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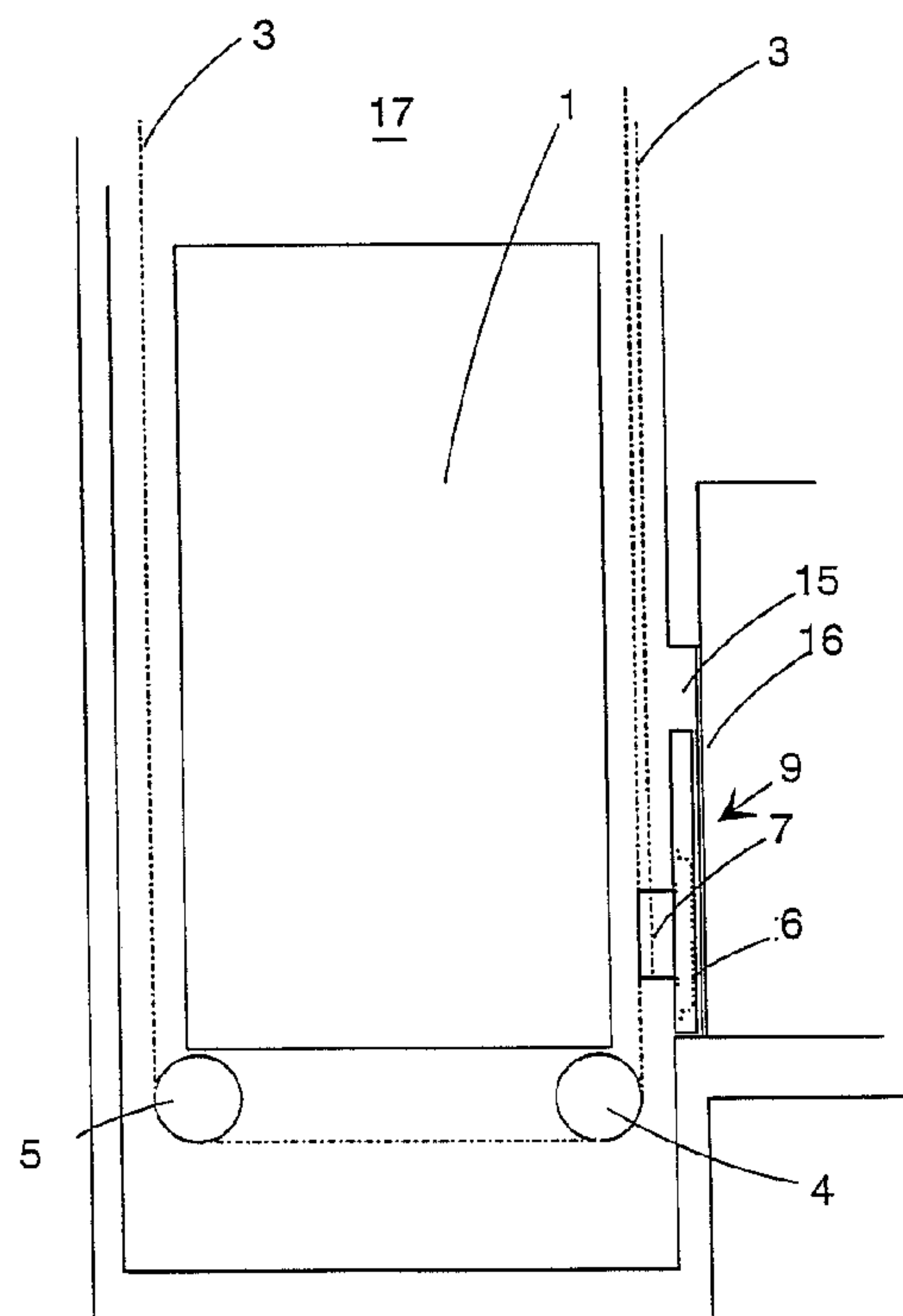
(72) Inventeurs/Inventors:
AULANKO, ESKO, FI;
MUSTALAHTI, JORMA, FI;
HAKALA, HARRI, FI

(73) Propriétaire/Owner:
KONE Oy, FI

(74) Agent: G. RONALD BELL & ASSOCIATES

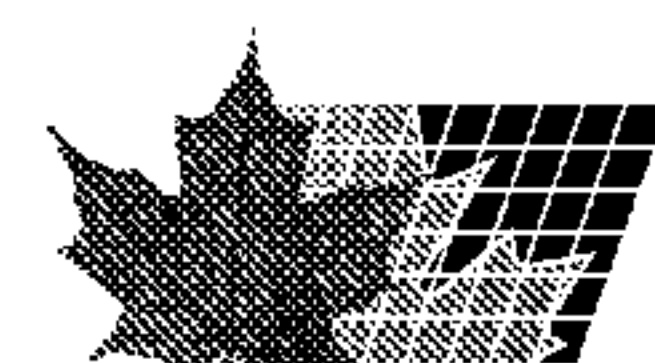
(54) Titre : ESPACE POUR MECANISME D'ENTRAINEMENT ET ENSEMBLE DE LEVAGE D'ELEVATEUR A REA DE TRACTION

(54) Title: TRACTION SHEAVE ELEVATOR, HOISTING UNIT AND MACHINE SPACE



(57) Abrégé/Abstract:

A traction sheave elevator consists of an elevator car moving along elevator guide rails, a counterweight moving along counterweight guide rails, a set of hoisting ropes on which the elevator car and counterweight are suspended, and a drive machine unit driving a traction sheave acting on the hoisting ropes and placed in the elevator shaft. The drive machine unit is of a flat construction. A wall of the elevator shaft is provided with a machine space with its open side facing towards the shaft, the essential parts of the drive machine unit being placed in said space. The hoisting unit of the traction sheave elevator consists of a substantially discoidal drive machine unit and an instrument panel mounted on the frame of the hoisting unit.



ABSTRACT OF DISCLOSURE

A traction sheave elevator consists of an elevator car moving along elevator guide rails, a counterweight moving along counterweight guide rails, a set of hoisting ropes on which the elevator car and counterweight are suspended, and a drive machine unit driving a traction sheave acting on the hoisting ropes and placed in the elevator shaft. The drive machine unit is of a flat construction. A wall of the elevator shaft is provided with a machine space with its open side facing towards the shaft, the essential parts of the drive machine unit being placed in said space. The hoisting unit of the traction sheave elevator consists of a substantially discoidal drive machine unit and an instrument panel mounted on the frame of the hoisting unit.

TRACTION SHEAVE ELEVATOR, HOISTING UNIT AND MACHINE SPACE

This application is a division of Canadian Patent Application Serial Number 2,148,423 filed on May 2, 1995. The claims of this application are directed to a traction
5 sheave elevator, a hoisting unit and a machine space to satisfy unit of invention requirements of the Canadian Patent Office. However, in order to assist the reader to readily understand the overall invention including all features which are inextricably bound up in one and the same inventive concept, the teachings of those features and the broad objects relating thereto are all retained in the present disclosure as they were in the disclosure of the parent
10 application aforesaid but the claims are limited to the features identified hereinbefore.

The present invention relates to a traction sheave elevator, a hoisting unit and a machine space.

One of the objectives in elevator development has been to achieve an efficient and economic space utilization. In conventional traction sheave driven elevators, the
15 elevator machine room or other space for the drive machinery takes up a considerable part of the building space required for the elevator. The problem is not only the volume of the space required by the elevator, but also its placement in the building. There are various solutions for the placement of the machine room, but they generally involve significant restrictions as to the design of the building at least with regard to space utilization or
20 appearance. For example, in the case of a so-called "side-drive elevator with the machine room below", a machine room or space is required below or beside the shaft, generally on the bottommost floor of the elevator system. Being a special space, the machine room generally increases the building costs.

An object of the present invention is to achieve at an economic cost a reliable
25 elevator allowing efficient space utilization and in which, irrespective of the hoisting height, the building space required for the elevator is substantially limited to the space needed by the elevator car and counterweight on their paths, including the safety distances, and the space needed to provide a passage for the hoisting ropes, and in which the problems or drawbacks described above can be avoided.

30 According to an aspect of the present invention, there is provided a traction sheave elevator comprising an elevator car movable along elevator guide rails, a counterweight movable along counterweight guide rails, a set of hoisting ropes on which the

elevator car and counterweight are suspended in the elevator shaft and a drive machine unit driving a traction sheave placed in the elevator shaft and acting on the hoisting ropes wherein the drive machine unit is substantially flat in the direction of the drive shaft of the traction sheave, and a wall of the elevator shaft contains a machine space in which the
5 essential parts of the drive machine unit are placed.

According to another aspect of the present invention, there is provided a hoisting unit for a traction sheave elevator, wherein the hoisting unit comprises a discoidal drive machine unit and an instrument panel attached to the frame of the hoisting unit.

According to a further aspect of the present invention, there is provided a
10 machine space for a traction sheave elevator, wherein the machine space is delimited in the thicknesswise direction of a wall by the plane of the wall surface facing towards the elevator shaft and the plane of the wall surface facing outwards from the elevator shaft.

Various advantages can be achieved by applying the invention, including the following:

- 15 - The traction sheave elevator of the invention allows an obvious space saving to be achieved in the building because no separate machine room is required.
- The elevator is cheap to install as the elevator machinery can be assembled and tested beforehand in the factory.
- 20 - Applying the invention to practice requires no major changes in the design or manufacture of the elevator.
- The machinery and the instrument panel are within easy reach, so the manner of accessing the machinery for maintenance or in an emergency does not essentially differ from conventional elevators.

25 In the following, the invention is described in detail by the aid of one of its embodiments by referring to the attached drawings, in which

Figure 1 presents a diagrammatic view of a hoisting unit employed in the invention;

Figure 2 illustrates an elevator with machinery below in which an embodiment
30 of the invention is applied;

Figure 3 illustrates the layout of the main components of an elevator employing the invention, projected on the cross-section of the elevator shaft; and

Figure 4 illustrates an elevator with machinery above, implemented according to an embodiment of the invention.

Figure 1 illustrates a hoisting unit 9 for a traction sheave elevator in accordance with an embodiment of the invention. The unit in this figure is the hoisting unit of a traction sheave elevator with machinery below, in which the hoisting ropes 3 go upwards from the traction sheave 7 of the hoisting machinery 6. In the case of an elevator with machinery above, the ropes would go downwards. The hoisting machinery 6 is fixed to the support 20 of the hoisting unit, which support 20 is preferably of a framelike design. Mounted on the frame 20 is also an instrument panel 8, which contains the elevator control equipment and the equipment needed for the control of and supply of power to the electromotor comprised in the hoisting machinery 6. The hoisting machinery 6 is of a discoidal shape and, in relation to its diameter, relatively flat in the direction of the traction sheave shaft. The traction sheave 7 protrudes from the discoidal hoisting machinery 6 into the shaft space. Placed on the circumference of the hoisting machinery 6 is a brake 14. An elevator machinery usable as a hoisting machinery 6 is described. Such a machinery does not require a large machine space, so it can easily be placed in an opening in the wall or in a recess made in the wall on the side facing towards the shaft. A preferable thickness of the hoisting unit 9 is about or somewhat over ten centimetres. The traction sheave 7 is not included in this thickness. A 10 cm thick hoisting unit 9 can readily be accommodated in an ordinary elevator shaft wall because a typical wall thickness is at least about 15 cm, both in the case of a cast concrete wall and a brick wall.

Figure 2 illustrates an elevator with machinery below in which the invention is employed, the hoisting unit 9 being placed beside the shaft in its lower part. The main parts of the elevator machinery 6 are mounted in a space limited in its maximum by the thickness of the wall of the elevator shaft 17, in an opening 15 in the wall which is open towards the shaft space and closed with a door 16 from the outside to prevent illicit access to the machinery or entry into the shaft through the opening 15. On the shaft side, the opening may be provided with a safety net or glass or the like to make sure that one cannot, for example stretch a hand into the shaft space past the equipment in the opening. In general, it is not preferable to close the machine space 15 completely from the shaft side because, regarding ventilation of the machine space 15, an advantageous solution is one in which the machine

space is ventilated through the shaft. In some cases, however, closing the machine space on the shaft side may be necessary, for example to stop the propagation of noise. In such cases the machine space 15 is closed on the shaft side except for the inlets required for power transmission to the traction sheave 7 and other purposes. In any case, the machine space 15 has a depth not exceeding the thickness of the wall of the elevator shaft 17. From the hoisting machinery 6 comprised in the hoisting unit, the traction sheave 7 moving the hoisting ropes 3 (depicted in broken lines) protrudes into the shaft 17. Figure 2 shows both the portion of the hoisting ropes passing below the car 1 over diverting pulleys 4,5 and the portions of the hoisting ropes coming down from the upper part of the shaft 17 to the traction sheave.

Figure 3 illustrates the layout of the main components of an elevator with machinery below, projected on a cross-section of the elevator shaft 17. The elevator car 1 moves along elevator guide rails 10 and the counterweight 2 along counterweight guide rails 11. The hoisting machinery 6 and the instrument panel 8 are placed in an opening in the wall of the elevator shaft 17. The traction sheave 7 protrudes from the hoisting machinery 6 and also from the opening 15 into the shaft 17. Diverting pulleys 12 placed in the top part of the shaft guide the passage of the hoisting ropes. One of the diverting pulleys 12 guides the hoisting ropes from the traction sheave 7 to the diverting pulley 13 on which the counterweight 2 is suspended and from which the hoisting ropes go further to a fixed rope anchorage at the top of the shaft. Another diverting pulley 12 guides the hoisting ropes from the traction sheave 7 to the diverting pulleys 4 and 5 attached to the car 1, by means of which the elevator car 1 is suspended on the hoisting ropes and from which the ropes go further to a fixed rope anchorage at the top of the shaft. In the figure, the hoisting ropes are represented by their cross-sections on the traction sheave and diverting pulleys, but otherwise the ropes are not shown. At each landing, the wall of the elevator shaft 17 is provided with a door opening 18 for the landing door. The elevator car 1 is provided with a corresponding door opening 19. If the elevator car is provided with a door, its door opening 19 is closed by the car door.

Figure 4 is a diagram representing an elevator with machinery above, implemented according to an embodiment of the invention. The hoisting unit 9 is placed beside the elevator shaft 117 in its upper part. The elevator machinery 6 is mounted in an opening 115 in the wall of the elevator shaft 117. The opening is open towards the shaft and

closed with a door 116 from the outside of the shaft. From the hoisting machinery 6 comprised in the hoisting unit, the traction sheave 7 moving the hoisting ropes 103 (depicted in broken lines) protrudes into the shaft 117. The figure shows the portion of the hoisting ropes 103 passing below the car 101 over diverting pulleys 104, 105 and the portion of the
5 hoisting ropes going from the traction sheave towards the counterweight.

It will be obvious to a person skilled in the art that different embodiments of the invention are not restricted to the examples described above, but that they may instead be varied within the scope of the claims presented below. For instance, the lay-out of the car and counterweight in the shaft is not a decisive question. It is also obvious to the skilled
10 person that the drive shaft of the traction sheave can be provided with a support on the side facing the shaft as well, e.g. by using a support beam attached to the frame of the hoisting machinery. The skilled person also knows that the traction sheave comprised in an elevator machinery is frequently not a fixed part of the machinery but a component which need not be mounted on its drive shaft until during installation of the elevator.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A hoisting unit for a traction sheave elevator, which is in an opening of an elevator shaft wall, essentially within the thickness of the shaft wall, wherein the hoisting unit comprises a discoidal drive machine unit and an instrument panel attached to a frame of the hoisting unit, whereby in the thickness direction of the wall the hoisting unit has a thickness not exceeding that of said wall of the elevator shaft and that substantially only the traction sheave or its drive shaft protrudes from the hoisting unit into the shaft.

2. A hoisting unit as defined in claim 1, wherein in one direction the hoisting unit has a thickness not exceeding that of a conventional cast concrete or brick wall of an elevator shaft, suitably about ten centimetres, and that substantially only the traction sheave or its drive shaft protrudes from the hoisting unit.

3. A machine space for a traction sheave elevator, wherein the machine space is delimited in the thicknesswise direction of a wall by the plane of the wall surface facing towards the elevator shaft and the plane of the wall surface facing outwards from the elevator shaft.

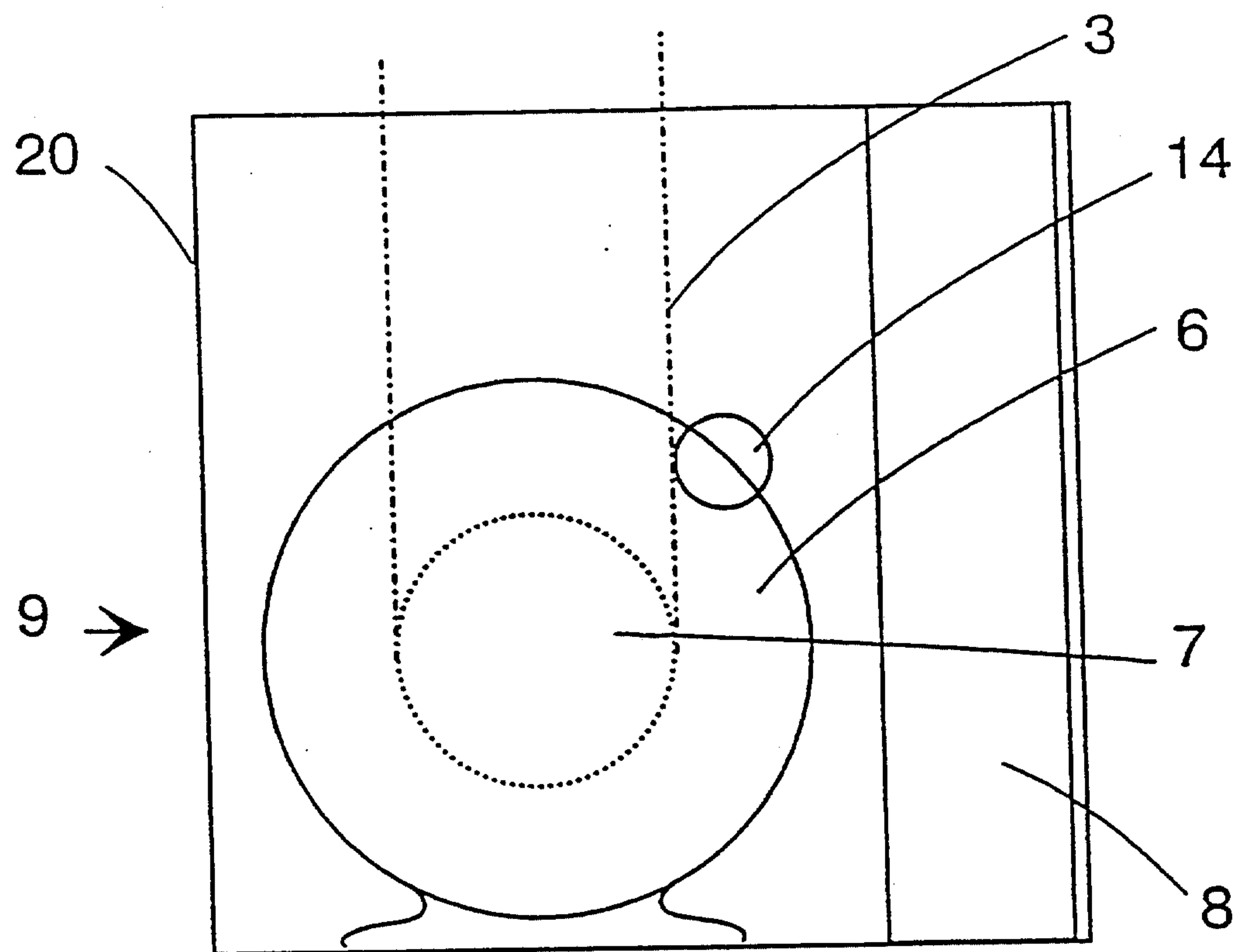


Fig. 1

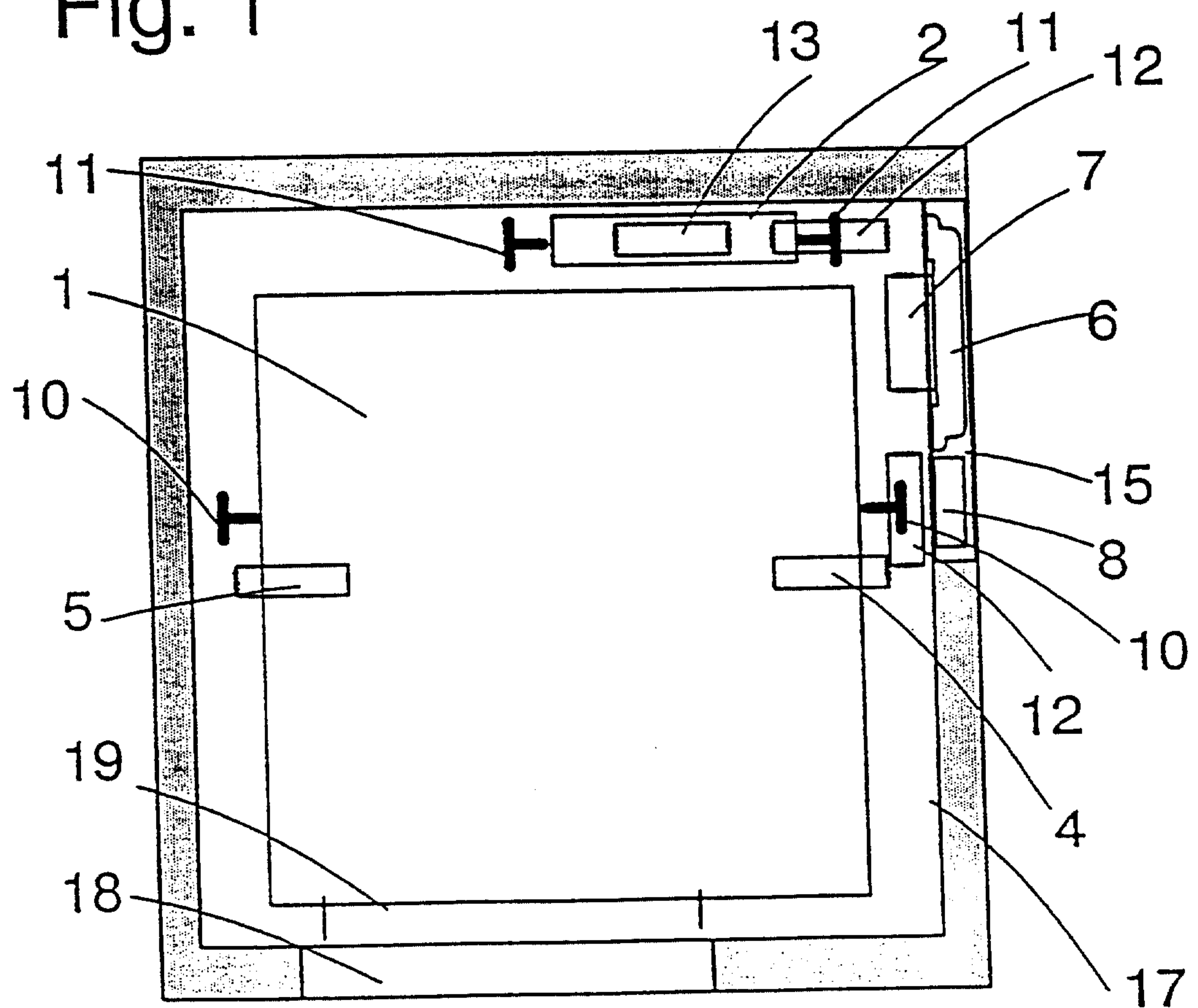


Fig. 3

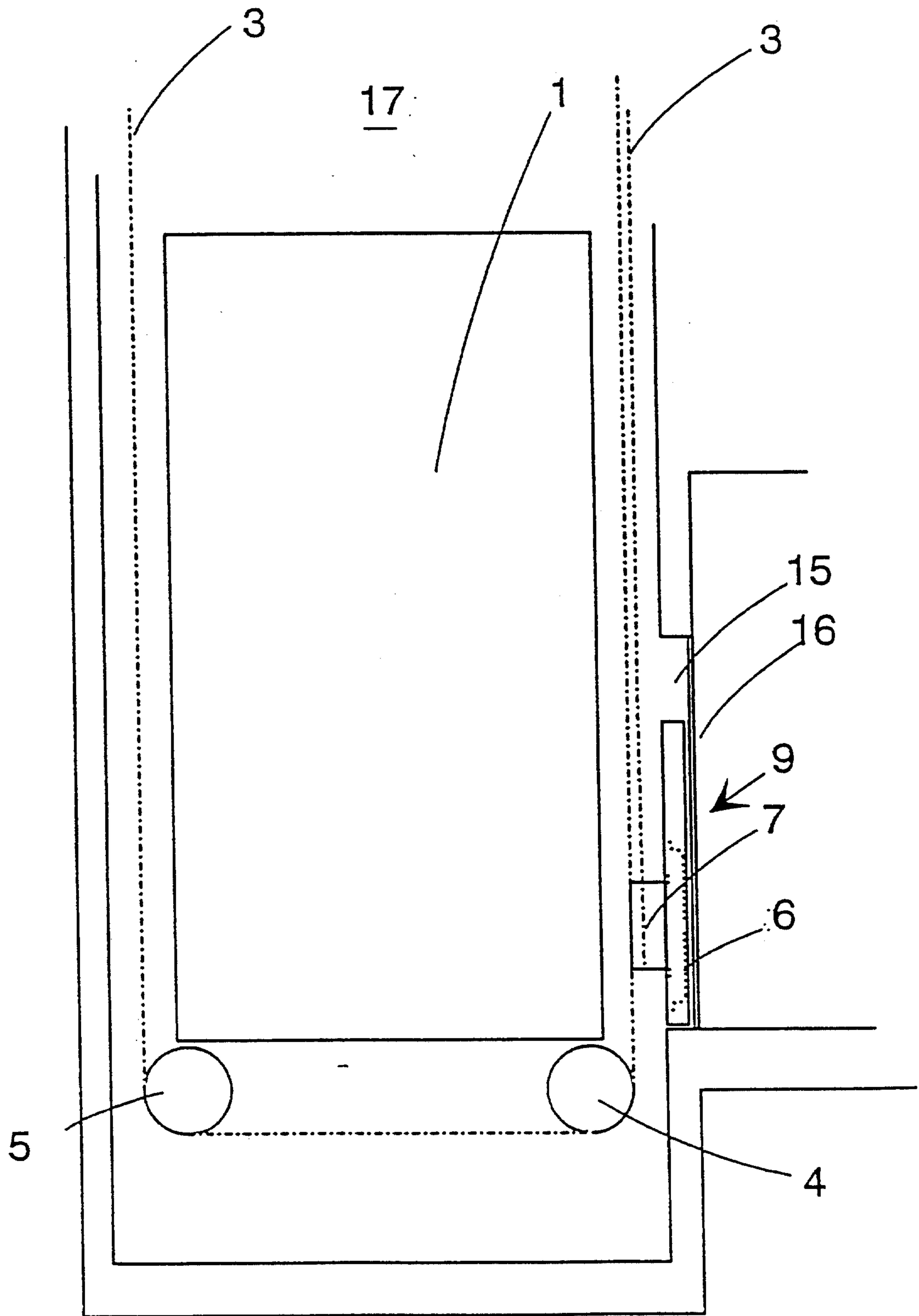


Fig. 2

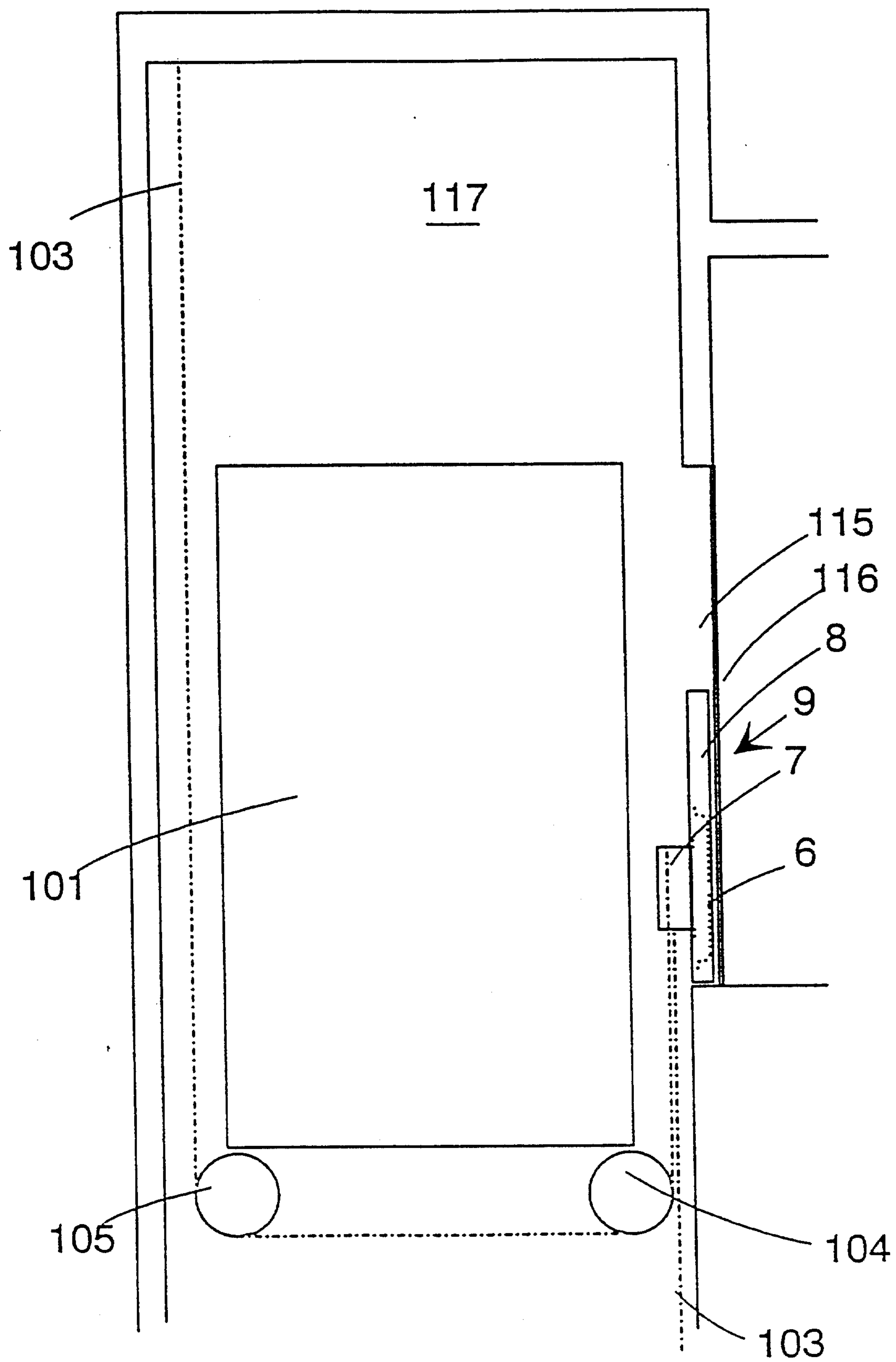


Fig. 4

