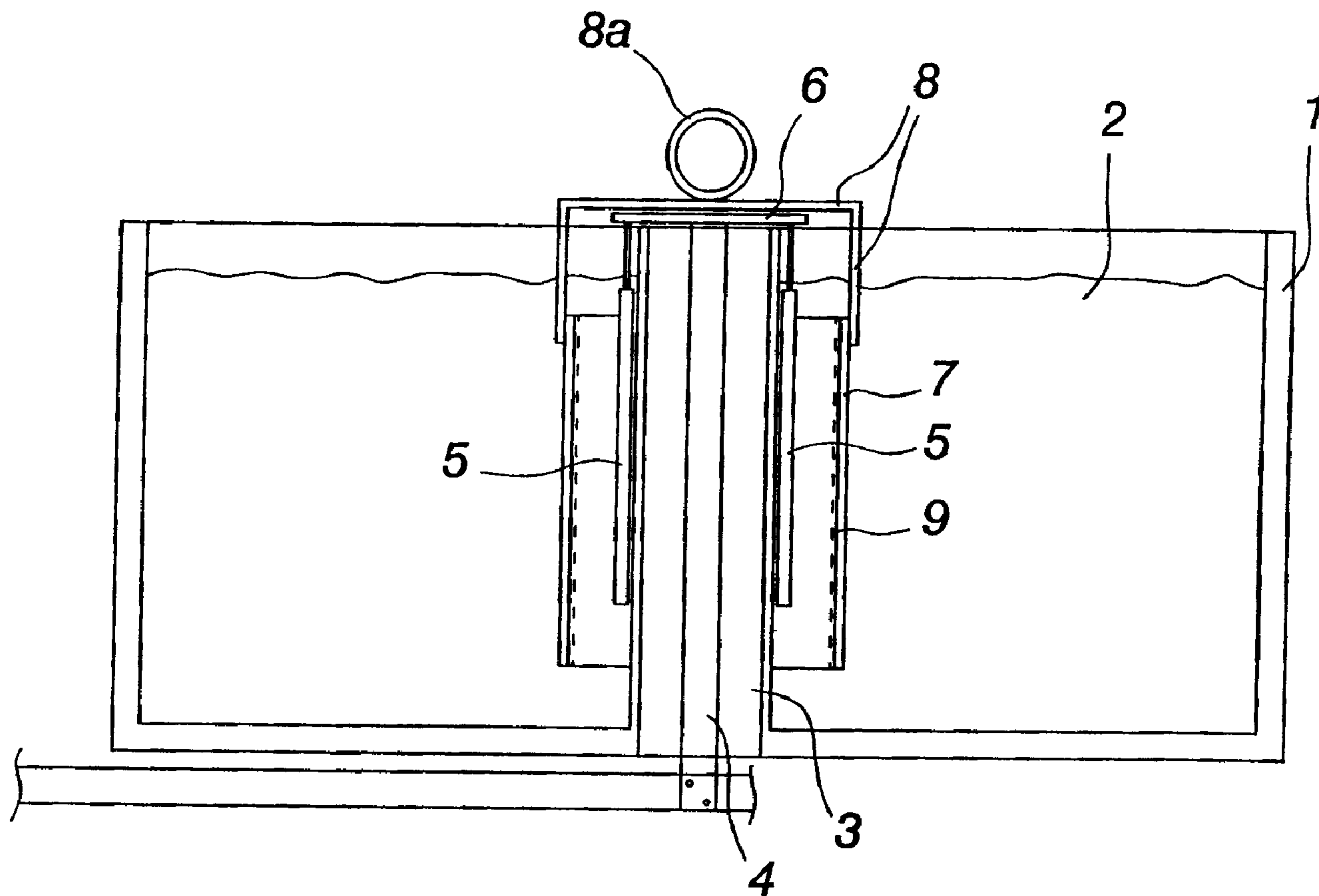




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(54) Titre : ELECTRODEPOSITION ET DISPOSITIF
 (54) Title: A PLATING METHOD AND APPARATUS



(57) Abrégé/Abstract:

The present invention relates to a plating method and apparatus in which an object to be coated is immersed in a bath in a basin and a plating tool which is kept permanently in the basin in the vicinity of a pipe or duct passing through the basin, where the object

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

to be coated is not placed in conjunction with the tool until inside the bath. In the plating method of the present invention, a current is supplied to anodes by means of a conductor rail, which is located in the pipe in the basin which the electrolytic liquid surrounds and which extends above the liquid surface where the object to be coated is immersed in the basin by means of a suspender supported on the upper end of the pipe.

ABSTRACT

The present invention relates to a plating method and apparatus in which an object to be coated is immersed in a bath in a basin and a plating tool which is kept permanently in the basin in the vicinity of a pipe or duct passing through the basin, where the object to be coated is not placed in conjunction with the tool until inside the bath. In the plating method of the present invention, a current is supplied to anodes by means of a conductor rail, which is located in the pipe in the basin which the electrolytic liquid surrounds and which extends above the liquid surface where the object to be coated is immersed in the basin by means of a suspender supported on the upper end of the pipe.

A Plating Method and Apparatus

Field of the Invention

The invention relates to a plating method, in which the object to be plated is
5 immersed in a bath in a basin, a plating tool is kept permanently in the
basin, and the object to be plated is not placed in conjunction with the tool
until inside the bath. The invention also relates to a plating apparatus, which
comprises a plating basin containing the liquid bath and the plating tool
immersed permanently in the liquid bath.

10

A special application of the invention is internal plating of objects with
chromium coating.

Background of the Invention

15 When objects are plated electrolytically with chromium, the plating period is
long, which is often due to the thick plating layer required, and the fact that
in electrolysis, chromium is reduced poorly and requires much electricity.
This necessitates strong electric fields, and it must be possible to direct them
to a desired point at the desired intensity.

20

In the methods currently applied the plating tool, such as anode plates,
electric field screens, etc., is fixed to the object to be coated outside the bath
and then immersed in the bath together with the object to be coated. The
anodes are often contaminated and difficult to handle.

25

From the inventor's certificate SU 509664 is known a method and apparatus
of the type mentioned above. In this known solution, the anode acting as the
plating tool is fixed around a mounting bar in the basin. The electric current
for this anode must be provided by a particular contactor arrangement

30

located on a cover which can be opened and closed.

Summary of the Invention

The aim of the invention is to improve known methods and apparatuses in such a way that the handling of plating tools will be substantially facilitated and production will thus be increased.

Since in the solution according to the invention the tool is permanently in the basin and the object to be coated is placed in conjunction with the tool inside the bath, only the object to be coated needs to be changed. The attachments of the tool or the supply of electricity or chemicals to the tool do not have to be disassembled and reassembled when objects are changed.

According to one aspect of the present invention there is provided a plating method, in which an object to be coated is immersed in a liquid bath in a basin, a plating tool is kept permanently immersed in the bath in the basin and the object to be coated is placed in its plating position relative to the plating tool not until inside the bath, the plating tool is kept outside a pipe or duct passed through the basin, the pipe or duct being empty of but surrounded by the liquid bath, the object, to be internally coated is immersed in the basin outside the pipe or duct, around the plating tool and electric current or chemicals are supplied to the plating tool through the pipe or duct.

According to a further aspect of the present invention there is provided a plating apparatus, which comprises a plating basin containing a liquid bath and a plating tool immersed in the liquid bath, the tool being permanently in the basin, characterised in that in the basin is a pipe passing through the bottom of the basin and surrounded by the liquid bath, the pipe being empty of the liquid bath, and that the plating tool is arranged in its plating position relative to the pipe outside the pipe and that the pipe comprises means for supplying electricity or chemicals to the plating tool.

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Brief Description of the Drawings

One embodiment of the invention is described in greater detail in the following, with reference to the accompanying drawing, which shows a section of the plating basin with its plating apparatus, by means of which the method according to the invention can be implemented.

Detailed Description of the Preferred Embodiments

In the following, the invention is described when applied to electrolytic plating, but it may be applied more widely in hydrometallurgy, in which case a pipe or duct 3 arranged in the basin 1 will serve the supply of chemicals or when, for example, technical nickel plating is carried out without electricity by means of reduction on desired surfaces. Reducing chemicals or electrolytes in general can be supplied through the pipe 3 to the tool.

Most preferably the invention is, however, applicable to electrolytic plating with chromium (hard chromium plating).

In the embodiment described, the plating basin 1 is, for example, a plastic-coated steel basin containing electrolytic liquid 2. The basin 1 comprises one or more vertical pipes 3 passing through the bottom of the basin, the upper ends of which extend above the liquid surface. In the pipe 3 is located a
5 conductor rail which is fixed to a plate 6 resting on the upper end of the pipe 3, the plate being of electrically extremely conductive material, for example, copper. On the plate 6 are suspended the anode plates 5, which settle around the pipe 3 in a circle. Through the pipe 3 can also be arranged current supply to the cathode. This type of an arrangement may
10 advantageously be used in the processing industry for the internal plating of tubular objects.

The object 7 to be coated is immersed in the basin 1 by means of a suspender 8 supported on the upper end of the pipe 3 which comprises a
15 lifting lug 8a. Reference numeral 9 denotes the plating precipitated on the inner surface of the object 7.

In addition to the anodes 5, the plating tool often comprises current screens located, for example, in the vicinity of the ends of the object 7. This type of
20 current screens or other components of the apparatus associated with the plating tool may also be supported or suspended on the pipe 3 in such a way that they will be permanently in the basin for as long as identical objects are being coated. When the object to be coated changes, the plating tools are changed or replaced in accordance with the object to be coated.
25

Through the pipe 3 may also be conducted cooling water or compressed air or the hydraulics required, for example, for expanding or contracting the anodes.

30 The number, location and shape of the pipes 3 passing through the electrolytic liquid may vary in many ways. However, the pipes 3 are typically

located symmetrically in the basin 1, are vertical and pass through the bottom of the basin.

In the following is in addition a short list of essential features relating to the
5 invention:

1. The plating tools are fixedly in the basin (conventional method: the tool is lifted into the basin together with the object to be coated)
2. The objects to be coated are placed in tools already present in the basin
10 (conventional method: the object to be coated is fixed on the plating tool outside the basin)
3. The new basin makes possible efficient serial working, which saves time and work substantially
4. Makes possible automated operation
- 15 5. Applicable for use in both chemical and electrical precipitation
6. The apparatus is particularly well suited for internal plating
7. The supply of electrical current or chemicals used in the plating takes place mainly through ducts passed through the bottom of the basin
8. The apparatus is also suitable for electrolytic polishing
- 20 9. The basin system also comprises all other auxiliary equipment required for managing the bath (e.g. heating, cooling, filtration, chemicals' supply, etc.) located either in the plating basin itself, an auxiliary basin or in the vicinity of the basin.

WHAT IS CLAIMED IS:

1. A plating method, in which an object (7) to be coated is immersed in a liquid bath (2) in a basin (1), a plating tool (5) is kept permanently immersed in the bath (2) in the basin (1) and the object (7) to be coated is placed in its plating position relative to the plating tool (5) not until inside the bath (2), the plating tool (5) is kept outside a pipe or duct (3) passed through the basin, the pipe or duct (3) being empty of but surrounded by the liquid bath, the object (7), to be internally coated is immersed in the basin (1) outside the pipe or duct (3), around the plating tool (5) and electric current or chemicals are supplied to the plating tool (5) through the said pipe or duct (3).
2. A method as claimed in claim 1 for electrolytic plating, wherein the plating tool, which comprises anodes (5), is kept permanently in the basin around the pipe or duct (3), that the current is conveyed to the anodes (5) by means of a conductor rail (4) located in the pipe (3) in the basin, the pipe (3) being surrounded by electrolytic liquid (2) and extends above the liquid surface.
3. A method as claimed in claim 1 or 2, wherein the object (7) to be coated is immersed in the basin (1) by means of a suspender (8) supported on the upper end of the pipe (3).
4. A plating apparatus, which comprises a plating basin (1) containing a liquid bath (2) and a plating tool (5) immersed in the liquid bath (2), the said tool being permanently in the basin, characterised in that in the basin is a pipe (3) passing through the bottom of the basin (1) and surrounded by the liquid bath (2), the pipe being empty of the liquid bath, and that the plating tool (5) is arranged in its plating position relative to the pipe outside the pipe and that the pipe comprises means (4) for supplying electricity or chemicals to the plating tool (5).

5. An apparatus as claimed in claim 4 for electrolytic plating, characterized in that the plating tool comprises anodes (5) to which a current is supplied by means of a conductor rail (4) located in the pipe (3) in the basin (1), which the electrolytic liquid (2) surrounds and which extends above the liquid surface.
6. An apparatus as claimed in claim 4 or 5, characterised in that one or more vertical pipes (3) pass through the bottom of the basin (1).
7. An apparatus as claimed in any one of claims 4 to 6, characterised in that an object (7) to be coated is immersed in the basin (1) by means of a suspender (8) supported on the upper end of the pipe (3).
8. An apparatus as claimed in any one of claims 4 to 6, characterised in that the anode plates (5) comprised in the plating tools are arranged in a circle surrounding the pipe (3) and the arrangement is used for the internal plating of tubular objects of the processing industry.
9. An apparatus as claimed in any one of claims 4 to 8, characterised in that one or more pipes (3) surrounded by the liquid bath (2) are located symmetrically in the basin (1).
10. The use of the method according to any one of claims 1 to 3 or of the apparatus according to any one of the claims 4 to 8 for plating objects with an internal chromium coating.

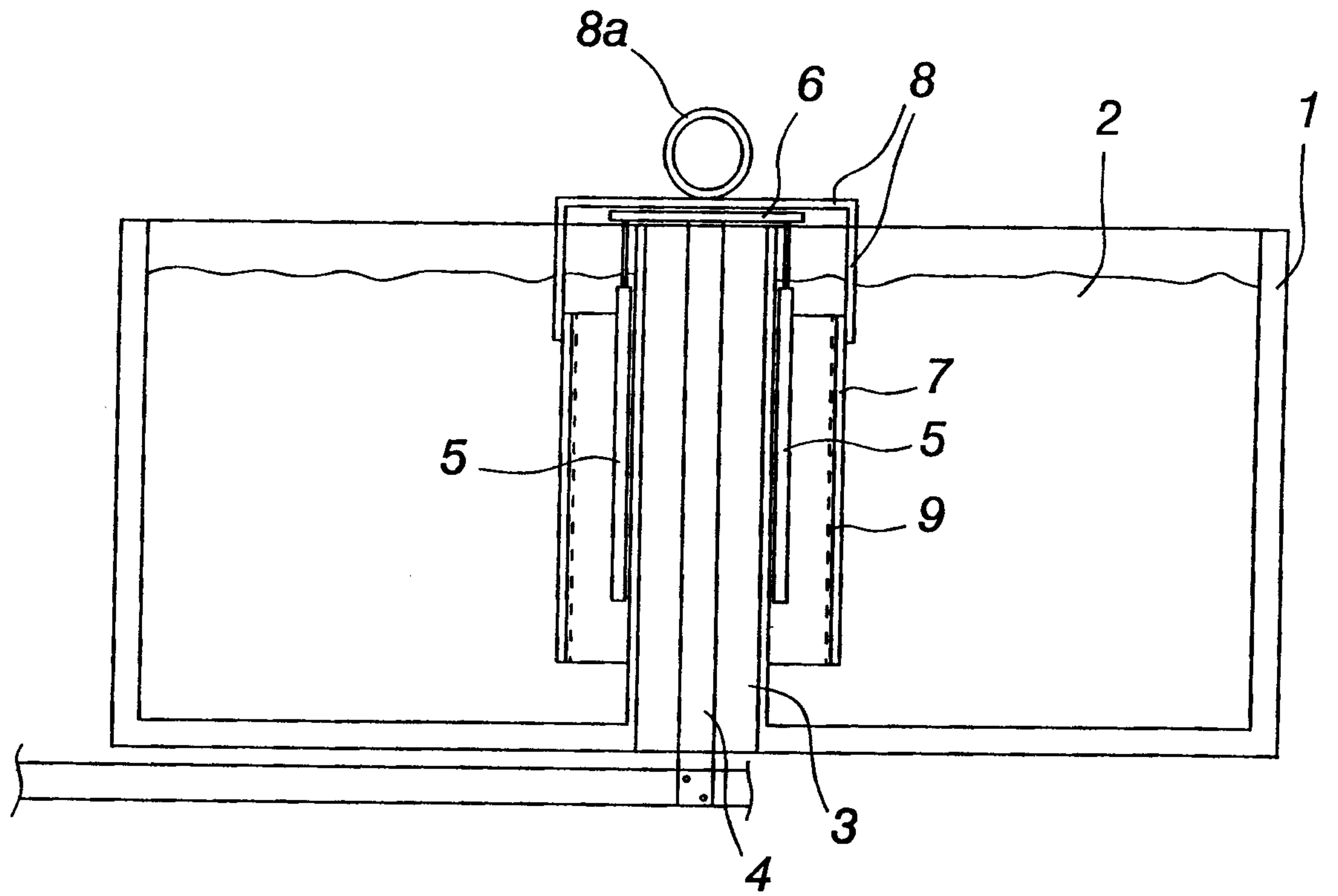


FIGURE 1

