements to the above technical solutions, and the specific improvements are the heating furnace used in the step 3 includes a furnace body, a device of vertical circulation is fixedly disposed in the furnace body, and a fixing member is provided on the device of vertical circulation, a tray is horizontally placed in the furnace body, and the tray is provided with a detachable member, the detachable member provided on the tray is so adapted as to be able to be mounted on the fixing member provided on the

device of vertical circulation, a feed port is provided on a left side of the furnace body, and a discharge port is provided on a right side of the furnace body, and the feed port and the discharge port are not arranged on a same horizontal line. The invention has the following advantages: the bearing retainer can move vertically
5 in the heating furnace and be uniformly heated after the bearing retainer is put into the heating furnace. The feed port and the discharge port are arranged on a different horizontal line, which can prevent air convection effectively, avoid heat losses in the heating furnace, and keep the temperature in the furnace stable. The design of the heating furnace makes it to take up small space, require a low-cost
10 investment and have a low energy consumption.

The present invention makes specific improvements to the above technical solutions, and the specific improvements are the temperature of the heat-curing treatment in the step 3 is from 100 °C to 300 °C, and the time of the heat-curing treatment is from 10 minutes to 20 minutes. The invention has the following
15 advantages: the sprayed material can be stabilized on the bearing retainer through heat-curing treatment after the plastic spraying treatment on the bearing retainer is completed.

The present invention makes specific improvement to the above technical solutions, and the specific improvement is the bearing retainer is cooled to 80 °C
20 in the step 4.

The present invention also provides an apparatus for processing plastic spraying on a bearing retainer, the apparatus comprises a heating furnace and a plastic spraying device, the heating furnace includes a furnace body, a device of vertical circulation is fixedly disposed in the furnace body, and a fixing member
25 is provided on the device of vertical circulation, a tray is horizontally placed in the furnace body, and the tray is provided with a detachable member, the detachable member provided on the tray is so adapted as to be able to be mounted

on the fixing member provided on the device of vertical circulation. The invention has the following advantages: the bearing retainer can move vertically in the heating furnace and be uniformly heated after the bearing retainer is put into the heating furnace. The design of the heating furnace makes it to take up small space,
 5 require a low-cost investment and have a low energy consumption.

The present invention makes specific improvements to the above technical solutions, and the specific improvements are a feed port is provided on a left side of the furnace body, and a discharge port is provided on a right side of the furnace body, and the feed port and the discharge port are not aligned on a same horizontal
 10 line. The feed port and the discharge port are arranged on a different horizontal line, which can prevent air convection effectively, avoid heat losses in the heating furnace, and keep the temperature in the furnace stable.

Brief Description of the Drawings

15 FIG. 1 shows a schematic structural diagram of a heating furnace of the present invention.

FIG. 2 shows a schematic structural diagram of a chain in a heating furnace of the present invention.

20 FIG. 3 shows a schematic structural diagram of a chain and a tray cooperated with installation in a heating furnace of the present invention.

FIG. 4 shows a schematic structural diagram of a tray in a heating furnace of the present invention.

1 refers to a furnace body, 2 refers to a feed automatic door, 3 refers to a fixation rod I, 4 refers to a bearing, 5 refers to a fixed base for bearing, 6 refers to a rotating shaft, 7 refers to a coupling, 8 refers to a motor, 9 refers to a motor
 25 support frame, 10 refers to a device of vertical circulation, 11 refers to a discharge automatic door, 12 refers to a fixed base for bearing, 13 refers to a bearing, 14

refers to a sprocket II, 15 refers to a rotating shaft, 16 refers to a fixation rod II, 17 refers to a sprocket I, 18 refers to a tray, 19 refers to a fixing member, 20 refers to a detachable member.

5 Detailed Description

The present invention is further described in detail in the following specific embodiments.

Use a plastic spraying process to treat a bearing retainer which has been processed by a conventional processing technology. The plastic spraying process
 10 for bearing retainer comprises the following process steps: firstly, preprocess the bearing retainer to remove the dirt on the surface of the bearing retainer; secondly, put the bearing retainer treated by the pretreatment into a plastic spraying device to carry out plastic spraying treatment on the bearing retainer, a thickness of the coating obtained by the spraying treatment is no less than 10 microns; and then
 15 put the bearing retainer treated by plastic spraying technology into a heating furnace for heating and curing treatment, a heating temperature is not lower than 100 °C, and a heating time period is no less than 5 minutes; finally, cool the bearing retainer down after taking the bearing retainer treated by heat-curing technology out of the heating furnace, and a cooling temperature is not higher than
 20 120 °C.

The heating furnace used in the above heat-curing technology includes a furnace body 1, a device of vertical circulation 10 is fixedly disposed in the furnace body 1, and a fixing member 19 is provided on the device of vertical circulation 10, a tray 18 is horizontally placed in the furnace body 1, and the tray
 25 18 is provided with a detachable member 20, the detachable member 20 provided on the tray 18 is so adapted as to be able to be mounted on the fixing member 19 provided on the device of vertical circulation 10, a feed port is provided on a left

side of the furnace body, and a discharge port is provided on a right side of the furnace body, and the feed port and the discharge port are not arranged on a same horizontal line.

Specifically, the heating furnace includes a furnace body 1, a fixation rod I 3 is provided on an upper interior part of the furnace body 1, and the fixation rod I 3 is horizontally mounted between the left inner wall and the right inner wall of the furnace body 1. The fixation rod I 3 is provided with a fixed base for bearing 5, and the fixed base for bearing 5 is installed with a bearing 4. A rotating shaft 6 penetrates the bearing 4 and is horizontally installed in the furnace body 1. The rotating shaft 6 is connected to a motor 8 through a coupling 7. Both the left side and the right side of the rotating shaft 6 are fixed with a sprocket I 17. The furnace body is provided with a chain 10 and the chain 10 is vertically arranged in the furnace body. The chain 10 is mounted on the sprocket I 17, and the chain is provided with a buckle hole. A sprocket II 14 matching with a chain is arranged on a lower interior part of the furnace body. The sprocket II 14 is fixed on a rotating shaft 15 and the rotating shaft 15 penetrates a bearing 13 and is horizontally arranged in the furnace body 1. The bearing 13 is mounted on a fixed base for bearing 12. The fixed base for bearing 12 is mounted on a fixation rod II 16. The fixation rod II 16 is horizontally mounted between the left inner wall and the right inner wall of the furnace body 1. A feed port 2 is provided on a left side of the furnace body, and a discharge port 11 is provided on a right side of the furnace body 1, and the feed port 2 and the discharge port 11 are not arranged on a same horizontal line.

A pushing device transports the tray 18 into the heating furnace, and the bearing retainer enters the heating furnace together with the tray 18 in the process of concrete operation usage. The tray 18 is fixed in the buckle hole on the chain through the slot on the left end and right end of the tray. The tray 18

drives the bearing retainer to move with the chain in the heating furnace, so that the bearing retainer can be uniformly heated. The bearing retainer moves unidirectionally from the top of the heating furnace to the bottom of the heating furnace after it is put into the heating furnace from the feed port. The tray is pulled
 5 out of the heating furnace by using the pushing device when the bearing retainer moves to the discharge port.

Detailed description 1

Plastic spraying process for 6302-type deep groove ball bearing retainer, which comprises the following process steps:

10 step 1: processing on the bearing retainer: sheet metal or strip metal--shearing--punching--press forming--shaping and finishing. The finishing refers to a process of trimming the bearing retainer to remove the burrs on the surface of the bearing retainer.

step 2: pretreatment to the bearing retainer: remove the dirt on the surface of
 15 the bearing retainer by using a shoot blasting machine when the shaping and finishing treatment on the bearing retainer is over.

step 3: plastic spraying treatment on the bearing retainer: put the bearing retainer into a plastic spraying device to carry out plastic spraying treatment on the bearing retainer, and the surface of the bearing retainer is evenly coated with
 20 a coating having a thickness of 50 microns after the plastic spraying treatment.

step 4: heat-curing treatment on the bearing retainer: put the bearing retainer with a uniform coating into a heating furnace for heating and curing, a heating temperature is 180 °C, and a heating time is 10 minutes.

step 5: take the bearing retainer out of the heating furnace when the plastic
 25 spraying treatment is completed, and cool the bearing retainer down to 80 °C in the air.

After the plastic spraying treatment, the 6302-type deep groove ball bearing

retainer has a coating thickness of 50 microns on the surface and a coating density of 0.98 grams per cubic centimeter. Compared with bearing retainers treated by conventional processing technology, the wear rate of the bearing retainers treated by plastic spraying technology has decreased by about 50%, and its working life
5 has been extended by about 10 years. And the bearing retainer treated by the plastic spraying technology has a good seismic behavior.

Detailed description 2

Plastic spraying process for 51109-type thrust bearing retainer, which comprises the following process steps:

10 step 1: processing on the bearing retainer: sheet metal or strip metal--shearing--punching--press forming--shaping and finishing.

step 2: pretreatment to the bearing retainer: remove the dirt on the surface of the bearing retainer by using a shoot blasting machine when the shaping and finishing treatment on the bearing retainer is over.

15 step 3: plastic spraying treatment on the bearing retainer: put the bearing retainer into a plastic spraying device to carry out plastic spraying treatment on the bearing retainer, and the surface of the bearing retainer is evenly coated with a coating having a thickness of 80 microns after the plastic spraying treatment.

step 4: heat-curing treatment on the bearing retainer: put the bearing retainer
20 with a uniform coating into a heating furnace for heating and curing, a heating temperature is 200 °C, and a heating time is 15 minutes.

step 5: take the bearing retainer out of the heating furnace when the plastic spraying treatment is completed, and cool the bearing retainer down to 80 °C in the air.

25 After the plastic spraying treatment, the 51109-type thrust bearing retainer has a coating thickness of 80 microns on the surface and a coating density of 0.98 grams per cubic centimeter. Compared with bearing retainers treated by

conventional processing technology, the wear rate of the bearing retainers treated by plastic spraying technology has decreased by about 50%, and its working life has been extended by about 10 years. And the bearing retainer treated by the plastic spraying technology has a good seismic behavior.

- 5 The above description is only the embodiment of the present application and is not intended to limit the application. Various changes and modifications can be made to the present application by those skilled in the art. Any modifications, equivalents, improvements, etc. made within the spirit and scope of the present application are intended to be included within the scope of the claims.

What is claimed is:

1. Plastic spraying process for bearing retainer, wherein using a plastic spraying process to treat a bearing retainer which has been processed by a conventional processing technology.

5 2. Plastic spraying process for bearing retainer according to claim 1, wherein the process comprising the following process steps:

step 1: pretreatment to the bearing retainer: carrying out rust removal and decontamination treatment on the bearing retainer;

step 2: plastic spraying treatment on the bearing retainer: putting the bearing retainer treated in the step 1 into a plastic spraying device to carry out plastic spraying treatment on the bearing retainer, a thickness of the coating obtained by the spraying treatment is no less than 10 microns;

step 3: heat-curing treatment on the bearing retainer: putting the bearing retainer treated in the step 2 into a heating furnace for heating and curing, a heating temperature is not lower than 80 °C, and a heating period is no less than 5 minutes;

step 4: cooling treatment on the bearing retainer: cooling the bearing retainer down after taking the bearing retainer treated in the step 3 out of the heating furnace, and a cooling temperature is not higher than 80 °C.

3. Plastic spraying process for bearing retainer according to claim 2, wherein a shot blasting machine is used to perform the rust removal treatment on the bearing retainer in the step 1.

4. Plastic spraying process for bearing retainer according to claim 2, wherein the thickness of the coating obtained by the plastic spraying treatment in the step 2 is from 30 microns to 300 microns.

25 5. Plastic spraying process for bearing retainer according to claim 2, wherein the heating furnace used in the step 3 includes a furnace body, a device of vertical circulation is fixedly disposed in the furnace body, and a fixing member is

provided on the device of vertical circulation, a tray is horizontally placed in the furnace body, and the tray is provided with a detachable member, the detachable member provided on the tray is so adapted as to be able to be mounted on the fixing member provided on the device of vertical circulation, a feed port is provided on a left side of the furnace body, and a discharge port is provided on a right side of the furnace body, and the feed port and the discharge port are not arranged on a same horizontal line.

6. Plastic spraying process for bearing retainer according to claim 2, wherein the temperature of the heat-curing treatment in the step 3 is from 100 °C to 300 °C, and the time of the heat-curing treatment is from 10 minutes to 20 minutes.

7. Plastic spraying process for bearing retainer according to claim 2, wherein the bearing retainer is cooled to 80 °C in the step 4.

8. An apparatus for processing plastic spraying on a bearing retainer, comprising a heating furnace and a plastic spraying device, wherein the heating furnace includes a furnace body, a device of vertical circulation is fixedly disposed in the furnace body, and a fixing member is provided on the device of vertical circulation, a tray is horizontally placed in the furnace body, and the tray is provided with a detachable member, the detachable member provided on the tray is so adapted as to be able to be mounted on the fixing member provided on the device of vertical circulation.

9. An apparatus for processing plastic spraying on a bearing retainer according to claim 8, a feed port is provided on a left side of the furnace body, and a discharge port is provided on a right side of the furnace body, and the feed port and the discharge port are not arranged on a same horizontal line.

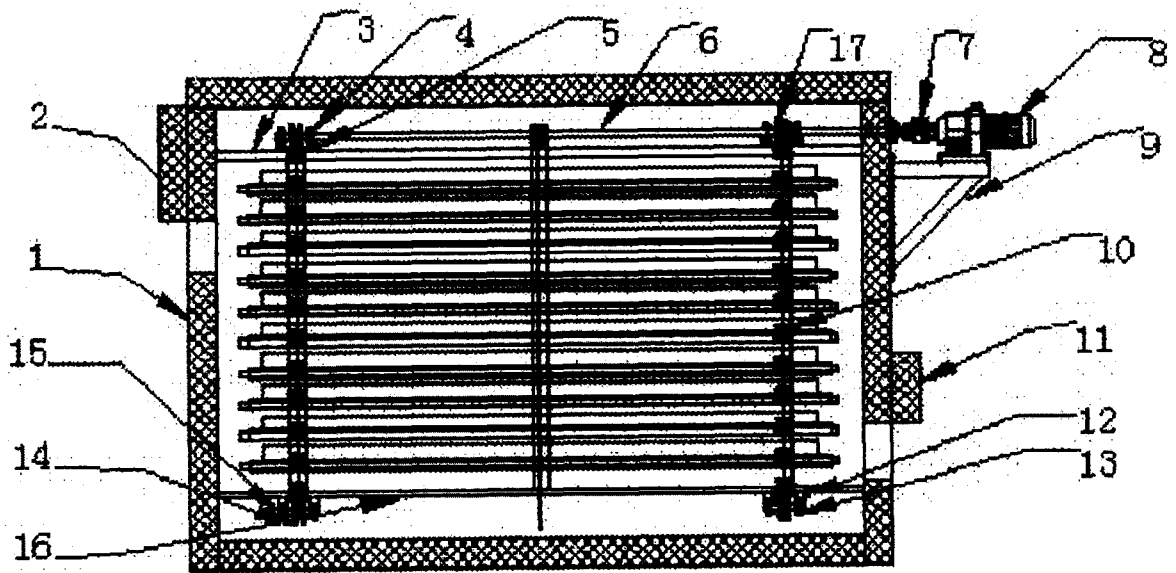


FIG. 1

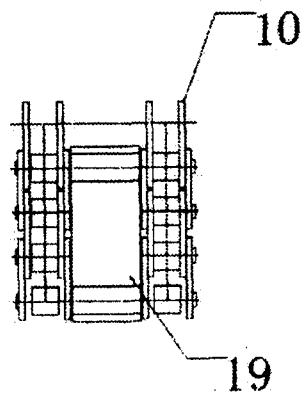


FIG. 2

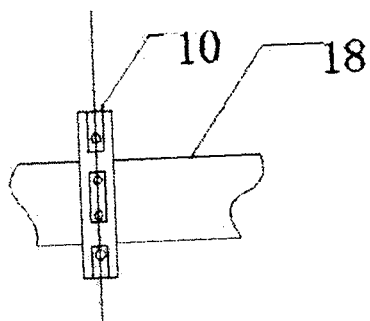


FIG.3

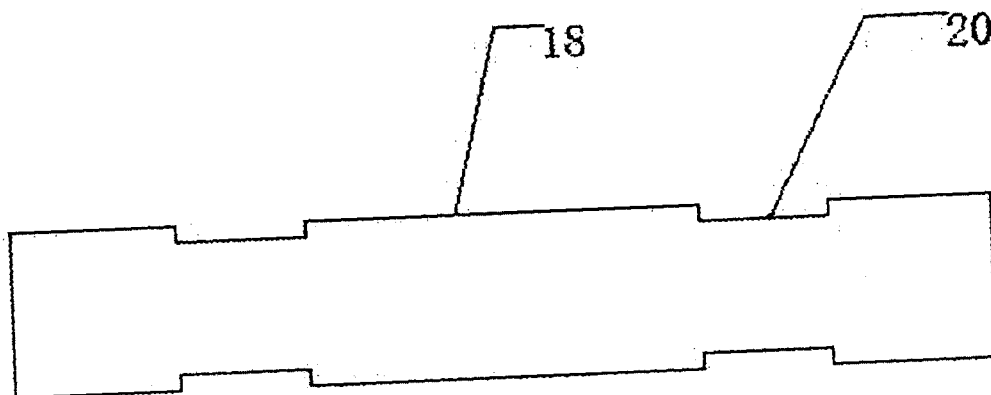


FIG.4

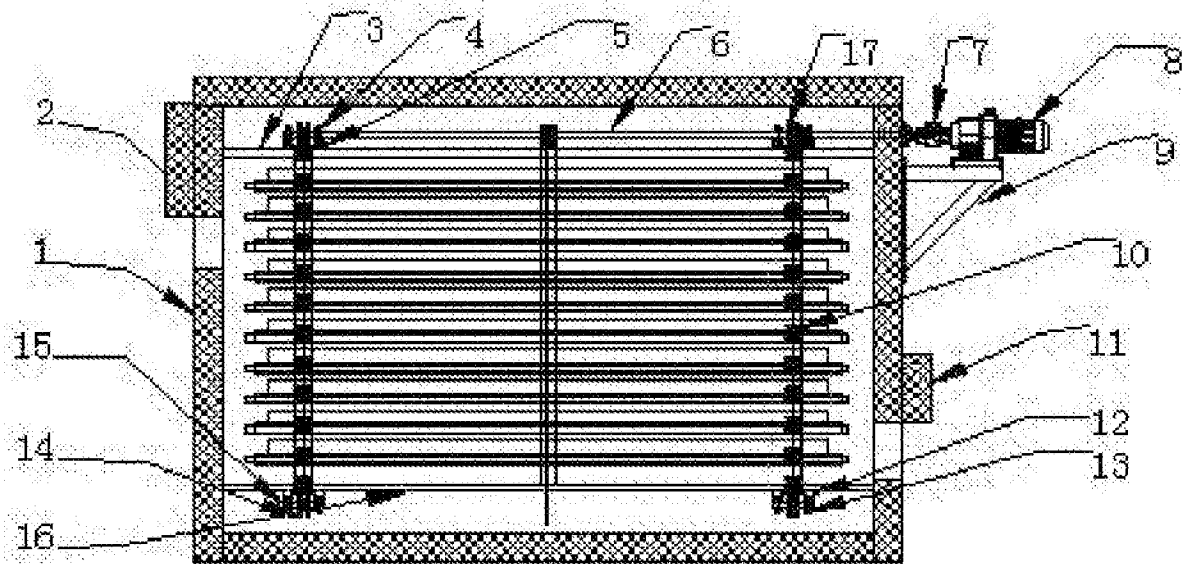


图 1