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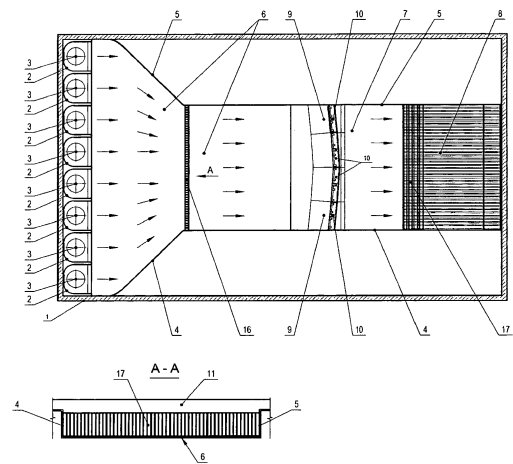
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(54) **ARTIFICIAL WAVE GENERATION SURFING FACILITY**

(57) A rtificial wave generation surfing facility, comprising a water tank (1) having installed at its upper portion: a working surface having an inclined section (6) and a drainage grille (8); further comprising a submersible pump (4) whose outlet is connected to a water moving device (2), with the hydraulic unit's outlet being positioned above the working surface, wherein the working surface is laid over flooring with a wave generation threshold (9) and the hydraulic unit's outlet is partitioned into sections, wherein the hydraulic unit's outlet has a direct exit channel to the upper edge of the working surface inclined section, while the lower edge of the working surface inclined section makes a smooth transition to the wave generation threshold.



**FIG.9**

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## Description

### FIELD OF THE INVENTION

**[0001]** The present invention relates to water amusement facilities producing artificial waves for surfing.

**[0002]** One known design of an artificial wave generation surfing facility is described in patent No. US8516624 (published on 2013-08-27). This prior art design has been chosen as the closest analog.

**[0003]** The closest analogous artificial wave generation surfing facility comprises: a main pool; a wave pool; an inclined ramp whose bottom end extends down into the pool, a horizontally arranged flow section flow section connected at an outlet end thereof to an upper end of the ramp; at least one pump connected to an inlet end of the flow section by means of which water is conveyed from the main pool to the flow section; at least one adjustable guide device in the wave pool at a distance downstream from the lower end of the ramp, wherein the wave pool is positioned above the main pool, wherein the at least one pump unit, during operation, being adapted to produce a liquid level in the wave pool sufficient to produce a defined resistance to water flowing down the ramp which will enable formation of the standing wave at the at least one adjustable guide device by a change of the flow velocity of the water, and an overflow via which water is able to flow back from the wave pool into the main pool, the overflow being provided with an adjusting mechanism that enables the water level in the wave pool to be regulated in a manner enabling, in a resting state, retaining of a total amount of water to fill the main pool and wave pool to a level sufficient to provide said defined resistance upon commencement of operation.

**[0004]** One disadvantage of the prior art is the inclusion of the horizontally arranged section to which water is pumped. Adjoining to the side of the horizontally arranged flow section is the edge of the inclined surface abutting on the pool bottom with the other end. It is noted that the length of the inclined section would be preferably half the length of the horizontal flow section.

**[0005]** Therefore, the entire structure of the surfing facility requires supplemental support structural members (pillars and beams) that should hold in place the horizontal flow section. It makes the structure more complex, heavyweight and cumbersome, extending the assembly and dismantling time.

**[0006]** Also, the side walls of the surfing facility will be moved together to stabilize and regulate the water flow, which gives rise to further technical difficulties and the need to use additional drives and actuators. It is, therefore, an objective of the proposed invention to address the above issues.

**[0007]** The technical result of the invention is a simpler and lighter design and a shorter assembly and dismantling time along with the capability to control the water flow rate and to stabilize the flow.

The above technical result is achieved by providing an

artificial wave generation surfing facility, comprising a water tank having installed at its upper portion: a working surface having an inclined section and a drainage grille; further comprising a submersible pump whose outlet is connected to a water moving (lifting) machine (hydraulic unit), with the hydraulic unit's outlet being positioned above the working surface, wherein the working surface is laid over flooring with a wave generation threshold, and the hydraulic unit's outlet is partitioned into sections, characterized in that the hydraulic unit's outlet has a direct exit channel to the upper edge of the working surface inclined section, while the lower edge of the working surface inclined section makes a smooth transition to the wave generation threshold.

**[0008]** The working surface inclined section may be provided with a partition with sections used to stabilize the flow.

The inclined section may be configured tapering from upper to lower edge.

**[0009]** The inclined section may be configured tapering from upper to lower edge to a specified level from which the flow width to the inclined section lower edge coming into abutment with the bottom remains constant.

The span where the flow width remains constant may house the partition with sections used to stabilize the flow. The wave generation threshold may be configured as a fixture repositionable relative to the flooring.

### BRIEF DESCRIPTION OF THE DRAWINGS

#### **[0010]**

Fig. 1 shows the simplest embodiment of the surfing facility (the top view in the operating state).

Fig. 2 shows the simplest embodiment of the surfing facility (the top view without inspection platforms).

Fig. 3 illustrates the simplest embodiment of the surfing facility (the cross-section side view and the close-up view of the wave crest section).

Fig. 4 depicts the simplest embodiment of the surfing facility complete with a flow stabilizer (the top view without inspection platforms).

Fig. 5 shows the simplest embodiment of the surfing facility complete with a flow stabilizer (the cross-section side view and the close-up view of the wave crest section).

Fig. 6 depicts the embodiment of the surfing facility with a tapering inclined surface (the top view in the operating state).

Fig. 7 shows the embodiment of the surfing facility with a tapering inclined surface (the top view without inspection platforms).

Fig. 8 illustrates the embodiment of the surfing facility with a tapering inclined surface (the cross-section side view and the close-up view of the wave crest section).

Fig. 9 depicts the embodiment of the surfing facility complete with a flow stabilizer (the top view without

inspection platforms).

Fig. 10 shows the embodiment of the surfing facility with a tapering inclined surface and a flow stabilizer (the cross-section side view and the close-up view of the wave crest section).

**[0011]** In the drawings: 1 - reinforced concrete bowl (water tank), 2 - water moving (lifting) machine (hydraulic unit with water injection nozzles), 3 - submersible pump, 4 - left-hand side of channel, 5 - right-hand side of channel, 6 - wave fetching portion of channel, 7 - channel bottom, 8 - drainage grille, 9 - threshold, 10 - lifting (wave forming) crest, 11 - two tier central platform, 12 - side initiating platform, 13 - water level, 14 - riding wave, 15 - crest hoist, 16 - partition with sections (flow stabilizer), 17 - control plate on drainage grilles.

#### DETAILED DESCRIPTION OF THE INVENTION

**[0012]** The artificial wave generation surfing facility includes a water tank 1 (ref. to Fig. 1, Fig. 2, and Fig. 3) having installed at its upper portion a working surface having inclined section 6, drainage grille 8 that may have control plates 17.

**[0013]** The facility further comprises a submersible pump 3 whose outlet is connected to a water moving (lifting) machine (hydraulic unit) 2 with the hydraulic unit outlet being positioned above the working surface.

**[0014]** The working surface is laid over the flooring having threshold 9 used for generating a wave 14.

**[0015]** Furthermore, the water moving (lifting) machine (hydraulic unit) 2 outlet is split into sections.

**[0016]** The novelty is that the water moving (lifting) machine (hydraulic unit) 2 outlet has the direct exit channel to the upper edge of the working surface inclined section 6 and the lower edge of the working surface inclined section 6 smoothly transitions into wave generation threshold 9.

A simpler design, a smaller weight, and a shorter assembly and dismantling time is ensured by obviating the need for additional support structures (pillars and beams) that should hold in place the horizontal flow section. This horizontal flow section is made redundant in the claimed facility by connecting inclined section 6 directly to threshold 9 and hydraulic unit 2 outlet.

Alternative embodiments of the facility include the following additions to the facility design.

Working surface inclined section 6 may house partition 16 split into sections used to stabilize the flow (see the embodiments in Fig.4 and Fig.5). By shutting off sections in partition 16, for instance, by means of gate valves, water flow may be stabilized and water flow rate may be controlled without the need for side walls of the surfing facility to be moved together, thus making the design simpler while retaining the capability to control the water flow rate and to stabilize the flow. Inclined section 6 may be configured tapering from upper to lower edge thus creating a downward slope of the channel left-hand side

4 and/or the right-hand side 5, which makes the design simpler while retaining the capability to control the water flow rate and to stabilize the flow.

**[0017]** Inclined section 6 may be configured tapering from upper to lower edge to a specified level from which the flow width to the inclined section lower edge coming into abutment with channel bottom 7 remains constant (see the embodiments in Fig.6, Fig.7, and Fig.8), which makes the design simpler while retaining the capability to control the water flow rate and to stabilize the flow. The span where the flow width remains constant may house a partition with sections used to stabilize the flow (see the embodiments in Fig. 6, Fig.9, and Fig. 10). Threshold 9 serving to generate waves may be configured as a fixture repositionable relative to the flooring and in the form of crest 15 hoist, which also makes it possible to control the water flow rate and to stabilize the flow.

#### Claims

1. An artificial wave generation surfing facility, comprising a water tank having installed at its upper portion: a working surface having an inclined section and a drainage grille; further comprising a submersible pump whose outlet is connected to a water moving device (hydraulic unit), with the hydraulic unit's outlet being positioned above the working surface, wherein the working surface is laid over flooring with a wave generation threshold and the hydraulic unit's outlet is partitioned into sections, **characterized in that** the hydraulic unit's outlet has a direct exit channel to the upper edge of the working surface inclined section, while the lower edge of the working surface inclined section makes a smooth transition to the wave generation threshold.
2. The surfing facility of claim 1, **characterized in that** the working surface inclined section houses a partition with sections used to stabilize the flow.
3. The surfing facility of claims 1 or 2, **characterized in that** the inclined section is configured tapering from upper to lower edge.
4. The surfing facility of claim 3, **characterized in that** the inclined section is configured tapering from upper to lower edge to a specified level from which the flow width to the inclined section lower edge coming into abutment with the bottom remains constant.
5. The surfing facility of claim 1, **characterized in that** the span where the flow width remains constant may house the partition with sections used to stabilize the flow.
6. The surfing facility of claim 1, **characterized in that**

the wave generation threshold may be configured as a fixture repositionable relative to the flooring.

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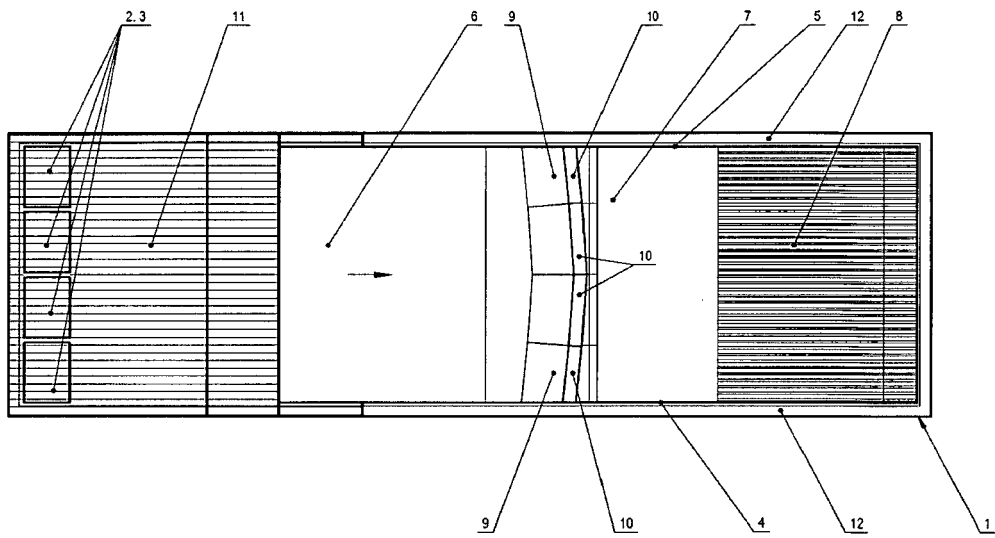


FIG.1



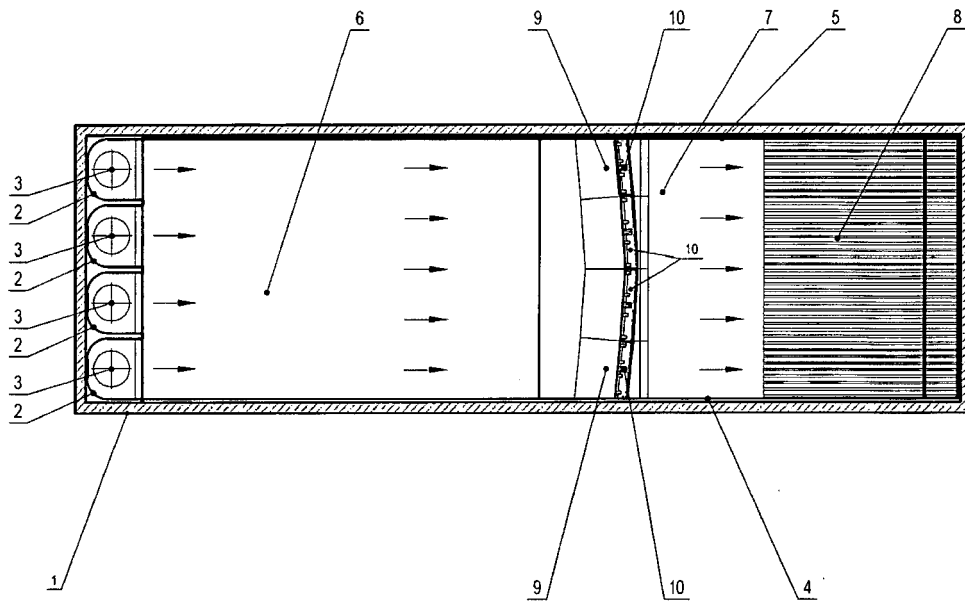


FIG.2

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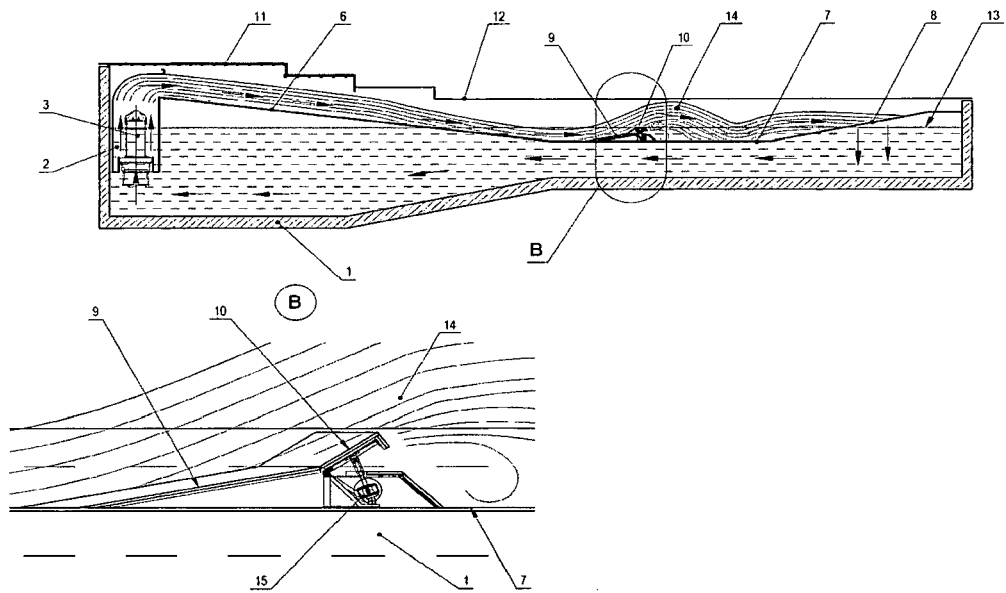


FIG.3

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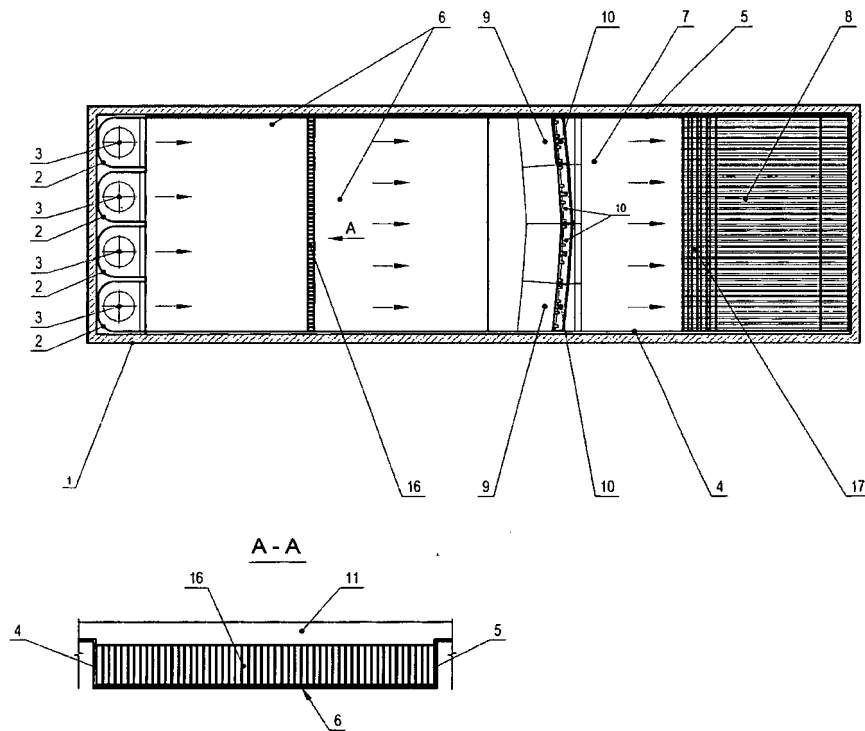


FIG.4

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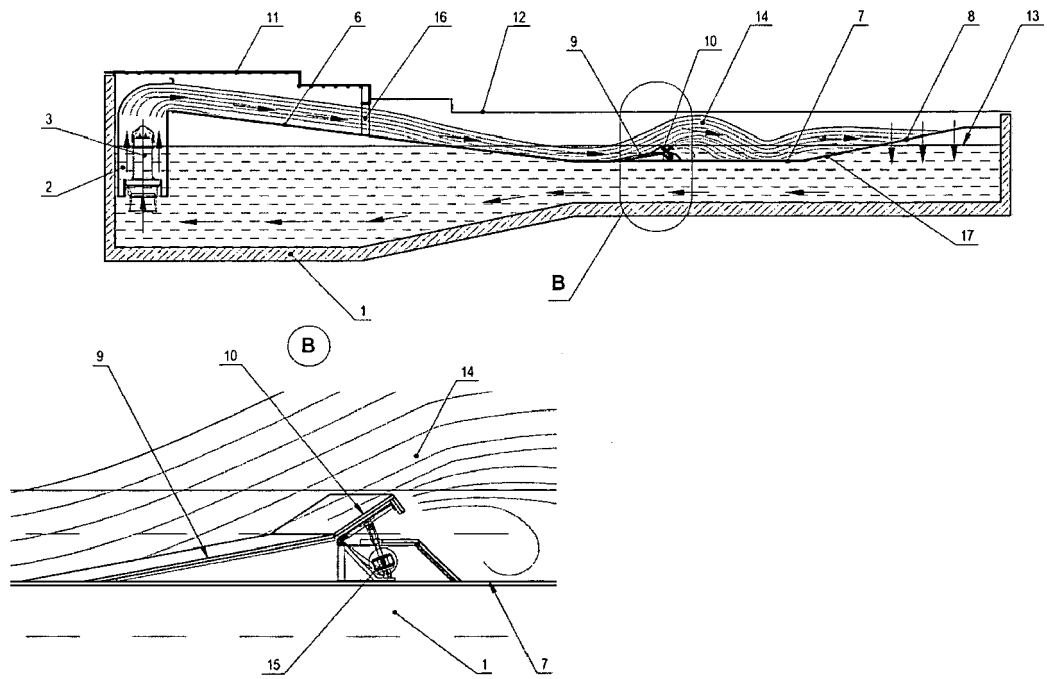
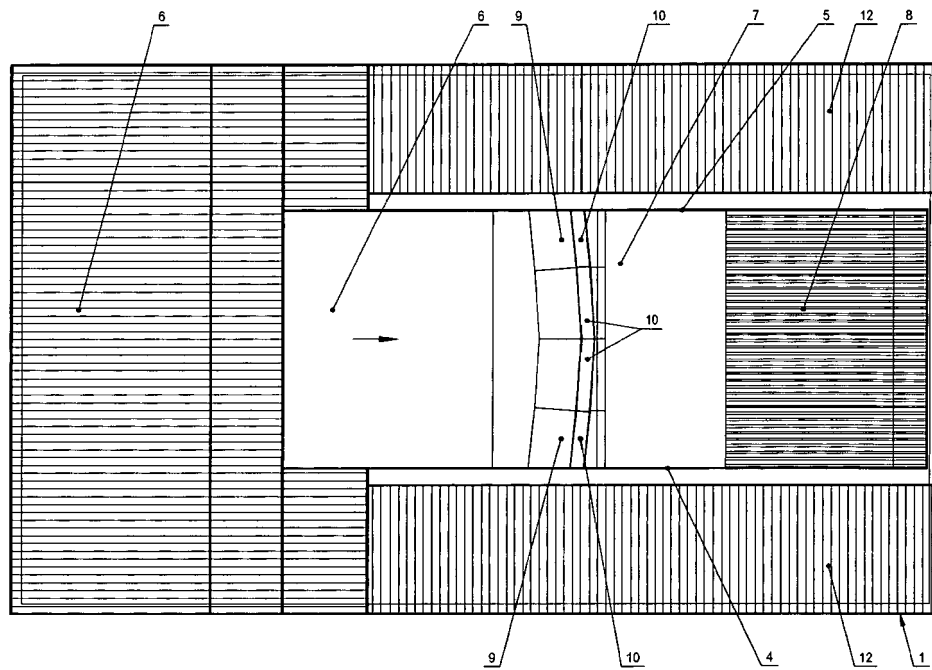


FIG.5

*[Handwritten signature]*



**FIG.6**

*[Signature]*

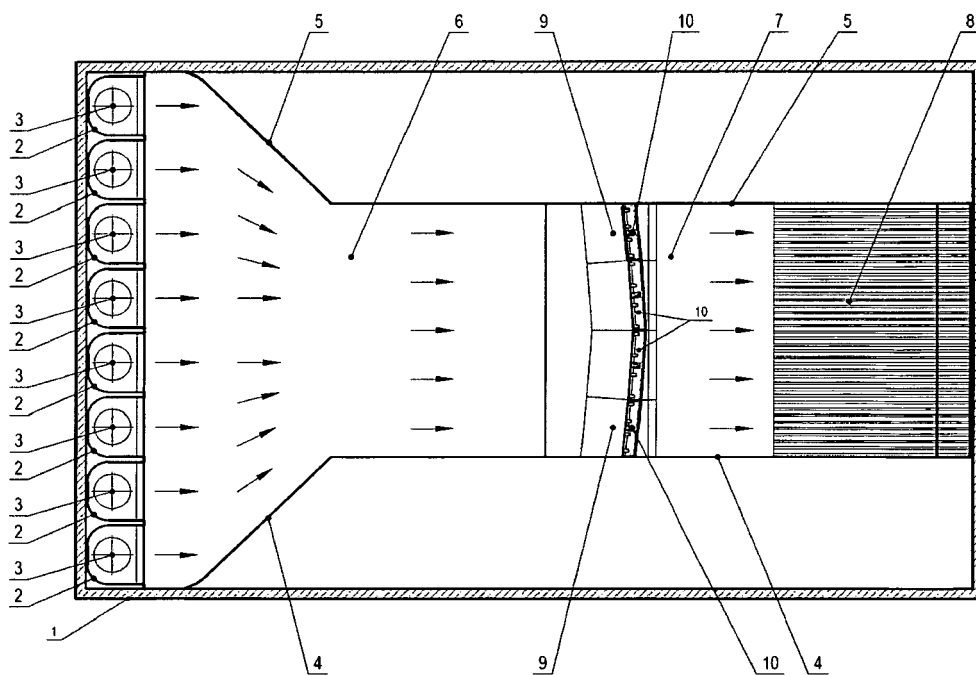


FIG.7

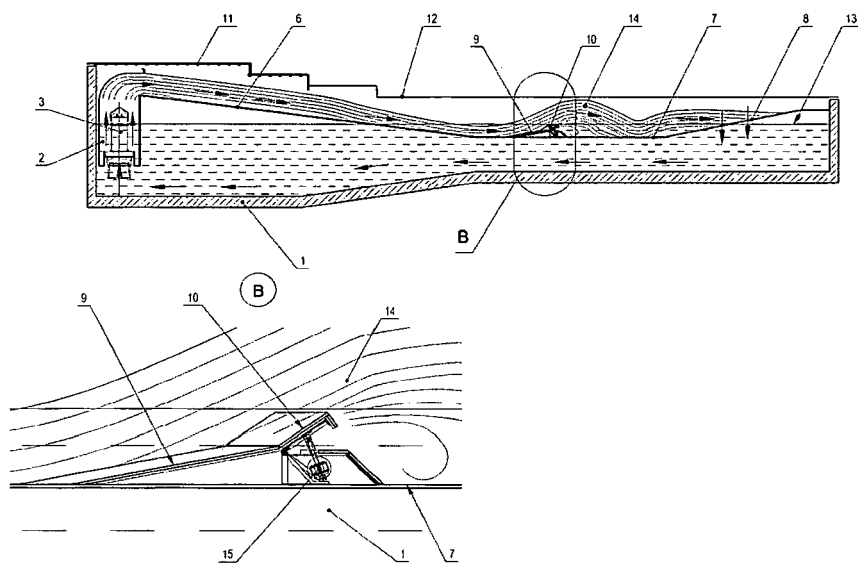
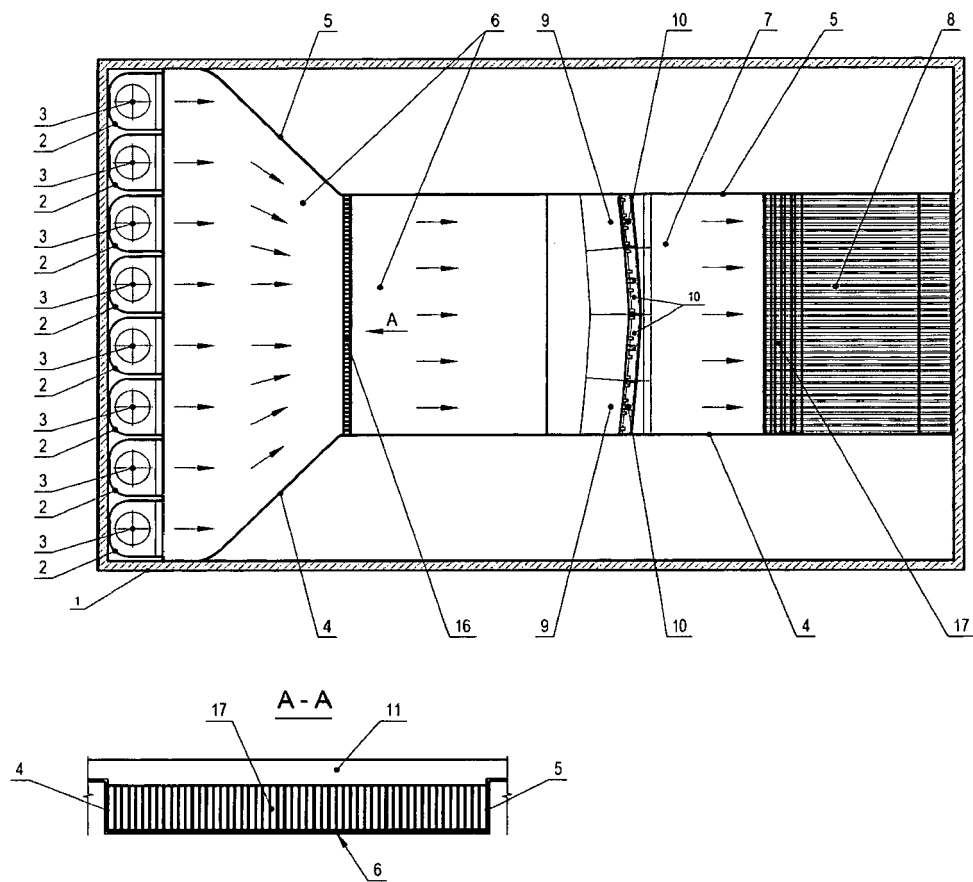


FIG.8



**FIG.9**

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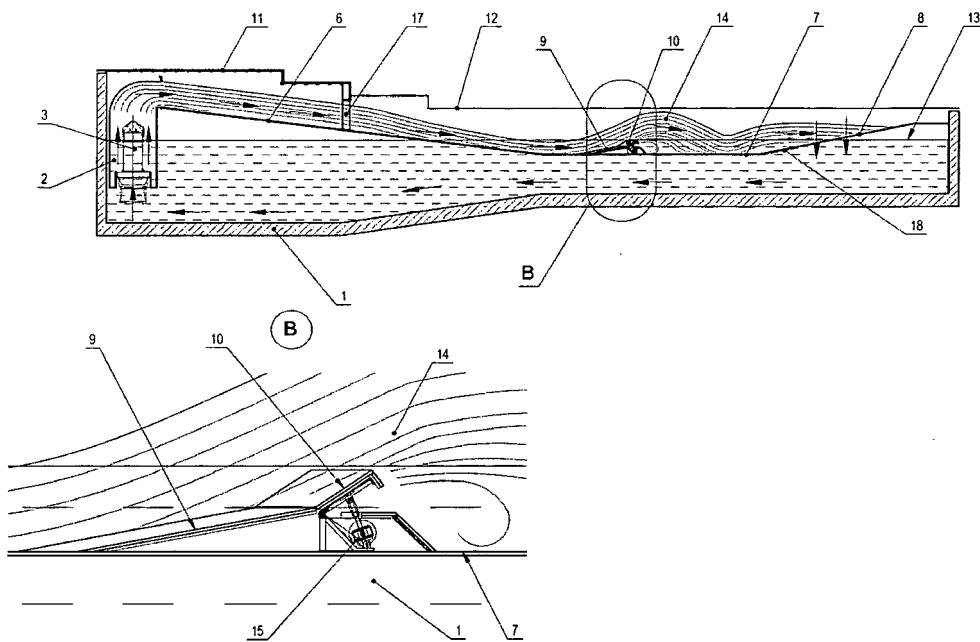


FIG.10

*[Signature]*  
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 ADVOCATES - LEGAL CONSULTANTS.



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 Application Number  
 EP 20 39 0001

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EPO FORM 1503 03.82 (P04C01)

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Y	* figures 1-3 *	2,5	
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Place of search <b>Munich</b>		Date of completion of the search <b>4 November 2020</b>	Examiner <b>Decker, Robert</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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