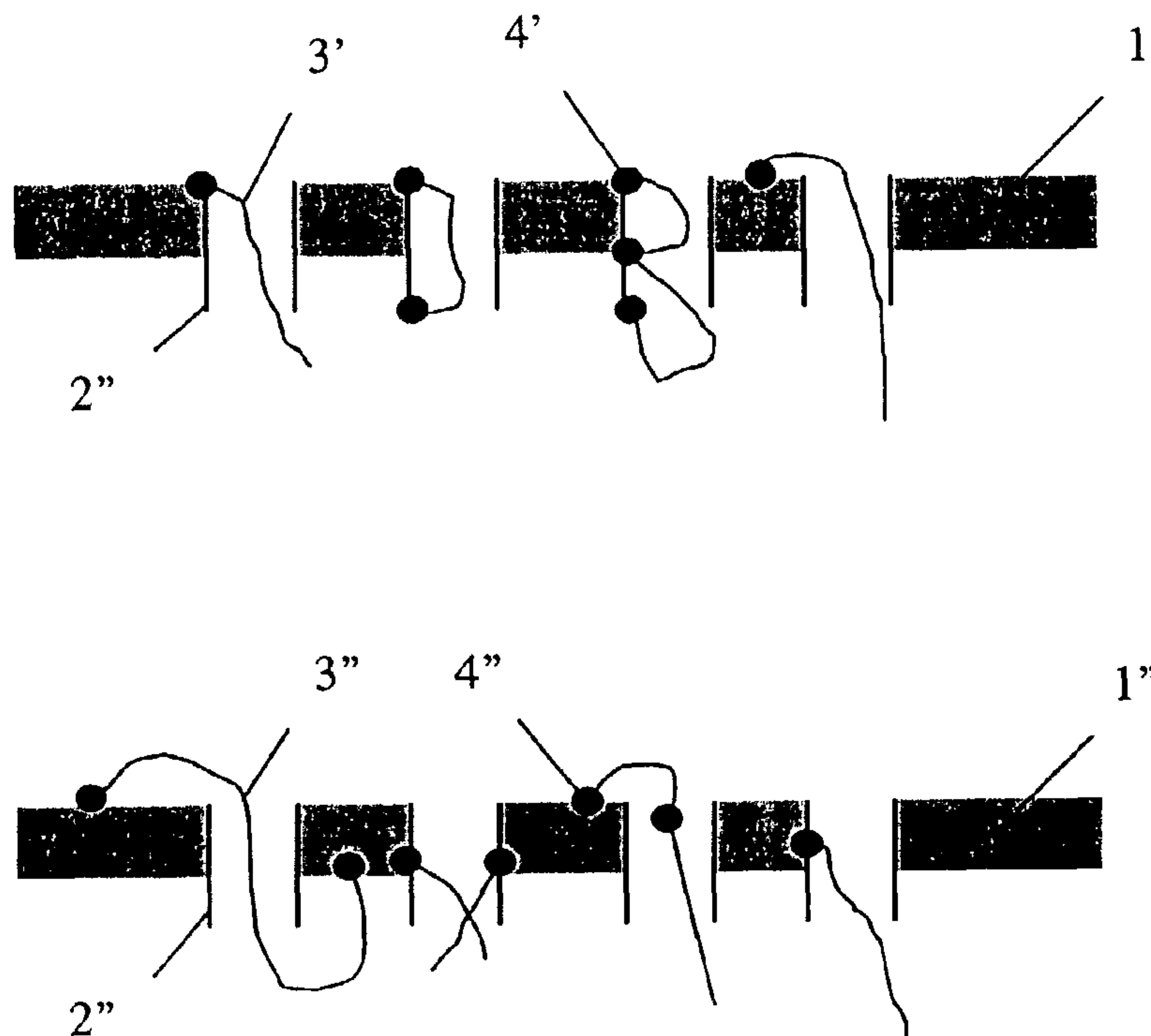




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 (71) Demandeurs/Applicants:
VOEST-ALPINE INDUSTRIEANLAGENBAU GMBH &
CO., AT;
POHANG IRON & STEEL CO., LTD., KR;
RESEARCH INSTITUTE OF INDUSTRIAL SCIENCE &
TECHNOLOGY INCORPORATED FOUNDATION,
KR
 (72) Inventeur/Inventor:
HAUZENBERGER, FRANZ, AT
 (74) Agent: OGILVY RENAULT

(54) Titre : FOND DE DISTRIBUTION SERVANT A DISTRIBUER UN GAZ CHARGE DE PARTICULES SOLIDES
 (54) Title: DISTRIBUTOR BASE FOR DISTRIBUTING A GAS WHICH IS LADEN WITH FINE SOLIDS PARTICLES



(57) Abrégé/Abstract:

The invention relates to a distributor bottom (1), especially a nozzle distributor bottom, for the distribution of a gas charged with solid particles, preferably used in a fluidised bed unit, especially for the reduction of solid particles containing metal oxide. At least one moveable cleaning device is arranged on the distribution bottom, enabling the formation of deposits on the distributor bottom, especially on the nozzles of the distributor bottom to be reduced during operation of said distributor bottom, and enabling deposits already formed thereon to be at least partially removed. The cleaning device is provided with a means (3) for cleaning the distributor bottom by means of a directly mechanical, especially beating effect on the distributor bottom, especially the nozzles of a nozzle distributor bottom. The invention also relates to a method for reducing the formation of deposits and/or at least partial removal of deposits on a distributor bottom.

Abstract

The invention relates to a distributor base 1, in particular nozzle distributor base, for distributing a gas which is laden with fine solids particles, preferably for use in a fluidized-bed unit, in particular for the reduction of metal oxide-containing solids particles, at least one movable cleaning device being arranged on the distributor base, which makes it possible to reduce the formation of deposits on the distributor base, in particular on the nozzles of a nozzle distributor base, while the distributor base is operating and/or to at least partially remove deposits which have already formed. In this distributor base, the cleaning device has a means 3 for cleaning the distributor base by means of a direct mechanical, in particular striking, action on the distributor base, in particular on the nozzles of a nozzle distributor base. The invention also relates to a method for reducing the formation of deposits and/or for at least partially removing deposits on a distributor base.

Fig. 1

Distributor base for distributing a gas which is laden
with fine solids particles

The invention relates to a distributor base, in particular nozzle distributor base, for distributing a gas which is laden with fine solids particles, preferably for use in a fluidized-bed unit, in particular for the reduction of metal oxide-containing solids particles, at least one movable cleaning device being arranged on the distributor base, which makes it possible to reduce the formation of deposits on the distributor base, in particular on the nozzles of a nozzle distributor base, while the distributor base is operating and/or to at least partially remove deposits which have already formed. The invention also relates to a method for reducing the formation of deposits and/or for at least partially removing deposits on a distributor base.

The person skilled in the art already knows how to remove deposits from a nozzle distributor base by means of a movable cleaning device from publication EP 0 444 614 A2. The installation and method taught by that document have proven complex in practice and require high levels of technical and financial outlay.

Therefore, it is an object of the present invention to further develop an apparatus in accordance with the preamble of claim 1 and also a method in accordance with the preamble of claim 5, so that it is possible to realize an economical and reliable method and a corresponding apparatus.

According to the invention, this object is achieved, in terms of the apparatus according to the invention, by means of the characterizing clause of claim 1, and with regard to the method according to the invention, by means of the characterizing clause of claim 5.

- 2 -

Simple and expedient cleaning of the nozzle distributor base is ensured by the fact that the cleaning device has a means for cleaning the distributor base by means of a direct mechanical, in particular striking, action on the distributor base, in particular on the nozzles of a nozzle distributor base.

According to one particular embodiment of the apparatus according to the invention, the means for cleaning the distributor base is designed in such a manner that the means for cleaning the distributor base absorbs a kinetic energy which is sufficient to achieve the cleaning action from the flow of the gas.

According to a particular embodiment of the apparatus according to the invention, the means for cleaning the distributor base is a rope and/or a chain and/or a movably mounted rod.

According to a particular embodiment of the apparatus according to the invention, the means for cleaning the distributor base is arranged on the distributor base, in particular in at least one of the nozzles of the distributor base.

According to one particular embodiment of the apparatus according to the invention, the cleaning device is present for at least one nozzle and may be secured in the nozzle and/or on the distributor base and/or elsewhere in the fluidized-bed unit.

According to one particular embodiment of the apparatus according to the invention, the cleaning device is secured next to and/or in and/or above and/or below the nozzle.

According to one particular embodiment, the invention is characterized by a nozzle distributor base for distributing a gas which is laden with fine solids

- 3 -

particles, preferably for use in a fluidized-bed unit for the reduction of metal oxide-containing solids particles, at least one movable cleaning device being arranged on the nozzle distributor base, which makes it possible to reduce the formation of deposits in the nozzles and/or on the distributor base and/or to at least partially remove deposits which have already formed, in which case the cleaning device is a rope and/or a chain and/or a movably mounted rod arranged, for example, on the nozzle distributor base and/or in the nozzle itself, for at least one of the nozzles.

Furthermore, the invention is characterized by a method as described in claim 5.

According to one particular embodiment of the method according to the invention, the cleaning device is supplied with sufficient kinetic energy to achieve the cleaning action by the flow of the gas.

According to one particular embodiment of the method according to the invention, the nozzle distributor base is made to vibrate by the cleaning device.

According to one particular embodiment of the method according to the invention, the cleaning device is at least partially arranged, in particular secured, in at least one of the nozzles of the distributor base.

Nozzles of gas distributor bases, as are used, for example, in fluidized-bed technology, which have a dust-laden gas flowing to them, tend to become blocked as a result of caking of the dust entrained by the gas. This entails high maintenance costs for cleaning the nozzles.

Therefore, according to one particular embodiment of the invention, one or more chains, ropes or movably mounted rods, for example rods which are secured by a

- 4 -

chain and/or a rope, or similar items are secured in the nozzle and/or above the nozzle and/or below the nozzle and/or next to the nozzle. The objects are set in motion by the turbulence of the flowing gas and
5 knock adhering particles off the nozzles or make the nozzles vibrate, so that adhering particles flake off and/or the caking phenomenon is reduced.

Various embodiments of the subject matter of the
10 invention are illustrated on the basis of a number of non-limiting, diagrammatic drawings, in which:

Fig. 1 diagrammatically depicts a nozzle distributor
base,

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Fig. 2 shows a fluidized-bed unit with a nozzle distributor base,

Fig. 3 shows various further embodiments which can be
20 used to form a distributor base in accordance with the invention.

Fig. 1 illustrates a nozzle distributor base 1 which has a number of nozzles 2. Cleaning devices, in
25 particular chains 3, are arranged on the nozzle distributor base, fixed to the nozzle distributor base at suitable securing points 4. The flow 5 moves the chains 3, so that they strike the nozzle distributor base 1 and/or the nozzles 2. This mechanical action
30 removes caked deposits from the nozzle distributor base 1. According to an additional embodiment of the invention, the nozzle distributor base is made to vibrate by the cleaning devices, so that caking is further reduced. For the sake of simplicity, Fig. 1
35 only illustrates cleaning devices at selected nozzles. The cleaning device can be secured to the nozzle distributor base in any desired way.

Fig. 2 once again shows the nozzle distributor base 1,

- 5 -

in this case in a fluidized-bed unit 6, for example for
the reduction of iron ore in fine-particle form.
Beneath the nozzle distributor base 1 there is a blast
chamber 7, through which the reaction gas is introduced
5 via a gas feed line 8. After the reaction has taken
place in the reaction chamber, the gas is discharged
again from the fluidized-bed unit via a discharge line
9. Furthermore, the charge material in solid form is
fed to the fluidized-bed unit via a feed line 10 and is
10 discharged again via a discharge line 11.

Finally, Fig. 3 shows various further exemplary
embodiments for realizing distributor bases, which may
in addition be combined with one another.

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This figure shows a detailed illustration of various
forms of attaching, in particular securing 4' or 4'',
means 3' or 3'' for cleaning a distributor base to a
distributor base 1' or 1'', in particular to the
20 nozzles 2' or 2'' of a distributor base.

10-24-2003

EP0301279

- 6 -

Patent Claims:

1. A distributor base (1), in particular nozzle distributor base, for distributing a gas which is laden with fine solids particles, preferably for use in a fluidized-bed unit, for the reduction of metal oxide-containing solids particles, at least one movable cleaning device being arranged on the distributor base (1), which makes it possible to reduce the formation of deposits on the distributor base, in particular on the nozzles (2) of the nozzle distributor base, while the distributor base is operating and/or to at least partially remove deposits which have already formed, characterized in that the cleaning device has a means (3) for cleaning the distributor base and its openings by means of a direct mechanical, striking action on the distributor base and its openings, in particular on the nozzles of the nozzle distributor base.
2. The distributor base as claimed in claim 1, characterized in that the means (3) for cleaning the distributor base is designed in such a manner that the means for cleaning the distributor base absorbs a kinetic energy which is sufficient to achieve the cleaning action in the flow of the gas.
3. The distributor base as claimed in claim 1 or 2, characterized in that the means (3) for cleaning the distributor base is a rope and/or a chain and/or a movably mounted rod.
4. The distributor base as claimed in one or more of claims 1 to 3, characterized in that the means (3) for cleaning the distributor base is arranged on the distributor base, in particular in at least one of the nozzles of the distributor base.

10-24-2003

EP0301279

- 7 -

5. A method for reducing the formation of deposits and/or for at least partially removing deposits on a distributor base and/or on the nozzles of a nozzle distributor base, in which at least one movable
5 cleaning device is operated on the distributor base, characterized in that while the distributor base is operating, the distributor base is cleaned by a direct, mechanical, striking action of the cleaning device on
10 the distributor base and its openings, in particular on the nozzles of a nozzle distributor base, or on the corresponding deposits at this location.

6. The method as claimed in claim 5, characterized in that the cleaning device is supplied with sufficient
15 kinetic energy to achieve the cleaning action by the flow of the gas.

7. The method as claimed in claim 5 or 6, characterized in that the nozzle distributor base is
20 made to vibrate by the cleaning device.

8. The method as claimed in one or more of claims 5 to 7, characterized in that the cleaning device is at least partially arranged, in particular secured, in at least one of the nozzles of the distributor base.

Fig. 1

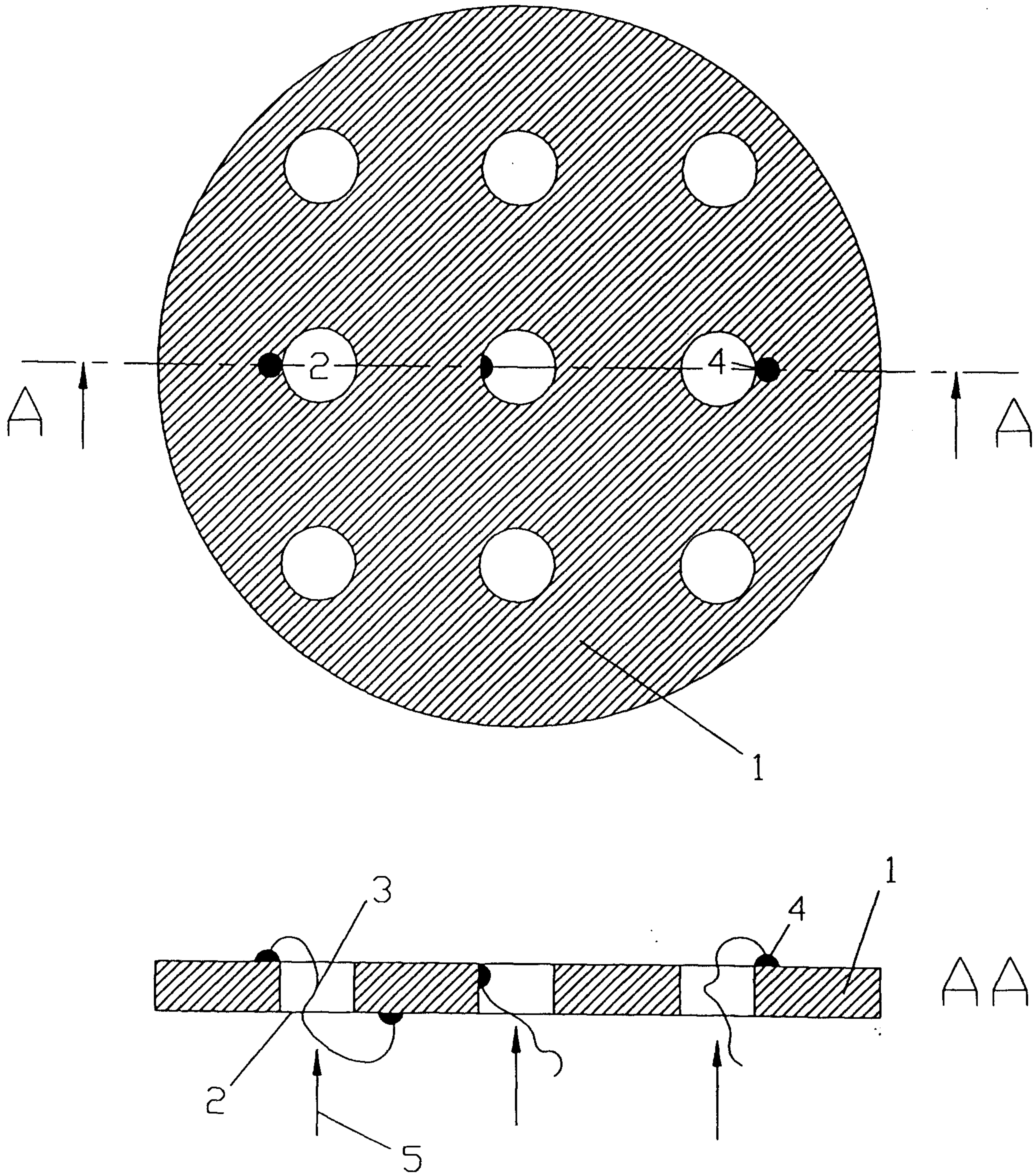


Fig. 3

