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(54) **A sump for a wet blast machine**

Sammelbehälter für ein Feuchtstrahlgerät

Collecteur de machine à sablage humide

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**US-A- 3 447 272** **US-A- 5 928 719**

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## Description

**[0001]** The invention relates to a sump for a wet blast machine of the type comprising a housing in which abrasive slurry is pumped, typically through a nozzle, turbine or the like, the abrasive slurry being incident, in use of the machine, on a component to be cleaned or stripped.

**[0002]** It is desirable to be able to collect and recirculate the slurry and this is typically achieved by mounting a collection sump under the housing and nozzle(s). The slurry in the pump can then be agitated to keep the abrasive particles in suspension in the liquid. However, the slurry should collect in the bottom of the sump and to achieve this the slurry must not adhere to the sides of the sump. To achieve this it has been proposed to incline the side walls of the sump. However, the angle of inclination typically required can lead to the sump becoming impractically deep.

**[0003]** A wet blasting sump and a wet blasting machine according to the preambles of claims 1 and 15 is disclosed in US 344 72 72.

**[0004]** According to a first aspect of the invention there is provided a wet blast machine sump comprising an outer peripheral wall the upper margin of which is adapted to be attached to a housing of the wet blast machine in which abrasive slurry is pumped in use, the abrasive slurry being incident on a component to be cleaned or stripped located within the housing, the sump being provided with a protrusion spaced inwardly from the outer wall, and so arranged that a channel in the form of a continuous loop is defined between the outer wall and the inner protrusion, the side walls of the channel, that is the walls of the channel as defined by the outer wall and protrusion, being inclined, characterised in that the sump (1) further comprises a slurry agitation system (17, 19, 21) comprising a pump (17) operative to pump abrasive slurry along the channel (15) such that, in use, abrasive slurry flows along the channel (15) so as to flow around the protrusion (3) and to keep abrasive particles in the slurry suspended.

**[0005]** Preferably the outer wall is integral with the protrusion.

**[0006]** Preferably the protrusion is located substantially in the centre of the sump, when the sump is viewed in plan.

**[0007]** Preferably the protrusion is located in a deepest part of the sump. The outer wall of the sump is preferably inclined from the upper margin of the outer wall so that the sump forms a bowl. The outer wall may, when viewed in transverse cross section or longitudinal cross section be curved, planar, or formed from a combination of curved and planar portions.

**[0008]** Preferably the base of the protrusion is wider than the top of the protrusion such that the protrusion is tapered.

**[0009]** Preferably the protrusion is of triangular transverse cross section.

**[0010]** Preferably the protrusion is of frusto-conical

longitudinal cross section.

**[0011]** The protrusion may alternatively comprise a cone or a pyramid. The cross section of the protrusion may vary along the length of the protrusion.

5 **[0012]** Preferably the side walls of the channel are inclined at an angle that is greater than 20 degrees to the horizontal when the sump is in use. Preferably the angle is between 35 and 55 degrees.

10 **[0013]** Most preferably, the side walls of the channel are inclined at an angle that is substantially 40 degrees to the horizontal when the sump is in use.

**[0014]** Preferably a nozzle is provided through which abrasive slurry is pumped by the pump in use.

15 **[0015]** Preferably the pump is operative to pump used slurry in use from the housing of the wet blast machine, and is further operative to re-circulate slurry from the sump to the housing of the wet blast machine.

**[0016]** According to a second aspect of the invention we provide a wet blast machine according to claim 15.

20 **[0017]** The present invention may be carried into practice in various ways, but embodiments will now be described by way of example only with reference to the accompanying drawings in which:

25 **Figure 1** is a perspective view of a sump in accordance with the present invention;

**Figure 2** is a plan view of the sump of Figure 1;

30 **Figure 3a** is a transverse sectional view of the sump along lines A-A of Figure 2 and **Figure 3b** is a longitudinal sectional view of the sump along lines B-B of Figure 2; and

35 **Figure 4** is a perspective view of another sump in accordance with the present invention.

40 **[0018]** Referring to Figures 1 to 3, a sump 1 for a wet blast machine (not shown) comprises a central protrusion 3 which projects upwardly from the base, that is, the deepest part, of the sump 1.

45 **[0019]** The protrusion 3, in this example comprises two opposed inclined planar sides 5 which meet at an apex 7 of the protrusion, and two opposed, curved ends 9, each of which abuts the inclined sides 5 and the apex 7. The protrusion 3 thus has a triangular transverse cross section when viewed from either end, as can be seen from Figure 3a, and has a frusto-conical longitudinal cross section when viewed from either side, as can be seen from Figure 3b.

50 **[0020]** The sump 1 further comprises an inclined outer peripheral wall 11. The upper margin 13 of the outer wall 11 is adapted to be attached in use to the lower margin of a housing 12 of the wet blast machine such that abrasive slurry that is pumped in the housing 12 drops into the sump 1 after use. A suitable seal may be incorporated as desired. The sump 1 may be releasably attached to the housing 12 using suitable quick release clamps or

the like.

**[0021]** The sump 1, in this embodiment, is lozenge shaped when viewed in plan, that is the sump 1 comprises two straight outer side wall portions 11A, 11B linked together by two semicircular outer side wall portions 11C, 11D. The protrusion 3 is of similar shape when viewed in plan and is arranged to be concentric with the outer sump wall 11. The two straight outer side wall portions 11A, 11B are substantially planar in this embodiment.

**[0022]** The outer side wall portions 11A to 11D are inclined to the horizontal at an angle of substantially 40°. The sides 5 and ends 9 of the protrusion 3 are inclined at a similar angle. The angle of inclination is chosen such that abrasive slurry incident on the wall portions 11A to 11D, and the sides 5 and end 9 of the protrusion 3, does not adhere to these surfaces, ie the angle is chosen such that the slurry slides down these surfaces towards the base of the sump 1. Generally speaking most wet abrasive slurry types require an angle of substantially 40°. However, it will be appreciated that the angle of inclination should be selected to achieve this effect and may vary in dependence upon the exact slurry used.

**[0023]** The sump is arranged such that a continuous slurry flow channel 15 is defined between the outer sump wall 11 and the protrusion 3. In this example the flow channel 15 is substantially oval in plan.

**[0024]** As can be seen from Figure 3, a slurry agitation system is provided which comprises a pump 17 and a plurality of abrasive slurry pipes 19 each of which terminates in a respective slurry outlet which in this example comprises a nozzle 21. Any other suitable slurry outlet can alternatively be provided, including, for example, a turbine or the like. The nozzles 21 are spaced around the channel 15 and are directed such that slurry exiting through each nozzle 21 flows around the channel 15 at a speed sufficient to maintain the abrasive particles of the slurry in suspension in the slurry liquid.

**[0025]** The pump 17 is provided with further pipework (not shown) to transfer abrasive slurry from the sump 1 and up into the housing of the machine.

**[0026]** The sump 1 may be of any shape when viewed in plan. Referring to Figure 4 the sump 31 is of rectangular shape when viewed in plan. In this embodiment, the outer wall 33 of the sump 31 comprises four planar, vertical side portions 35 and a curved base portion 37 that adjoins the vertical side portions 35. The angle of inclination of the curved base portion 37 is substantially 40° to the horizontal as described above.

**[0027]** It will be appreciated that the outer wall, of the sump 1, 31, 11, 33 could comprise any combination of curved and planar portions.

**[0028]** Any number of circulation pipes and nozzles may also be provided. Any other suitable slurry agitation system may alternatively be provided.

**[0029]** Additionally, it is envisaged that baffles could be added to the channel 15 to create an area of non turbulent flow. This allows suspended abrasive to fall to the bottom of the sump 1 where the pump inlet is situated,

thus increasing the concentration of the slurry that is recirculated to the housing of the machine.

**[0030]** Baffles could also be added to create additional turbulence in areas of the sump 1 where the agitation is insufficient to keep the abrasive in suspension.

**[0031]** The or each baffle can take any size and shape, including, for example, a plate that extends across the channel to fully or partially block the channel, the plate having a lower relief aperture through which the slurry can flow.

## Claims

1. A wet blast machine sump (1) comprising an outer peripheral wall (11) the upper margin (13) of which is adapted to be attached to a housing of the wet blast machine in which abrasive slurry is pumped in use, the abrasive slurry being incident on a component to be cleaned or stripped located within the housing, the sump (1) being provided with a protrusion (3) spaced inwardly from the outer wall (11), and so arranged that a channel (15) in the form of a continuous loop is defined between the outer wall (11) and the inner protrusion (3), the side walls of the channel (15), that is the walls of the channel (15) as defined by the outer wall (11) and protrusion (3), being inclined **characterised in that** the sump (1) further comprises a slurry agitation system (17, 19, 21) comprising a pump (17) operative to pump abrasive slurry along the channel (15) such that, in use, abrasive slurry flows along the channel (15) so as to flow around the protrusion (3) and to keep abrasive particles in the slurry suspended.
2. The sump (1) of claim 1 wherein the outer wall (11) is integral with the protrusion (3).
3. The sump (1) of claim 1 or claim 2 wherein the protrusion (3) is located substantially in the centre of the sump (1), when the sump (1) is viewed in plan.
4. The sump (1) of any one of the preceding claims wherein the protrusion (3) is located in a deepest part of the sump (1).
5. The sump (1) of any one of the preceding claims wherein the outer wall (11) of the sump (1) is inclined from the upper margin (13) of the outer wall (11) so that the sump (1) forms a bowl.
6. The sump (1) of any one of the preceding claims wherein the base of the protrusion (3) is wider than the top of the protrusion (3) such that the protrusion (3) is tapered. ,
7. The sump (1) of claim 6 wherein the protrusion (3) is of triangular transverse cross section.

8. The sump (1) of claim 6 or claim 7 wherein the protrusion (3) is of frustro-conical longitudinal cross section.
9. The sump (1) of claim 6 wherein the protrusion (3) comprises a cone.
10. The sump (1) of any one of the preceding claims wherein the side walls of the channel (15) are inclined at an angle that is greater than 20 degrees to the horizontal when the sump (1) is in use.
11. The sump (1) of claim 10 wherein the angle is between 35 and 55 degrees.
12. The sump (1) of claim 10 or claim 11 wherein the side walls of the channel (15) are inclined at an angle that is substantially 40 degrees to the horizontal when the sump (1) is in use.
13. The sump of any one of the preceding claims further comprising a nozzle through which abrasive slurry is pumped by the pump in use
14. The sump (1) of any one of the preceding claims wherein the pump (17) is operative to pump used slurry in use from the housing of the wet blast machine, and is further operative to re-circulate slurry from the sump (1) to the housing of the wet blast machine.
15. A wet blast machine comprising a housing in which abrasive slurry is pumped in use, such that the abrasive slurry is incident on a component to be cleaned or stripped located within the housing, the wet blast machine further comprising a sump (1) comprising an outer peripheral wall (11) the upper margin (13) of which is adapted to be attached to the housing, the sump (1) being provided with a protrusion (3) spaced inwardly from the outer wall (11), and so arranged that a channel (15) in the form of a continuous loop is defined between the outer wall (11) and the inner protrusion (3), the side walls of the channel (15), that is the walls of the channel (15) as defined by the outer wall (11) and protrusion (3), being inclined, **characterised in that** the sump (1) further comprises a slurry agitation system (17, 19, 21) comprising a pump (17) operative to pump abrasive slurry along the channel (15) so as to flow such that, in use, abrasive slurry flows along the channel (15) around the protrusion (3) and to keep abrasive particles in the slurry suspended.

#### Patentansprüche

1. Sammelbehälter (1) für ein Feuchtstrahlgerät mit einer Außenwand (11), deren oberer Rand (13) an ei-

nem Gehäuse des Feuchtstrahlgeräts befestigbar ist, in das im Betrieb Abrasivschlamm gepumpt wird, wobei der Abrasivschlamm auf eine zu reinigende oder abzuschleifende Komponente innerhalb des Gehäuses trifft, und der Sammelbehälter (1) einen Vorsprung (3) aufweist, der nach innen beabstandet zur Außenwand (11) derart angeordnet ist, dass eine Rinne (15) in Form einer durchgehenden Schleife zwischen der Außenwand (11) und dem inneren Vorsprung (3) gebildet ist, und wobei die Seitenwände der Rinne (15), die durch die Außenwand (11) und den Vorsprung (3) gebildet sind, geneigt sind, **dadurch gekennzeichnet, dass** der Sammelbehälter (1) weiterhin ein Schlammbewegungssystem (17, 19, 21) aufweist, mit einer Pumpe (17) zum Pumpen des Abrasivschlammes längs der Rinne (15) derart, dass im Betrieb der Abrasivschlamm entlang der Rinne (15) fließt, um um den Vorsprung (3) herumzuzießen und Abrasivpartikel im Schlamm zurückzuhalten.

2. Sammelbehälter (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die Außenwand (11) und der Vorsprung (3) aus einem Teil sind.
3. Sammelbehälter (1) nach Anspruch 1 oder Anspruch 2, **dadurch gekennzeichnet, dass** der Vorsprung (3) in der Draufsicht im Wesentlichen in der Mitte des Sammelbehälters (1) angeordnet ist.
4. Sammelbehälter (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Vorsprung (3) an der tiefsten Stelle des Sammelbehälters (1) angeordnet ist.
5. Sammelbehälter (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Außenwand (11) des Sammelbehälters (1) von ihrem oberen Rand (13) aus geneigt ist, so dass der Sammelbehälter (1) ein Becken formt.
6. Sammelbehälter (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Basis des Vorsprungs (3) breiter als die Spitze ist, so dass der Vorsprung (3) keilförmig ist.
7. Sammelbehälter (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** der Vorsprung (3) einen dreieckigen Querschnitt aufweist.
8. Sammelbehälter (1) nach Anspruch 6 oder Anspruch 7, **dadurch gekennzeichnet, dass** der Vorsprung (3) einen kegelstumpfförmigen Querschnitt aufweist.
9. Sammelbehälter (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** der Vorsprung (3) einen Kegel umfasst.

10. Sammelbehälter (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Seitenwände der Rinne (15) bei Betrieb des Sammelbehälters (1) um mehr als 20 Grad zur Horizontalen geneigt sind.
11. Sammelbehälter (1) nach Anspruch 10, **dadurch gekennzeichnet, dass** der Winkel zwischen 35 Grad und 55 Grad beträgt.
12. Sammelbehälter (1) nach Anspruch 10 oder Anspruch 11, **dadurch gekennzeichnet, dass** die Seitenwände der Rinne (15) um einen Winkel von im Wesentlichen 40 Grad zur Horizontalen geneigt sind.
13. Sammelbehälter (1) nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** er weiterhin eine Düse aufweist, durch die mittels der Pumpe Abrasivschlamm gepumpt wird.
14. Sammelbehälter (1) einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Pumpe (17) derart betreibbar ist, um im Betrieb benötigten Schlamm aus dem Gehäuse des Feuchtstrahlgeräts zu pumpen und um Schlamm aus dem Sammelbehälter (1) wieder in das Gehäuse des Feuchtstrahlgeräts zurückzuführen.
15. Feuchtstrahlgerät umfassend ein Gehäuse, in das bei Betrieb Abrasivschlamm gepumpt wird, so dass der Abrasivschlamm auf eine zu reinigende oder abzuschleifende Komponente innerhalb des Gehäuses trifft, wobei das Feuchtstrahlgerät ferner einen Sammelbehälter (1) umfasst mit einer Außenwand (11), deren oberer Rand (13) an dem Gehäuse befestigbar ist, wobei der Sammelbehälter (1) einen Vorsprung (3) aufweist, der nach innen beabstandet zur Außenwand (11) derart angeordnet ist, dass eine Rinne (15) in Form einer durchgehenden Schleife zwischen der Außenwand (11) und dem Vorsprung (3) gebildet ist und die Seitenwände der Rinne (15), die durch die Außenwand (11) und den Vorsprung (3) gebildet sind, geneigt sind, **dadurch gekennzeichnet, dass** der Sammelbehälter (1) weiterhin ein Schlammbewegungssystem (17, 19, 21) aufweist, mit einer Pumpe (17) zum Pumpen des Abrasivschlammes längs der Rinne (15) derart, dass im Betrieb der Abrasivschlamm entlang der Rinne (15) fließt, um um den Vorsprung (3) herumzuzießen und Abrasivpartikel im Schlamm zurückzuhalten.

## Revendications

1. Puisard de machine de sablage humide (1) comprenant une paroi périphérique externe (11) dont la marge supérieure (13) est adaptée pour être attachée à

un logement de la machine de sablage humide dans laquelle une boue abrasive est pompée en cours d'utilisation, la boue abrasive étant incidente sur un composant à nettoyer ou décaper situé dans le logement, le puisard (1) étant pourvu d'une protubérance (3) espacée vers l'intérieur de la paroi externe (11), et agencée de telle sorte qu'un canal (15) sous la forme d'une boucle continue est défini entre la paroi externe (11) et la protubérance interne (3), les parois latérales du canal (15), à savoir les parois du canal (15) telles que définies par la paroi externe (11) et la protubérance (3), étant inclinées, **caractérisé en ce que** le puisard (1) comprend en outre un système d'agitation de boue (17, 19, 21) comprenant une pompe (17) opérationnelle pour pomper la boue abrasive le long du canal (15) de telle sorte que, en cours d'utilisation, la boue abrasive s'écoule le long du canal (15) de façon à s'écouler autour de la protubérance (3) et à maintenir les particules abrasives dans la boue en suspension.

2. Puisard (1) selon la revendication 1, dans lequel la paroi externe (11) est solidaire de la protubérance (3).
3. Puisard (1) selon la revendication 1 ou la revendication 2, dans lequel la protubérance (3) est située sensiblement au centre du puisard (1), lorsque le puisard (1) est vu en plan.
4. Puisard (1) selon l'une quelconque des revendications précédentes, dans lequel la protubérance (3) est située dans une partie la plus profonde du puisard (1).
5. Puisard (1) selon l'une quelconque des revendications précédentes, dans lequel la paroi externe (11) du puisard (1) est inclinée par rapport à la marge supérieure (13) de la paroi externe (11) de sorte que le puisard (1) forme un bol.
6. Puisard (1) selon l'une quelconque des revendications précédentes, dans lequel la base de la protubérance (3) est plus large que le sommet de la protubérance (3) de telle sorte que la protubérance (3) est effilée.
7. Puisard (1) selon la revendication 6, dans lequel la protubérance (3) a une section transversale triangulaire.
8. Puisard (1) selon la revendication 6 ou la revendication 7, dans lequel la protubérance (3) a une section longitudinale tronconique.
9. Puisard (1) selon la revendication 6, dans lequel la protubérance (3) comprend un cône.

10. Puisard (1) selon l'une quelconque des revendications précédentes, dans lequel les parois latérales du canal (15) sont inclinées selon un angle plus grand que 20 degrés par rapport à l'horizontale lorsque le puisard (1) est en cours d'utilisation. 5
11. Puisard (1) selon la revendication 10, dans lequel l'angle est compris entre 35 et 55 degrés.
12. Puisard (1) selon la revendication 10 ou la revendication 11, dans lequel les parois latérales du canal (15) sont inclinées selon un angle qui est sensiblement de 40 degrés par rapport à l'horizontale lorsque le puisard (1) est en cours d'utilisation. 10  
15
13. Puisard selon l'une quelconque des revendications précédentes, comprenant en outre une buse à travers laquelle la boue abrasive est pompée par la pompe en cours d'utilisation. 20
14. Puisard (1) selon l'une quelconque des revendications précédentes, dans lequel la pompe (17) est opérationnelle pour pomper la boue utilisée en cours d'utilisation depuis le logement de la machine de sablage humide, et est en outre opérationnelle pour faire recirculer la boue depuis le puisard (1) vers le logement de la machine de sablage humide. 25
15. Machine de sablage humide comprenant un logement dans lequel une boue abrasive est pompée en cours d'utilisation, de sorte que la boue abrasive est incidente sur un composant à nettoyer ou décaper situé dans le logement, la machine de sablage humide comprenant en outre un puisard (1) comprenant une paroi périphérique externe (11) dont la marge supérieure (13) est adaptée pour être attachée au logement, le puisard (1) étant pourvu d'une protubérance (3) espacée vers l'intérieur de la paroi externe (11), et agencée de telle sorte qu'un canal (15) sous la forme d'une boucle continue est défini entre la paroi externe (11) et la protubérance interne (3), les parois latérales du canal (15), à savoir les parois du canal (15) telles que définies par la paroi externe (11) et la protubérance (3), étant inclinées, **caractérisé en ce que** le puisard (1) comprend en outre un système d'agitation de boue (17, 19, 21) comprenant une pompe (17) opérationnelle pour pomper la boue abrasive le long du canal (15) de telle sorte que, en cours d'utilisation, la boue abrasive s'écoule le long du canal (15) de façon à s'écouler autour de la protubérance (3) et à maintenir les particules abrasives dans la boue en suspension. 30  
35  
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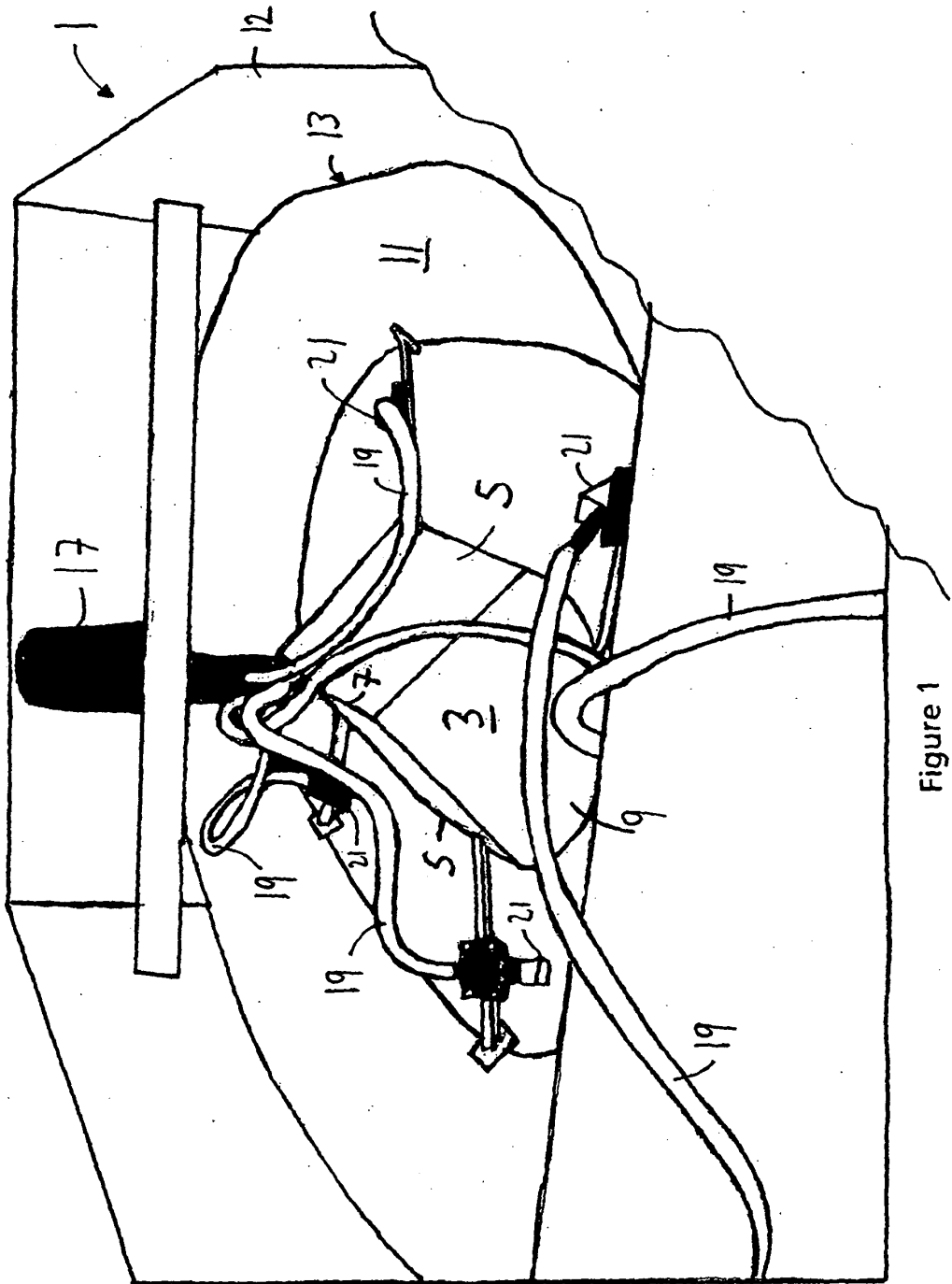


Figure 1

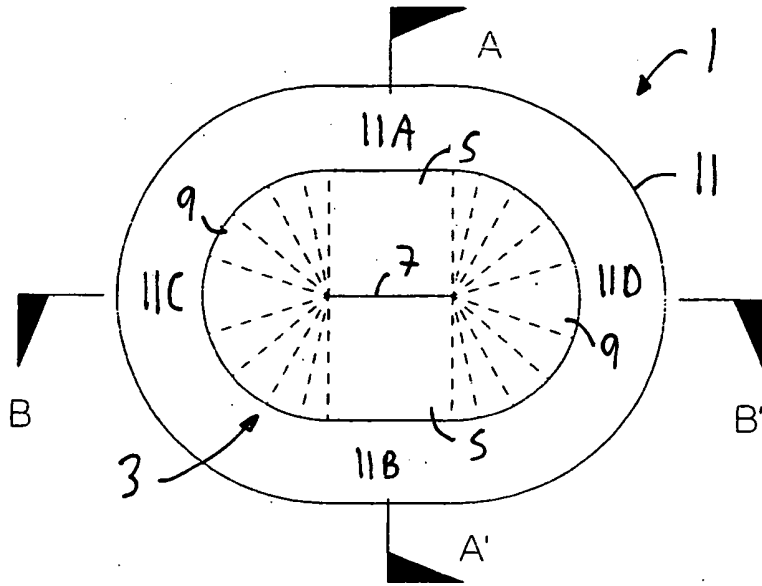


Figure 2

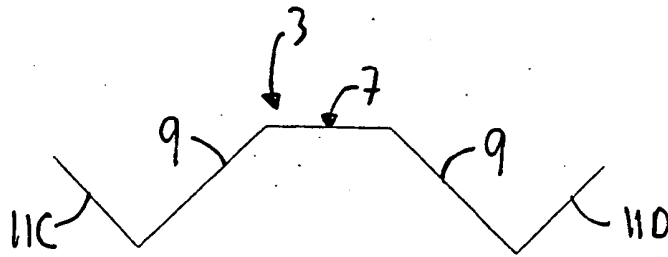


Figure 3a

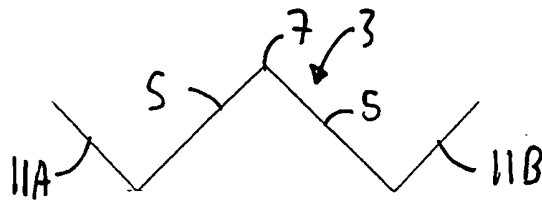


Figure 3b



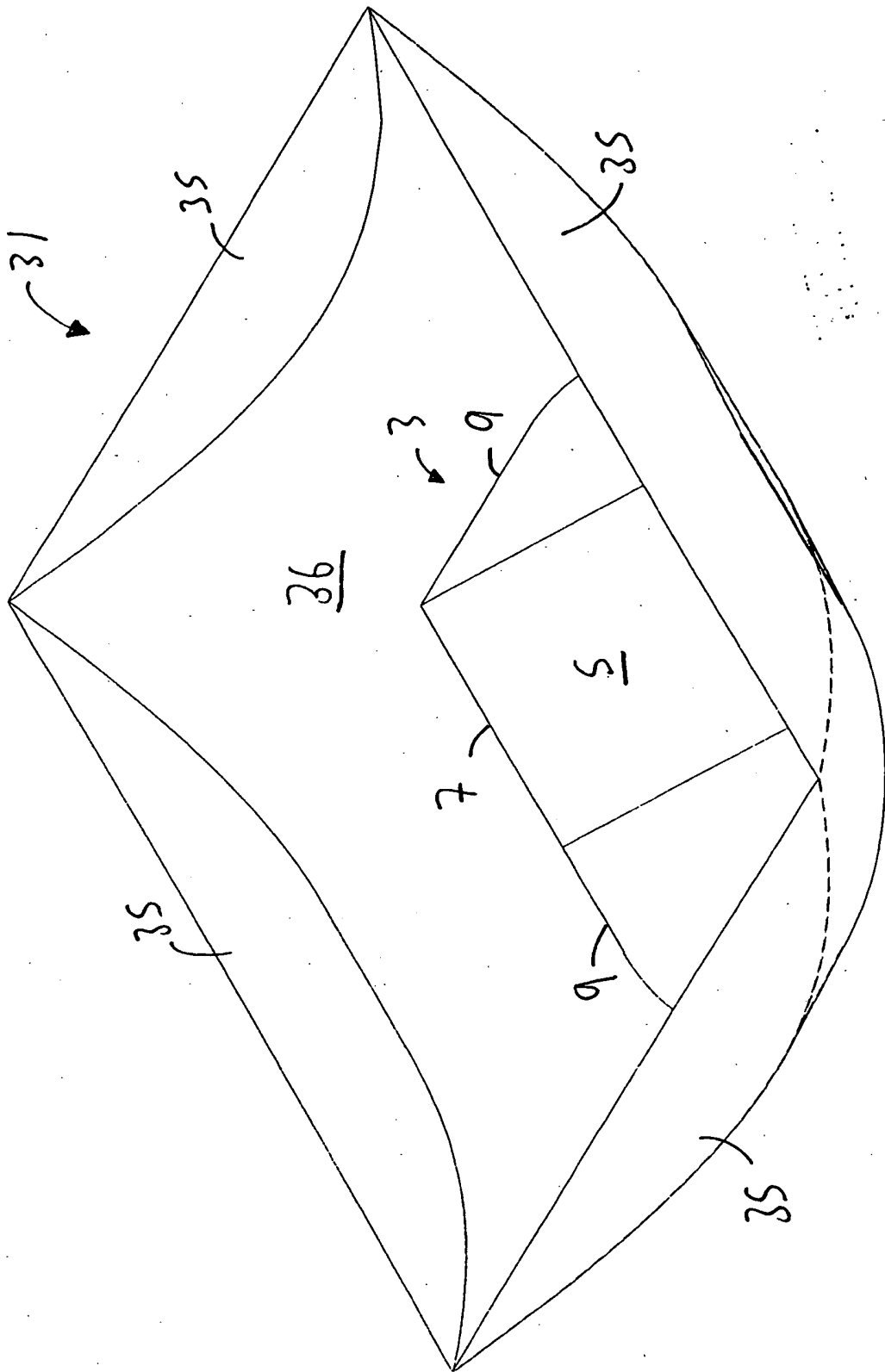


Figure 4

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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