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(54) **Notching machine**

Nutenmaschine

Machine d'encochage

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(73) Proprietor: **Pudas, Esa**
95900 Kolari (FI)

(72) Inventor: **Pudas, Esa**
95900 Kolari (FI)

(74) Representative: **IPR Partners Ltd**
Hietalahdenranta 13
00180 Helsinki (FI)

(56) References cited:
WO-A1-99/52692 US-A- 1 844 057
US-A- 3 010 495

- **ANONYMOUS: "SALVOSKONE MPK - 270 - 4",
INTERNET CITATION, 27 January 2009
(2009-01-27), pages 1-4, XP008164366, Retrieved
from the Internet:
URL: <http://www.scribd.com/doc/11434067/salvoskone-mpk270-fi> [retrieved on 2013-08-23]**

EP 2 674 268 B1

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Description

FIELD OF THE INVENTION

[0001] The invention relates to a notching machine as defined in the preamble of claim 1. Such a notching machine is disclosed in WO 99/52692 A1.

BACKGROUND OF THE INVENTION

[0002] As is known, log notches are made using many different machines and methods. The notch milling is usually carried out by milling cutters which, supported against the frame of the notching machine, move away from their idle position, do the notching and move back into their idle position. It is not rare that opposite notches are made simultaneously to save machining time. It also possible to machine more than one notch at different points on the log at the same time. This necessitates, of course, that the notching machine has more than one milling cutter positionally adjustable relative to each other in the longitudinal direction of the log.

[0003] The problem in the prior art is, above all, that the current structures are complex and expensive. The automatic notching machines have been made fast by including a necessary number of separate milling cutters but this has caused a significant increase in the dimensions and manufacturing costs of the machines.

[0004] Many of the machining devices known in the prior art machine the logs by using pairs of cutters (upper and lower cutters as well as lateral cutters) alternately in such a way that, after machining with one pair of cutters, this pair of cutters are returned to their position before the next pair of cutters may start machining. This induces remarkable problems because the paths of the pairs of cutters intersect and, in case of a control failure, the pairs of cutters may collide with one another thus having, almost always, an significantly adverse effect on the machining device, in the form of high repairing costs and cutter changes as well as downtime, which obviously add to the costs caused by the collision. Besides, it is understood that, in these kinds of solutions, the back-and-forth moving of the cutters in the different machining steps is time-consuming and makes it difficult to speed up the machining.

[0005] In addition, the machining devices known in the prior art often suffer from the disadvantage that, in solutions with a stationary frame, making a setting can be difficult, that is, when the thickness of the log to be notched changes and the distance between the cutters must be adjusted accordingly, the operator may have to thread his way, wearing a helmet, into the notching machine to adjust the distance between the cutters, which, of course, is very slow and difficult and even dangerous.

OBJECTIVE OF THE INVENTION

[0006] The objective of the invention is to eliminate the

above-mentioned drawbacks.

[0007] In particular, the objective of the invention is to provide a novel notching machine which is as simple as possible and therefore inexpensive to manufacture but which is able to notch fast and efficiently, whose structural solution prevents the cutters from colliding with one another and which, in addition, is easily adjustable to meet different log dimensions.

10 SUMMARY OF THE INVENTION

[0008] The notching machine according to the invention is defined in what is set forth in claim 1.

[0009] The notching machine according to the invention is intended to notch logs at the top above, at the bottom and at both sides, i.e. to cut out corner notches in logs intended to intersect each other. The notching machine includes an upper notching cutter, a lower notching cutter and two lateral notching cutters. Further, the notching machine has a body and a log bracket which is supported against the former and on which the log to be machined can be placed immovably. Further, the notching machine includes a rigid frame movable relative to the body in the transverse direction of the log being machined. Further, the notching machine includes an upper notching cutter and a lower nothing cutter supported by the frame to cut out an upper notch and a lower notch, respectively, in the log by moving the frame, as well as lateral notching cutters movably supported by the frame to cut out lateral notches in the log by moving the lateral notching cutters.

[0010] The notching cutters are preferably positioned on their respective cutter frames in such a way that supporting a cutter against the frame actually means supporting its cutter frame against the frame and in such a way that moving a cutter relative to the frame actually means moving its cutter frame relative to the frame.

[0011] Most preferably, guides or similar slide rails are mounted between the body and the frame of the notching machine for moving the frame back and forth along them.

[0012] When machining an upper notch and a lower notch, respectively, the upper notching cutter and the lower notching cutter are immobile relative to the frame and at a certain distance from each other. Thus, their position relative to each other only is changed when the log size or the milling cutters are changed. Therefore, it preferably is adequate that only one of the notching cutters, i.e. the upper notching cutter or the lower notching cutter, is provided with adjustment in its frame to allow the distance between them to be adjusted.

[0013] It is also possible to provide the log bracket with adjustment to allow the position of the log relative to the notching cutters to be adjusted.

[0014] Preferably, the lateral notching cutters are also provided with adjustment to allow the distance between them to be adjusted. This makes it possible to process logs of different thicknesses and to adjust the lateral notching cutters accordingly.

[0015] The notching machine according to the invention has significant advantages in comparison to the prior art. The notching machine according to the invention is extremely simple. Nevertheless, it is able to notch logs very fast because the construction of the notching allows fast machining operations and does not require the cutters to do any returning movements before machining the next notch groove in the same log or in a new log. In addition, the notching machine according to the present invention allows the notching operations to be carried out in an opposite order, which results in that the notching speed can be up to twice as high as in conventional notching machines where the milling cutters, after they have done their notching work, must be returned to their positions before the next notching can be performed.

[0016] An additional significant advantage of the notching machine according to the present invention is that it may be able to completely prevent the pairs of cutters from colliding with one another because the paths of the pairs of cutter do not intersect in any notching step. Thus, it may be possible to avoid the high reparation costs and to shorten the downtime due to service.

[0017] Besides, making a setting, i.e. adjusting the distance between the cutters of a pair of cutters, can be easy because the frame, being movable, can be driven out of the notching machine almost entirely to allow easy access to the cutter settings. This may reduce the time used for adjusting, make the actual adjusting work easier and improve safety.

[0018] In this application, the term "a pair of cutters" refers to a unit consisting of two cutters, which cutters are used for making notches in the opposite sides of a log.

DESCRIPTION OF THE DRAWINGS

[0019] In the following, the present invention will be described in detail by means of an example with reference to the accompanying drawings wherein

Figure 1 is a schematic view of a notching machine according to the invention in a first operating position,

Figure 2 shows the notching machine of Figure 1 in a second operating position, and

Figure 3 shows the notching machine of Figure 1 in a third operating position.

DETAILED DESCRIPTION OF THE INVENTION

[0020] Figures 1 to 3 are schematic views of a notching machine according to the invention. The notching machine has a body 5 and a substantially rectangular rigid frame 8 supported thereon. The frame 8 is supported on the body 5 by means of guides 9 to allow the frame to be moved back and forth along the guides, from right to left and back in the figures, relative to the body.

[0021] A log bracket 6 allowing the log 7 to be machined

to be locked in place relative to the body, is supported against the body 5. The log bracket 6 consists, for example, of two angular brackets situated on different sides of the frame 8 in the body 5 so that the log 7 supported on them moves through the opening defined by the frame 8 and lies perpendicular to the frame and its path. The log bracket 6 may include hydraulic, pneumatic or electrical locking devices or clamps to securely hold the log 7 in place while notches are machined in it.

[0022] A first cutter frame 10 having an upper notching cutter 1 supported thereon is fixed to the upper edge of the frame 8. A second cutter frame 11 having a lower notching cutter 2 supported thereon is mounted on the lower edge of the frame, in an aligned position. The first and the second cutter frames 10 and 11 are both provided with adjustment. Thus, the position of the cutters 1 and 2, i.e. the distance between them, can always be adjusted as desired. However, it is preferable that, during notching, the upper and the lower cutters stay firmly in place, and any adjustment of the distance between the cutters 1, 2 is usually performed in connection with a log or notching point change.

[0023] A third cutter frame 12 and a fourth cutter frame 13 fix the lateral notching cutters 3 and 4 to the upper part of the frame 5, respectively. At least one of the cutter frames 12 and 13 is provided with adjustment to allow the distance between them to be adjusted. The third and the fourth cutter frames 12 and 13 have transfer means and, in the figure, vertical paths to enable them to be moved down and up simultaneously. According to another embodiment, the lateral notching cutters 3 and 4 can also be fixed to lower part of the frame 5. It is understood by a person skilled in the art that these two embodiments can be combined by fixing one lateral notching cutter to the upper part of frame and the other lateral notching cutter to the lower part of the frame.

[0024] The notching machine shown in the schematic views 1 to 3 is operated as follows. A log 7 is fixed in place on the log bracket 6 and the point to be notched is aligned with the frame, i.e. the cutters 1, 2, 3 and 4 provided thereon. The upper notching cutter 1 and the lower notching cutter 2 are adjusted to lie at a required distance from each other and at an appropriate height relative to the log 5 supported on the log bracket 6. Further, the lateral notching cutters 3 and 4 are adjusted, in their upper position shown in the figure, to lie at the right distance from each other relative to the log to be processed. Then the frame 8 is moved to the left in figure 1 in order to move the upper notching cutter 1 and the lower notching cutter 2 across the upper face and the lower face of the log. The cutters 1 and 2 now mill an upper notch and a lower notch, respectively, at a desired point on the log.

[0025] As shown in figure 2, the log 7 notched at its upper face and its lower face comes out from between the cutters 1 and 2, and as the frame 8 continues to move in the same direction, the log 7 finally reaches the lateral notching cutters 3 and 4 where the frame 8 is stopped. Then, as shown in figure 3, while the frame is kept in

place, the lateral notching cutters 3 and 4 are pressed down the log to give the log its both lateral notches while they pass by the log.

[0026] After the log has been notched at each side, it can be removed from the log bracket 6 and repositioned thereon for the next notch, or replaced with a new log to be notched. The frame 8 and the lateral notching cutters 3 and 4 do not need to be returned to their initial position, i.e. to the position shown in figure 1. After the log has been repositioned on the log bracket or, alternatively, replaced with a new log, the next notch grooves can be cut out in an opposite order. First, the lateral notching cutters 3 and 4 are pulled up into their upper position, and, second, the frame 8 is driven to the right. That is, the upper and lower and lateral notches are made in the log in an opposite order. This makes the log machining considerably faster and easier because no machining cutter returning movements are needed.

[0027] The invention is not restricted to the above-described examples but many variations are contemplated within the scope of the invention defined by the accompanying claims.

Claims

1. A notching machine for machining logs at the top, at the bottom and at both sides, the notching machine comprising an upper notching cutter (1), a lower notching cutter (2) and two lateral notching cutters (3, 4), a body (5); a log bracket (6) which is supported against the body and on which the log to be machined (7) can be placed immovably; a rigid frame (8) movable relative to the body in the transverse direction of the log being machined; the upper notching cutter (1) and the lower notching cutter (2) supported by the frame to make an upper notch and a lower notch, respectively, in the log by moving the rigid frame (8); the lateral notching cutters (3, 4) supported by the frame to make lateral notches in the log by moving the lateral notching cutters, **characterized in that** the lateral notching cutters (3, 4) are movably mounted to the frame (8) with vertical paths to enable the notching cutters (3, 4) to be moved up and/or down simultaneously in a perpendicular direction to the direction of movement of the frame (8), when the frame (8) is stopped, to make lateral notches in the log, the lateral notching cutters (3, 4) being mounted at a distance from each other in the direction of movement of the frame (8).
2. A notching machine as defined in claim 1, **characterized in that** guides (9) are provided between the body (5) and the frame (8) for moving the frame back and forth along them.
3. A notching machine as defined in claim 1 or 2, **characterized in that** the upper notching cutter (1) and/or

the lower notching cutter (2) are provided with adjustment to allow the distance between them to be adjusted.

4. A notching machine as defined in any of claims 1 to 3, **characterized in that** the log bracket (6) is provided with adjustment to allow the position of the log (7) to be adjusted relative to the notching cutters.
5. A notching machine as defined in any of claims 1 to 4, **characterized in that** the lateral notching cutters (3, 4) are provided with adjustment to allow the distance between them to be adjusted.

Patentansprüche

1. Ausklinkmaschine zum Bearbeiten von Blöcken auf der Oberseite, auf der Unterseite und auf beiden Seiten, wobei die Ausklinkmaschine ein oberes Ausklinkmesser (1), ein unteres Ausklinkmesser (2), zwei seitliche Ausklinkmesser (3, 4), einen Körper (5); eine Blockwinkelstütze (6), die gegen den Körper gestützt wird und auf der der zu bearbeitende Klotz (7) unbeweglich untergebracht werden kann; und einen starren Rahmen (8) umfasst, der in Bezug zum Körper in der Querrichtung des bearbeiteten Klotzes beweglich ist; wobei das obere Ausklinkmesser (1) und das untere Ausklinkmesser (2) durch den Rahmen gestützt werden, um eine obere Ausklinkung beziehungsweise eine untere Ausklinkung in dem Klotz durch Bewegen des starren Rahmens (8) herzustellen; wobei die seitlichen Ausklinkmesser (3, 4) durch den Rahmen gestützt werden, um seitliche Kerben in dem Klotz durch Bewegen der seitlichen Ausklinkmesser herzustellen, **dadurch gekennzeichnet, dass** die seitlichen Ausklinkmesser (3, 4) an dem Rahmen (8) mit vertikalen Bahnen beweglich gelagert sind, um das gleichzeitige Bewegen der Ausklinkmesser (3, 4) nach oben und/oder unten in einer Richtung senkrecht zur Bewegungsrichtung des Rahmens (8) zu ermöglichen, wenn der Rahmen (8) angehalten wird, um seitliche Ausklinkungen in dem Klotz herzustellen, wobei die seitlichen Ausklinkmesser (3, 4) in der Bewegungsrichtung des Rahmens (8) in einem Abstand voneinander gelagert sind.
2. Ausklinkmaschine nach Anspruch 1, **dadurch gekennzeichnet, dass** Führungen (9) zwischen dem Körper (5) und dem Rahmen (8) zum Bewegen des Rahmens an ihnen entlang nach vorne und hinten bereitgestellt sind.
3. Ausklinkmaschine nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das obere Ausklinkmesser (1) und/oder das untere Ausklinkmesser (2) mit einer Einstellung versehen sind, um das Einstel-

len des Abstands zwischen ihnen zu ermöglichen.

4. Ausklinkmaschine nach einem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** die Klotzwinkelstütze (6) mit einer Einstellung versehen ist, um das Einstellen der Position des Klotzes (7) in Bezug zu den Ausklinkmessern zu ermöglichen.
5. Ausklinkmaschine nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** die seitlichen Ausklinkmesser (3, 4) mit einer Einstellung versehen sind, um das Einstellen des Abstands zwischen ihnen zu ermöglichen.

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4. Machine d'encoche selon une quelconque des revendications 1 à 3, **caractérisée en ce que** le support de bûches (6) est pourvu d'un ajustement pour permettre d'ajuster la position de la bûche (7) par rapport aux fraises d'encoche.

5. Machine d'encoche selon une quelconque des revendications 1 à 4, **caractérisée en ce que** les fraises d'encoche latérales (3,4) sont pourvues d'un ajustement pour permettre d'ajuster la distance entre eux.

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Revendications

1. Machine d'encoche pour usiner des bûches au sommet, à la base et au niveau des deux côtés, la machine d'encoche comprenant une fraise d'encoche supérieure (1), une fraise d'encoche inférieure (2) et deux fraises d'encoche latérales (3,4), un corps (5) ; un support de bûches (6) qui est soutenu contre le corps et sur lequel la bûche à usiner (7) peut être placée immobile ; un châssis rigide (8) déplaçable par rapport à la direction transversale de la bûche étant usinée ; la fraise d'encoche supérieure (1) et la fraise d'encoche inférieure (2) soutenues par le châssis pour réaliser une encoche supérieure et une encoche inférieure, respectivement, dans la bûche en déplaçant le châssis rigide (8), les fraises d'encoche latérales (3,4) soutenues par le châssis pour réaliser des encoches latérales dans la bûche en déplaçant les fraises d'encoche latérales, **caractérisée en ce que** les fraises d'encoche latérales (3, 4) sont montées de manière mobile sur le châssis (8) avec des trajets verticaux pour permettre aux fraises d'encoche (3,4) d'être déplacées vers le haut et/ou le bas simultanément dans une direction perpendiculaire à la direction de mouvement du châssis (8), quand le châssis (8) est arrêté, afin de réaliser des encoches latérales dans la bûche, les fraises d'encoche latérales (3,4) étant montées à une distance l'une de l'autre dans la direction de mouvement du châssis (8).
2. Machine d'encoche selon la revendication 1, **caractérisée en ce que** les guides (9) sont prévus entre le corps (5) et le châssis (8) pour déplacer le châssis d'avant en arrière le long de ces derniers.
3. Machine d'encoche selon la revendication 1 ou 2, **caractérisée en ce que** la fraise d'encoche supérieure (1) et/ou la fraise d'encoche inférieure (2) sont pourvues d'un ajustement pour permettre l'ajustement de la distance entre elles.

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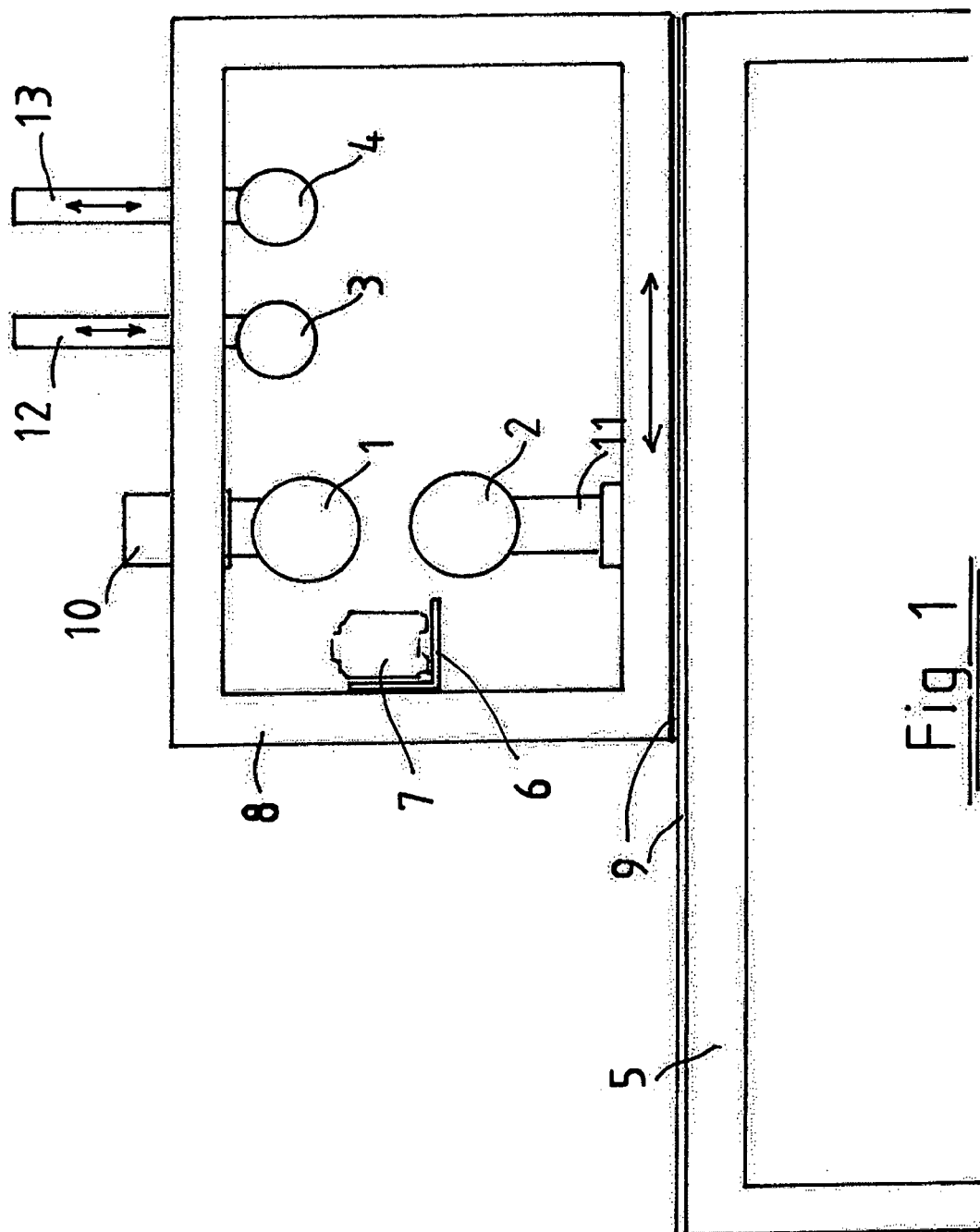
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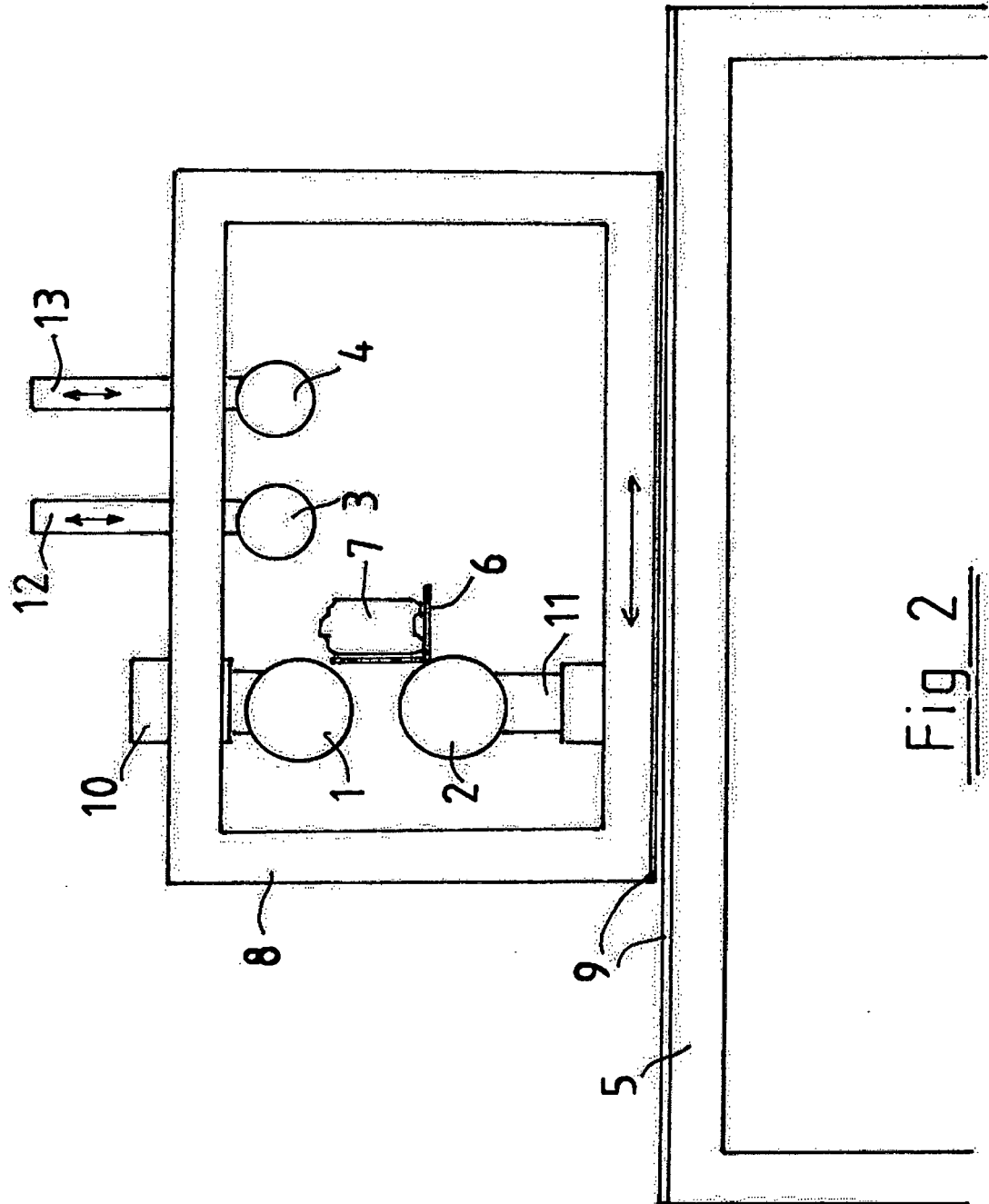


Fig 2

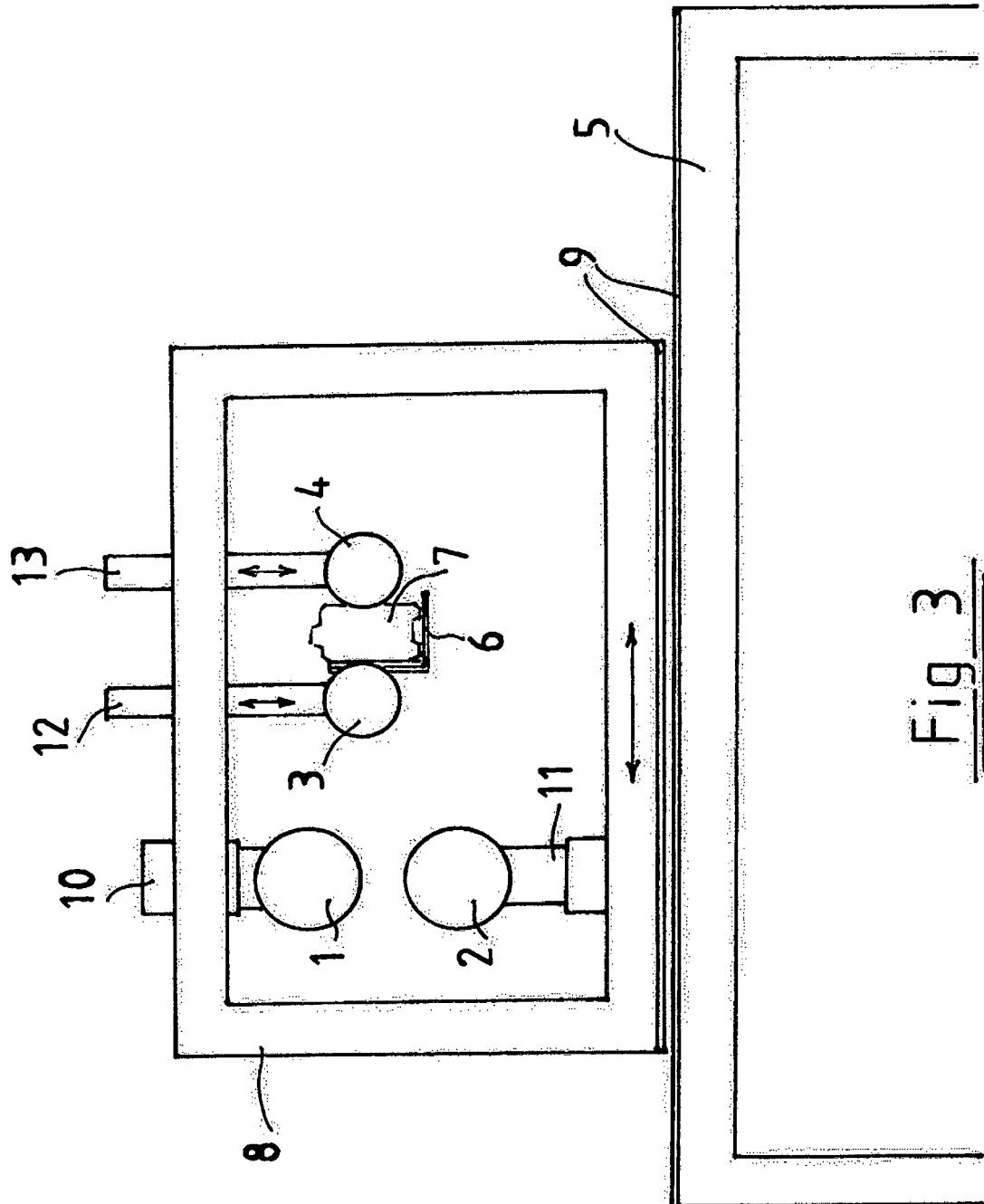


Fig 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 9952692 A1 [0001]