REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSTVO

URAD REPUBLIKE SLOVENIJE
ZA INTELEKTUALNO LASTNINO
1000 LJUBLJANA, KOTNIKOVA 6

ZAHTEVA ZA PODELITEV PATENTA

1. Naslov za obveščanje:

Marković Vladimir

Glavarjeva 47

1000 LJULJANA

tel.:041 377 270
faks: 01 563 12 32 š fra: P-

Potrdilo o prejemu prijave
(izpolni urad)

Datum vložitve prijave: _____

Številka prijave: **P-**_____

Žig urada in podpis:

2. Prijavitelj (priimek, ime in naslov za pravne osebe firma in sedež)**:**

Marković Vladimir
Glavarjeva 47
1000 LJUBLJANA

3. Zastopnik: Registrska številka:

4. Izumitelj (priimek, ime in naslov)

Marković Vladimir
Glavarjeva 47
1000 LJUBLJANA

5. Naziv izuma:

Samodejna hidrodinamična turbina

6. Podatki o zahtevani prednostni pravici in podlagi zanjo

7. Dodatne zahteve:

☐ prijava je za patent s skrajšanim trajanjem
☐ predhodna objava patenta po preteku ____ mesecev
☐ prijava je izločena iz prijave številka: _____

8. Izjava:

☐ izjava o skupnem predstavniku:

9. Priloge:

☒ opis izuma, ki ima 11 strani
☒ patentni zahtevek (zahtevki), ki ima(jo) 2 strani; število zahtevkov: 3
☒ skice (če so zaradi opisa izuma potrebne); število listov: 5
☒ povzetek
☐ potrdilo o plačilu prijavne pristojbine
☐ potrdilo o deponiranju biološkega materiala, če gre za izum, ki ga ni mogoče drugače opisati
☐ pooblastilo zastopniku
☐ generalno pooblastilo zastopniku je deponirano pri uradu pod št.: _____
☐ potrdilo o razstavni prednostni pravici
☐ podatki o drugih prijaviteljih
☐ podatki o drugih izumiteljih
☐ prikaz zaporedja nukleotidov ali aminokislin v opisu
☐ prijava je bila predhodno posredovana po faksu ali v elektronski obliki
☐ _____

Marković Vladimir
Priimek in ime ter podpis prijavitelja (zastopnika

MARKOVIC Vladimir

SELF PROPELLED HYDRODYNAMIC TURBINE

The subject of the present invention is submergible radial turbine, which as propellant uses the hydrodynamic energy of moving water masses, and without additional pressure pump allows ejection of water on the surface. With its technical design on propelling side exploits the hydrodynamic energy of moving water masses. On its opposite side which turns against water flow, actively captures water and transport it to the centre of the pump through one direction Check Valve, which can be produced on any known technical way, with self locked flap or self lock ball in coned chamber. The most important technical requirement which device by invention must fulfill is its technical adaptation for long – term use under the water level. Submergible turbine must be fixed on concrete or similar basis, which is placed on the bottom of the water stream, which has beside water capture on its passive side, on the concrete basis built-in variety of energy consumer devices, which are driven by rotation of propelling of the turbine. The invention belongs to Class F01D 7/00 of the international patent classification and it is by intention of use similar to submergible self propelled pumps, which I claimed in patents SI 9300175 A and P 200800218. Both previously claimed patents differs from new invention, because of completely differently shaped and designed propelling surfaces

which do not allow hydrodynamic capture and direct pumping of water with propelling parts.

The technical problem successfully solved by the present invention is permanent self propelling of a pump submerged in water without any kind of external mechanical, electric or other known energy source, because for its propelling exploits only part of energy from moving water masses. Beside of energetic advantages, the present invention successfully solves problem of usually low water stream, because for difference of previously claimed and today known solutions, the new invention enables also successful operation even in very shallow water streams and because of absence of rising of driving blades, does not effect or endanger swimmers or vessels on the water surface. The new device by the present invention is easy to produce and because of smaller number of moving parts significantly more reliable during the long-term use. From the ecologic aspect the device by the present invention, does not affect on visual view on the river flow and landscape, because it is placed on the bottom of the river and it can not be seen from the coast. It also does not pollute the environment from chemical or mechanical ballast and because of very slow rotation speed, which does not exceed 4 turns per minute, does not affect fish offspring, i.e. for the flora and fauna of the water body. Self propelled hydrodynamic turbine of the invention solves the set of technical problems as follows: On its central axle receiving rotational torque from the system of at least two pairs or primary three pairs of radial rotating driving and ladle hands, by which half of each pair provides rotation of whole system. One side of each pair provides propelling and the opposite side provides water ladle out, which is through hollow central axle transported to the coast. One

half of single pair of the driving-ladle hands is by closed surface turned parallel to water stream and second, completely identical half is turned with open surface against water stream. In such case moving water masses could not cause rotation of the whole system, while hydrodynamic pressure is the same on both sides. Rotation around common centre is provided by the shape of driving and ladle hands, because they are made in shape of »U« profile with – horizontally - one closed and one open side. Open side of »U« profile is always turning against direction of water stream and on the opposite side of the hand water is pressing to the closed wall of the “U” profile. Even under such circumstances, the turbine placed in the water stream, would not be rotating. Therefore, final rotation provides single directional working valves (Check Valves), which are working on the way that while ladle hand is turning against water current, the Check Valve stays opened what causes centripetal flow of water in central placed drum and through hollow main axle in pipeline placed on the bed of water current and on the surface on the coast. During that, the open Check Valve reduces braking force on the ladle hand, which is turning against water current. At the same time the Check Valve on the opposite hand side is closed, while force of the water current is pressuring on the closed wall of the »U« profile. As described, on the opposite side of driving hand are formed larger water pressure and force and that unbalance causes rotation of whole driving and simultaneously on water ladle out system.

The invention is described on basis of three implementing cases and their combination on fifteen Figures, where numbering is as follows:

Number 1: opened Check Valve

Number 2: body of Check Valve

Number 3: inner wall of the ladle hand

Number 4: propelling wall of the ladle hand

Number 5: vertical carrier

Number 6: upper wall of the ladle hand

Number 7: opened wall of the ladle hand

Number 8: external wall of the ladle hand

Number 9: lower wall of the ladle hand

Number 10: closed one directional Check Valve

Number 11: concrete base of the device

Number 12: central bore of main axle

Number 13: swinging flap of the ladle hand

Number 14: Hinge of the swinging flap

Number 15: outlet pipe for transport of water to the coast

Number 16: upper cover of the device central drum

Number 17: lower cover of the device central drum

Number 18: ball bearing

Number 19: hole for water exit

Number 20: body of vertical axle

Number 21: housing of peristaltic pump

Number 22: bearing system of the device and peristaltic pump

Number 23: vertical axle without central bore

Number 24: pressure hose of peristaltic pump

Number 25: roller for guidance of pressure hose

Number 26: pressure roller of peristaltic pump

Number 27: swinging axle of solenoid generator

Number 28: magnet of solenoid generator

Number 29: lower part of vertical axle

Number 30: eccentrically mounted driving axle

Number 31: coil of solenoid generator

Number 32: chamber for pushing water in the pipeline

Number '': marks the same integral part as the main number but placed on a different place.

The invention will now be described in more details based on embodiments and corresponding drawings representing in:

Figure 1/15 vertical section view of water driving and ladle hand of the device of the present invention in first implementing case

Figure 2/15 horizontal section view of water driving and ladle hand of the device of the present invention in first implementing case

Figure 3/15 vertical section view of six water driving and ladle hands of the device connected to the whole - driving water capturing system - of the present invention in first implementing case

Figure 4/15 horizontal section view of the whole device of the present invention in first implementing case

Figure 5/15 enlarged cut section view of ejection part of device of the present invention in first implementing case

Figure 6/15 vertical section view of water driving and ladle hand of the device of the present invention in first implementing case,

with attached swinging flap for increasing of propelling area in the second implementing case

Figure 7/15 vertical section view of water driving and ladle hand of the device of the present invention, with attached swinging flap for increasing of propelling area in low position in the second implementing case

Figure 8/15 vertical section view of six water driving and ladle hands of the device connected to the whole - driving water capturing system - with attached swinging flap for increasing of propelling area in the second implementing case

Figure 9/15 horizontal section view of whole device of the present invention, with attached swinging flaps for increasing of propelling area in the second implementing case

Figure 10/15 vertical section view of driving hand with attached swinging flap for increasing of propelling area in lifted position in the third implementing case

Figure 11/15 vertical section view of water driving hands of the device of the present invention, with attached flap for increasing of propelling area in lowered position in the third implementing case

Figure 12/15 vertical section view of six driving hands of the device connected to the whole - driving water capturing system - with attached swinging flaps for increasing of propelling area in the third implementing case

Figure 13/15 horizontal section view of the device of the present invention, in combination of driving and water ladle hands and addition of only driving hands in first and third implementing case

Figure 14/15 side section view of driving part of device of the present invention in combination of driving - water ladle hands and only driving hands in first and third implementing case in addition with peristaltic pump cast in common concrete base

Figure 15/15 side section view of driving part of device of the present invention, with solenoid power generator built in common concrete base in third implementing case

Self-propelled hydrodynamic turbine of the present invention, which is in first implementing case shown on Figures 1/15, 2/15, 3/15, 4/15, 5/15 is made special for centripetal water capturing on each working hand, when turning against water current. Capturing of water, on working hands shown on Figure 1/15, allows their shape of typical »U« profile, by which is side 7 during water intake moving towards water current. When hand is moving towards water current opposite wall 8 is always closed and while on the inner wall 3 is attached Check Valve 2, which moving flap 1 water current holds opened. On the open wall 7 of »U« shaped hand are on known way attached carriers 5, which has beside mechanical stability also function of coarse filter, which does not allow intake of larger pieces of floating dirt in the water.

On the Figure 2/15 is shown the same ladle hand from horizontal view or as seen from the view of water current during water capturing.

On the Figure 3/15 is shown section of driving – water capturing part of self-propelled hydrodynamic turbine, which is composed from at least one pair or two on the opposite side lying driving – water ladle hands. In priority there are three pairs of opposite lying hands, by which there are opposite lying hands in relation to each other turned for 180° on such way, that on water intake side wall 7 of body of the hand, is opened, and its pair on the opposite side wall 4 of body of the hand is closed for water current. All pairs of hands are on known way attached with upper cover 16 and lower cover 17, by which is on lower cover 17 attached central axle 20 with central and axial bore 12. In water placed device of the present invention, water effects on such way that on the driving side is made hydrodynamic pressure on opened wall 7 and in inner part of the wall 4 water current flows through opened Check valves 1 into closed central drum of the present invention. Imbalance of hydrodynamic pressures which occurs during process, causes turning of the whole construction and simultaneously brakes hydrostatic balance between forces, which effects on driving hands on one and water ladle hands on its opposite side.

On the Figure 4/15 is shown section of first implementing case of the present invention, where can be seen, that on water capturing part of the hand through the wall 7, water flows through Check valve 2 and by its opened flap 1 into central drum of the device, where is through axial opening 12 in axis 20, transported to radial opening 19 into central chamber 32 between bearings 18 and 18' and then to water outlet pipe 15,

to the coast. During operation of the device it has on its driving side of the hand, Check valve 2 flap 1 lowered into lock position 10.

On the Figure 5/15 is shown enlarged cut section view of lower part of device of the present invention, which is in the area of chamber 32 casted in concrete plate 14 and it has both bearings 18 and 18' permanently lubricated and protected, by which are against water intrusion also protected by with air filled safety covers 21 and 21'', which does not allow water to break into the bearings.

In second implementing case shown on Figure 6/15, is device of the present invention of first implementing case, additionally equipped with swinging flap 13, fixed on hinges 14 on outer and back side or driving side of each hand. Intention of each flap 13, is to increase driving effect of hydrodynamic force of water current, because from the view of the incoming water current, flap 13 stays raised in horizontal position, by which is its movement on known way limited to angle a little bit less than 90°.

On the Figure 7/15 is shown driving – swinging flap 13 of the hand of the device in the second implementing case, where water current is coming from the opposite direction, what causes lowering of swinging flap to vertical position. Lowered in vertical position, swinging flap of the hand significantly enlarges propelling area of entire back part of the hand, where water causes hydrodynamic pressure.

On the Figure 8/15 in the second implementing case, is shown vertical section of hydrodynamic turbine on its driving – water capturing part with

attached swinging flaps 13, which water current rises in horizontal position. By that, flaps 13 create relatively small obstacle unlike on the opposite side lying flaps, which by its lowered position significantly enlarges propelling area, where water causes hydrodynamic pressure.

The second implementing case, is shown on Figure 9/15 also in vertical section, by which are all other elements identical as in first implementing case with exception of swinging flaps 13, which increases force what causes rotation of the device of the present invention.

On the Figure 10/15 is shown driving hand of the device of present invention in its third implementing case. Unlike the first two implementing cases, shown driving hand in its inner wall 3 does not have fixed Check valve. Next thing that differ is, that back wall 4 is not covering the whole radial length of the driving hand, but only covering its shorter part in priority closer to the center of the rotation of whole system. On the part of the hand where hinges 14 and 14' and swinging flap 13 are placed, there is no longer back wall 4 and it is by horizontally raised swinging flap 13 free flow of the water limited only on part where back wall 4 is fixed, under horizontal positioned raised flap 13 water flow moves smoothly.

On the opposite side placed driving hand, shown on Figure 11/15, the water current automatically lowers the swinging flap 13 into vertical position and by that closes free flow of the water current through the body of the driving hand and with that significantly increases propelling area where water causes hydrodynamic pressure.

On the Figure 12/15 is shown section view of self-propelled hydrodynamic turbine on its driving part, where smooth flow of water current through driving hands which turns against water current. Water is lifting the swinging flaps 13 to horizontal position, on the opposite side lying driving hands water lowers the swinging flaps 13 in vertical position and with that significantly increases propelling area where water causes hydrodynamic pressure.

On the Figure 13/15 is shown operation of the device of the present invention in combination of first and third implementing case, where because of low water speed current we want to increase power of rotation of whole system and also water pressure, which is captured upper turbine part of the device of the present invention, what is shown in first implementing case.

On the Figure 14/15 is shown combination first and third implementing case in addition with peristaltic pump, horizontally placed in concrete base 11, which serves for increasing the pressure of captured water.

On the Figure 15/15 is shown driving part of device of the present invention in third implementing case, where device eccentrically drives solenoid power generator built in concrete base 11. Presented device of the present invention with addition of multiplier or gearbox for increasing of revolutions, can also drive submergible power generator of classic construction or different and known piston or centrifugal water pumps, built in concrete base 11.

Markovic Vladimir

CLAIMS

1. Self-propelled, hydrodynamic turbine

characterized in that

it is composed from at least two or more statically fixed driving hands boxed shape , where is one wall (7) partially, in large part or in whole removed and always turns in direction against water current and with that allows free intake of water into device. At the same time is on the opposite lying hand (4) completely or partially removed, but replaced with at least one swinging flap (13), which water current raises into horizontal position when coming from direction of open wall (7) and lowers in vertical position when water is coming from other direction, by which is every single driving hand on its radially outer end inseparable closed with wall (8), which mechanically connects upper wall of the hand (6) and lower wall of the hand (9). Its radial inner wall (3) is closed or it has built in Check ball, flap or any other construction valve (2), which allows free flow of the water from driving-water ladle hand through rotation center drum of the device by invention and prevents backflow from rotation center drum to driving and ladle hand of the device by invention.

2. Self-propelled hydrodynamic turbine as claimed in claim 1

characterized in that

is on common driving axle (20) attached several driving and ladle hands in more levels, where driving hands of each layer can be equipped with Check valves (2) and other levels can be designed to increase rotational power of the turbine and have solid inner walls (3).

3. Self propelled hydrodynamic turbine as claimed in claim,

characterized in that

torque gained with the device of the present invention, can be used for driving of other devices, which are connected to main vertical axle (20), by which can be devices placed in concrete base (11), or by vertical extension of main axle to floating device or bridge produced on known way, which is placed above the device of the present invention.

Markovic Vladimir

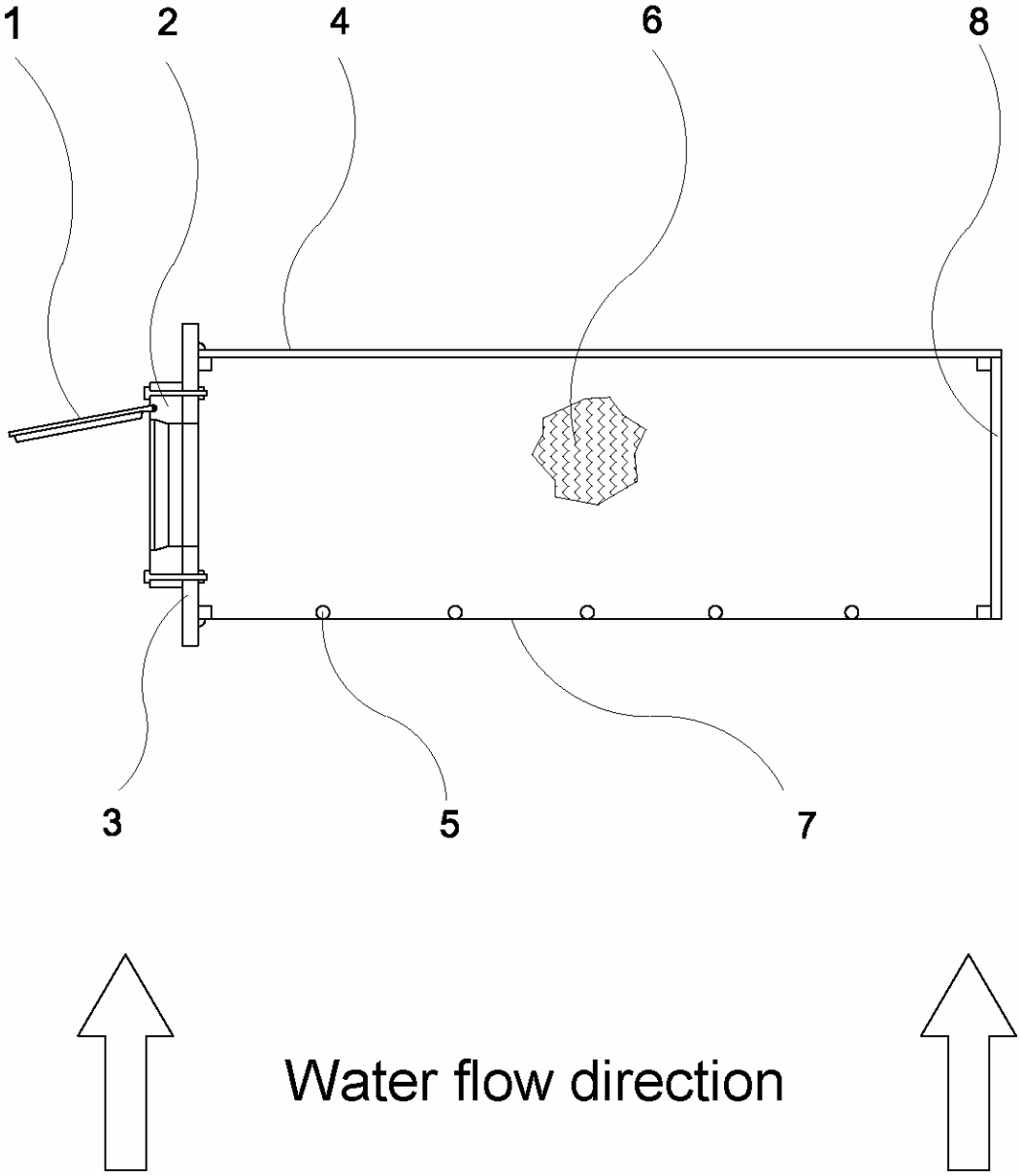

Figure 1/15

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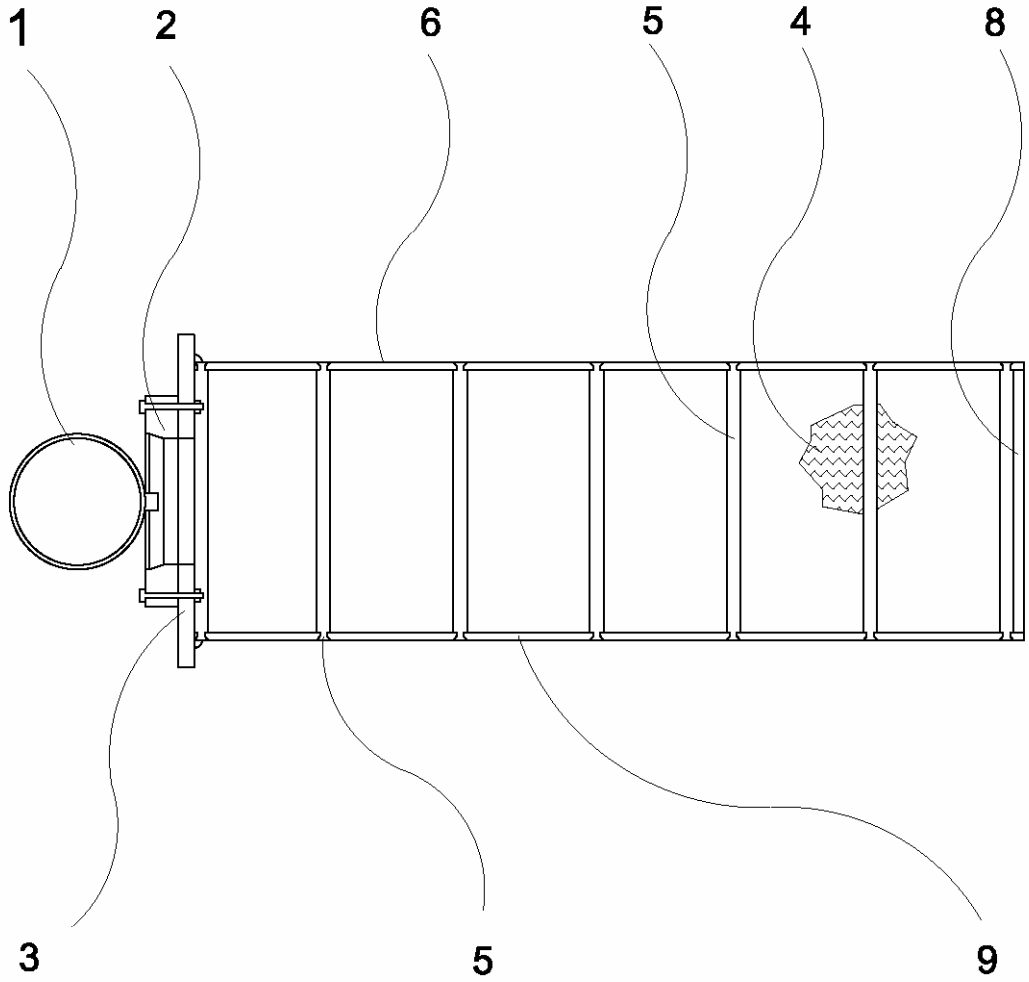

Figure 2/15

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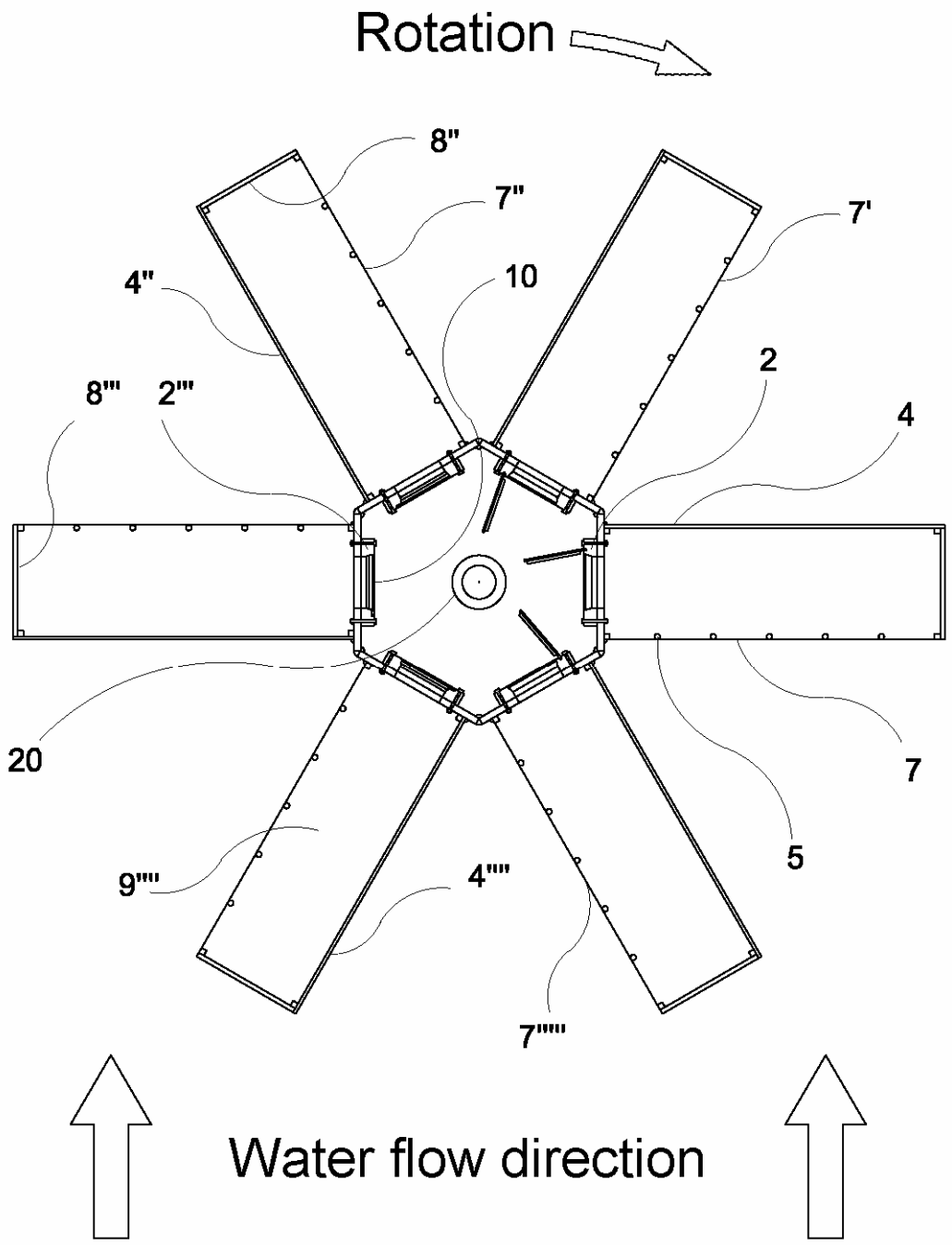

Figure 3/15

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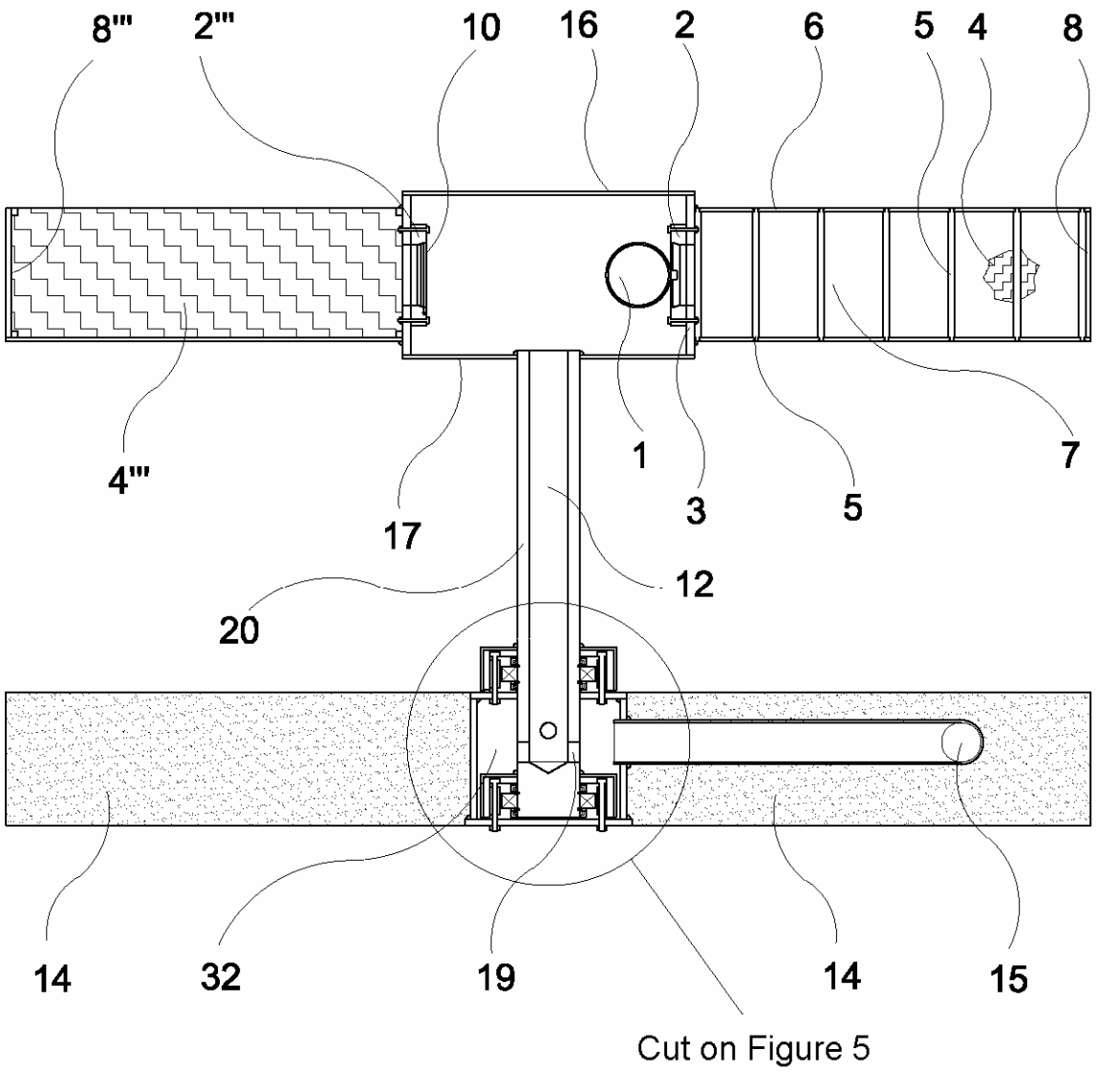

Figure 4/15

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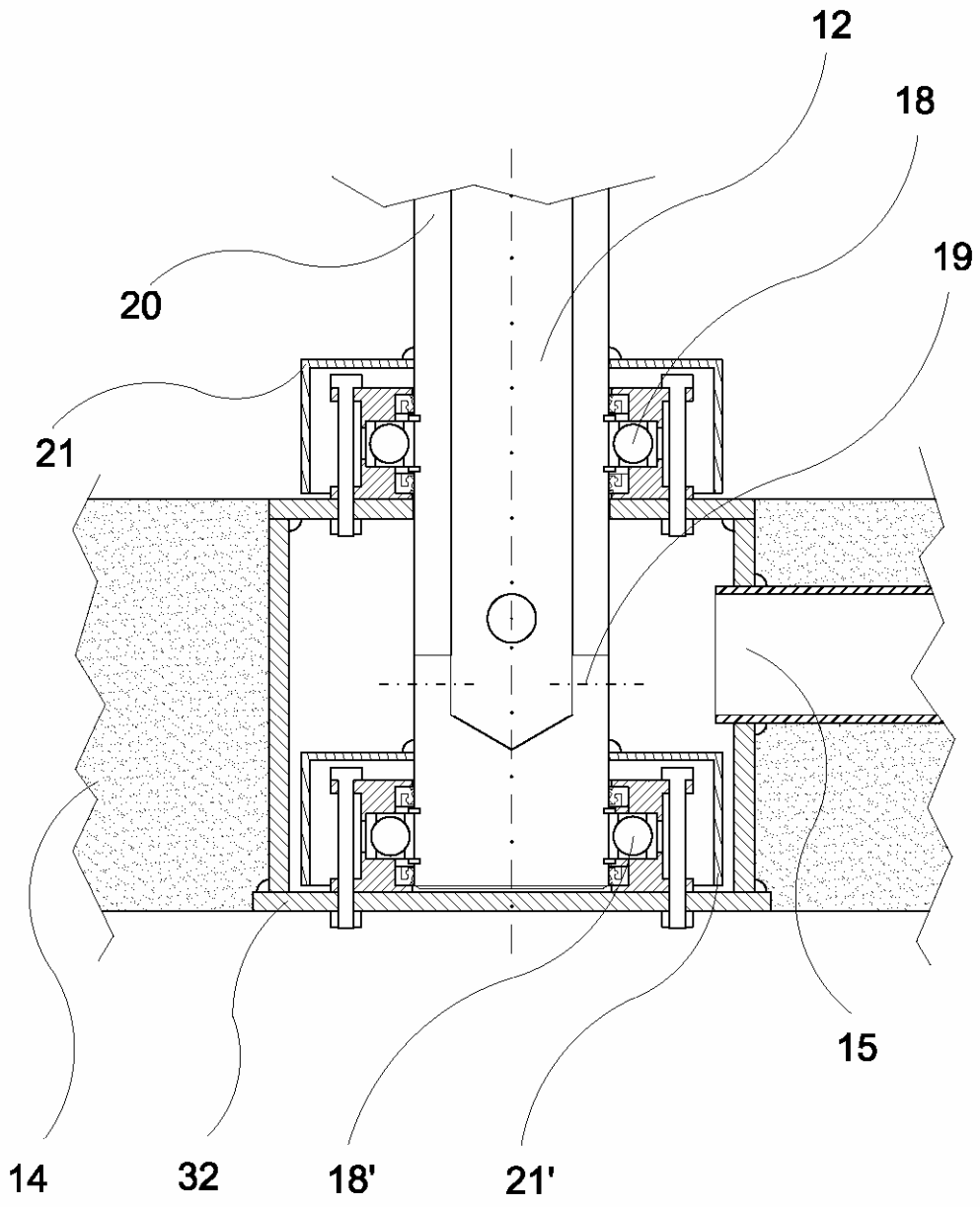

Figure 5/15

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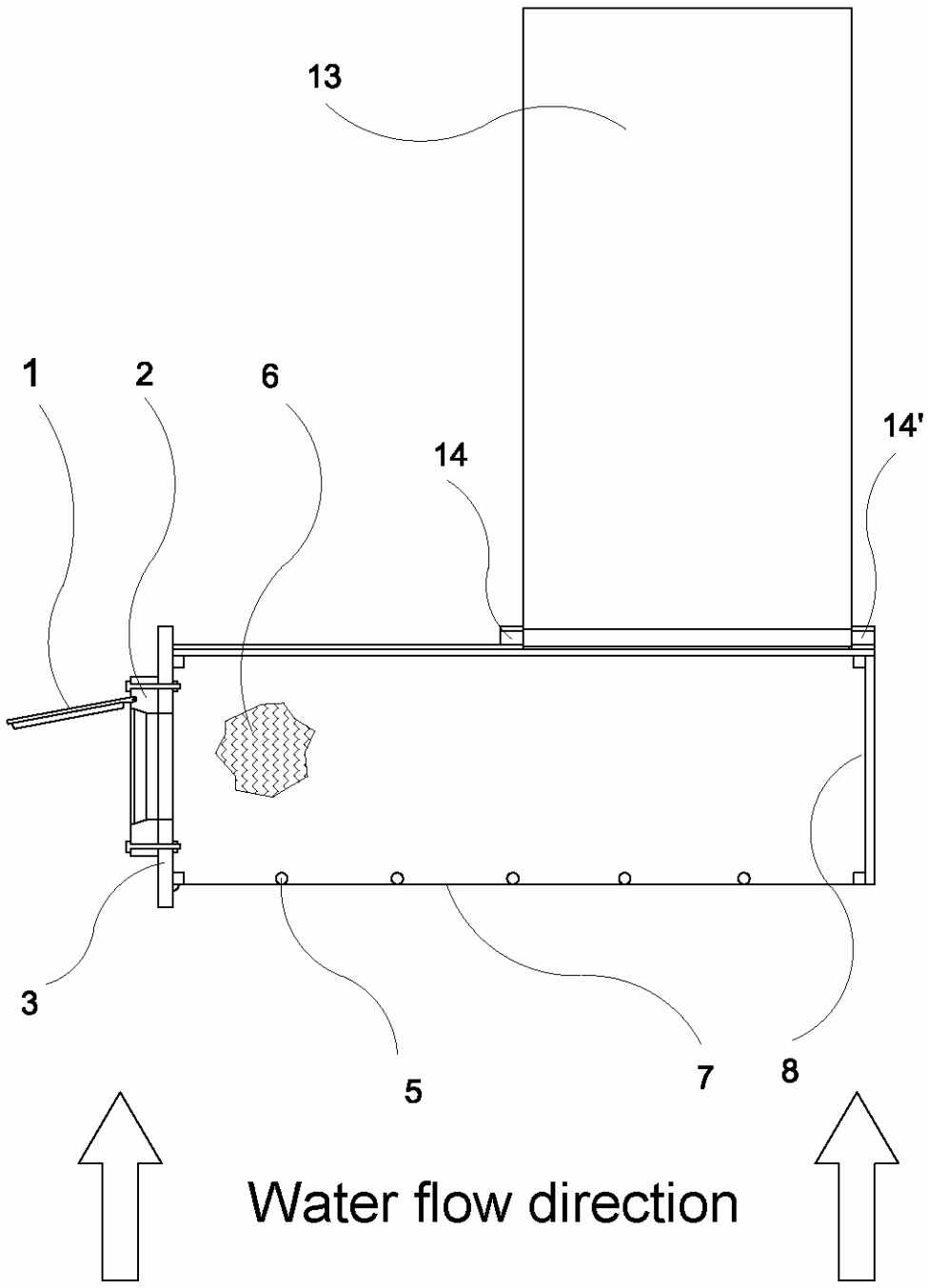

Figure 6/15

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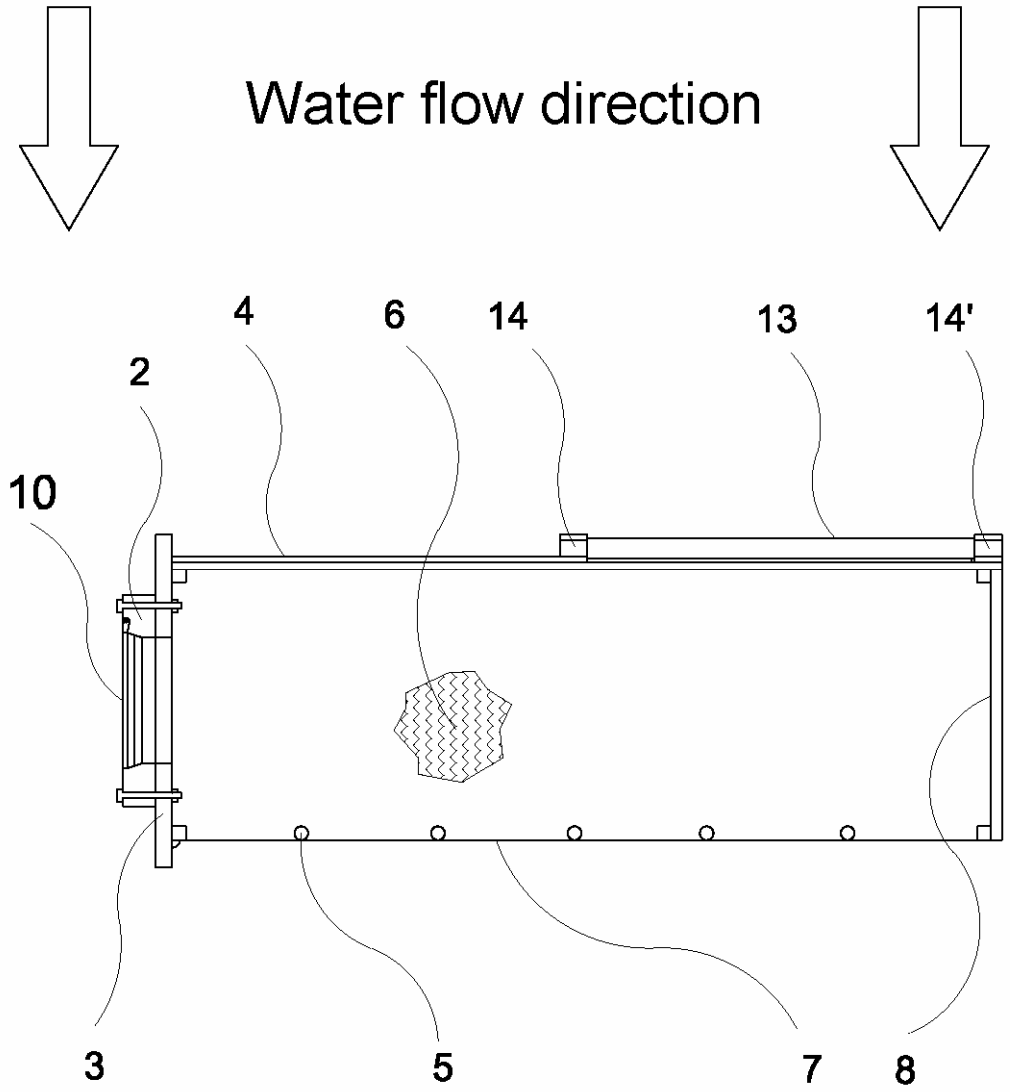

Figure 7/15

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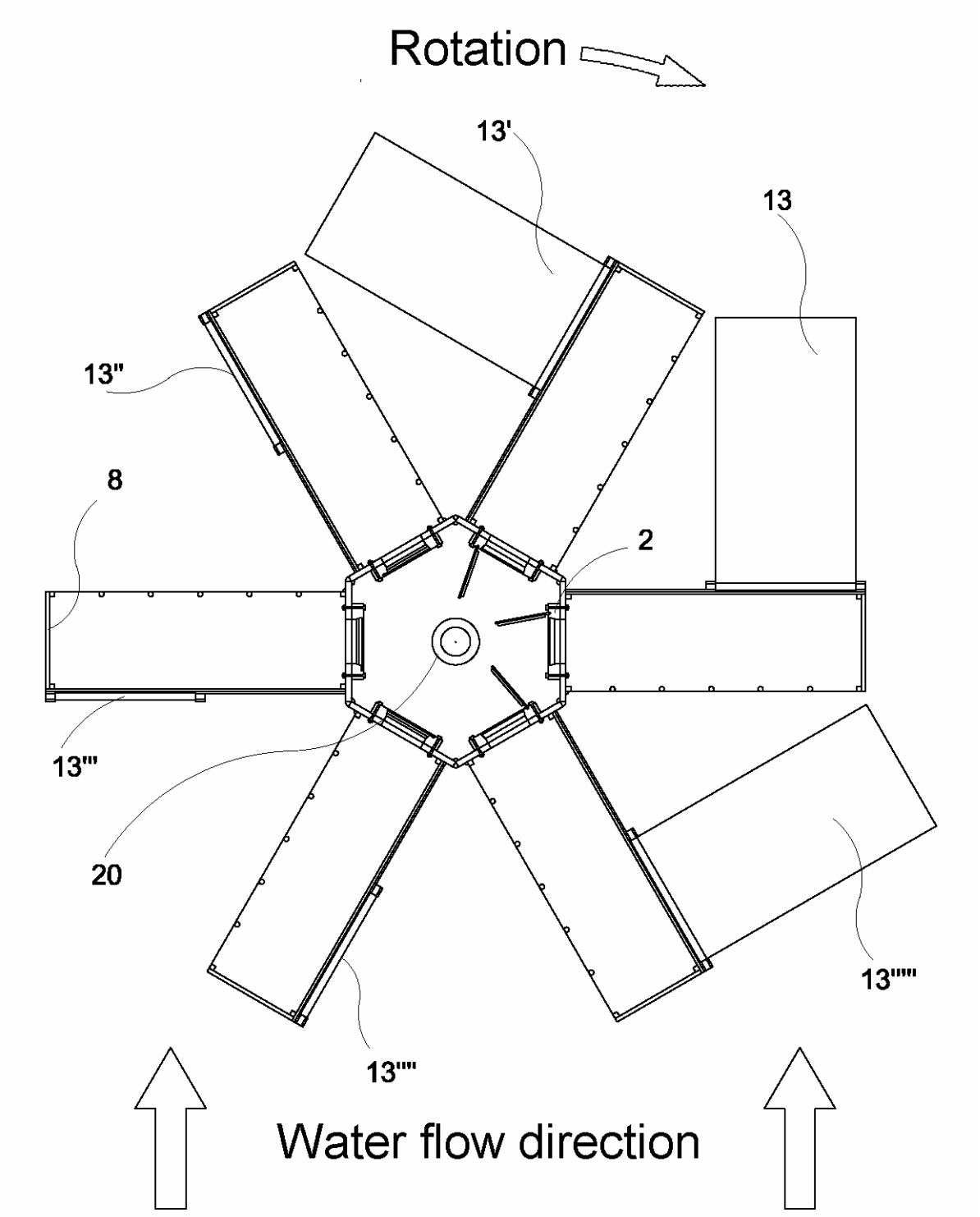

Figure 8/15

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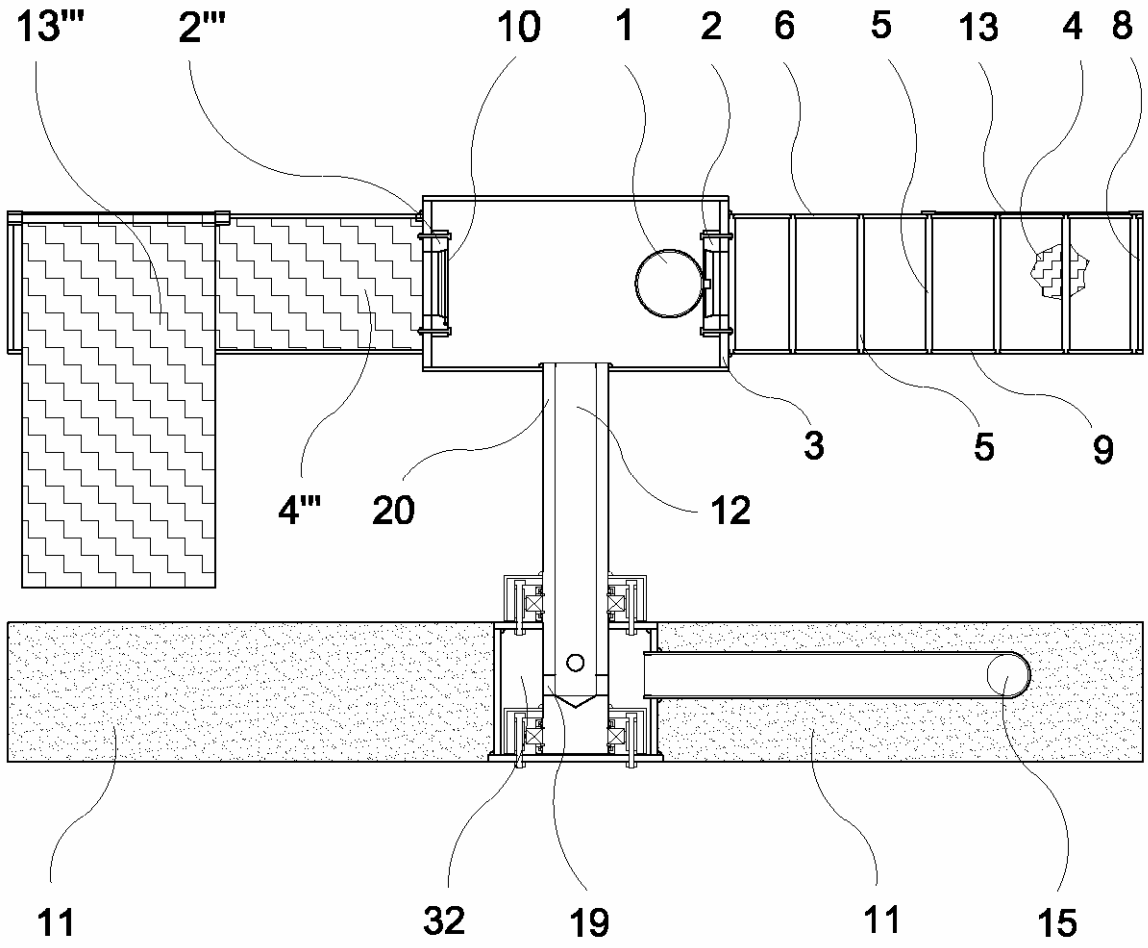

Figure 9/15

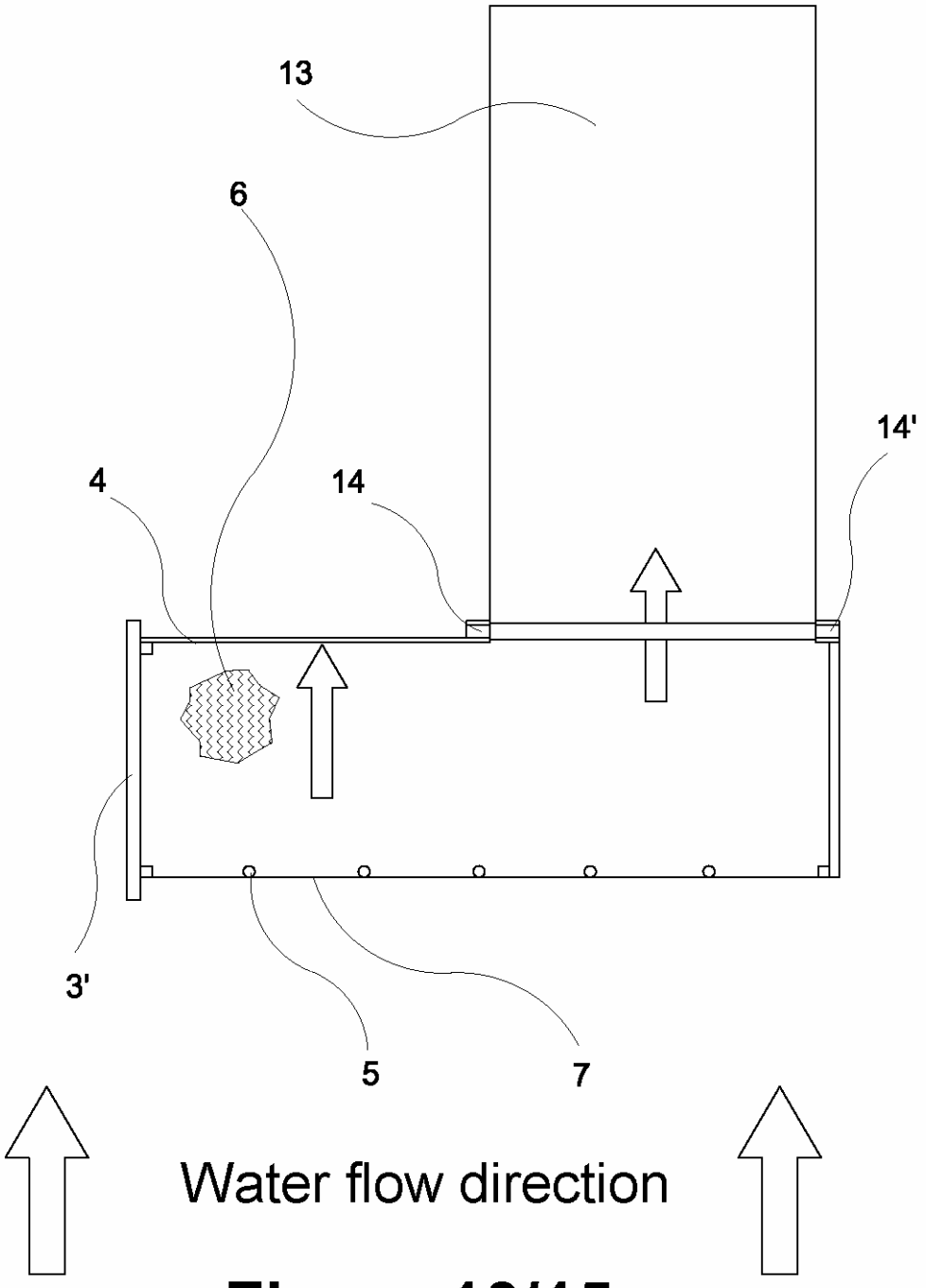

Figure 10/15

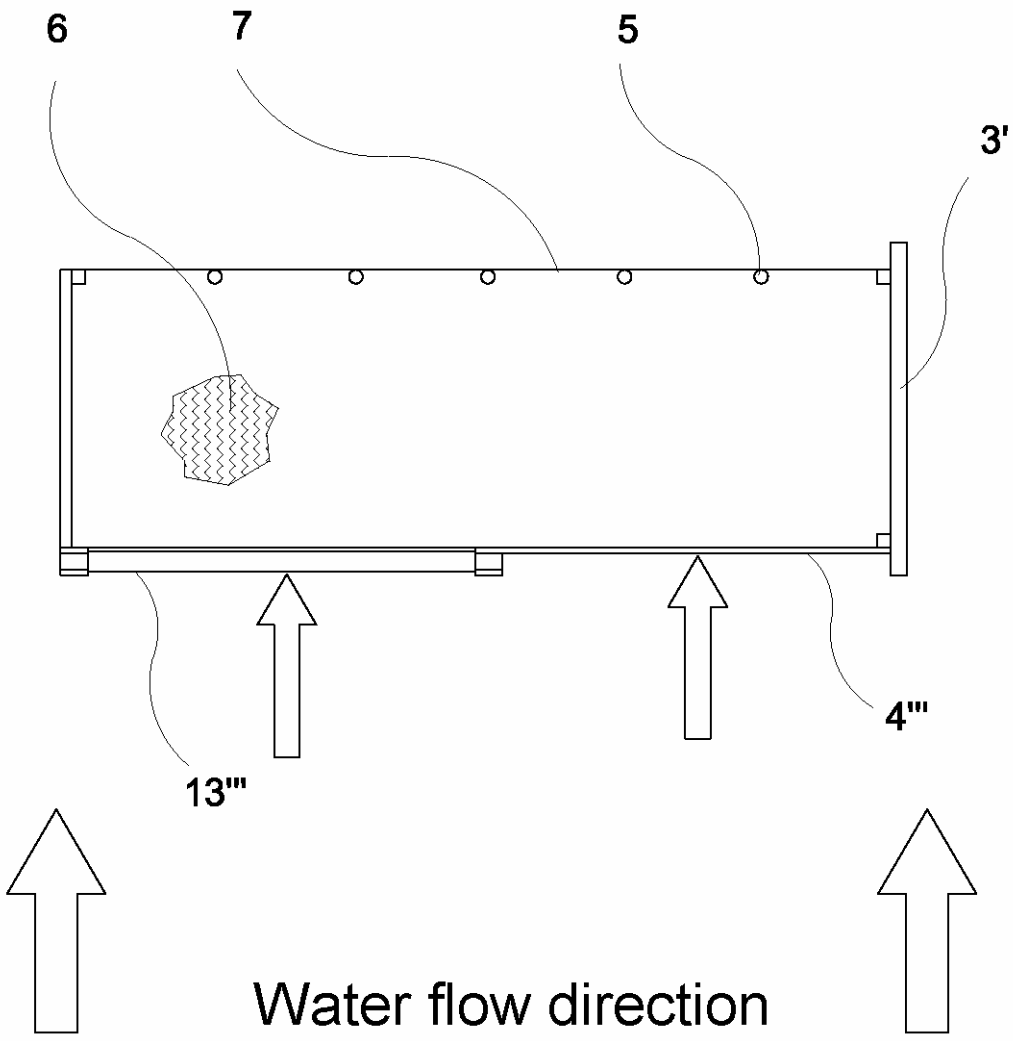

Figure 11/15

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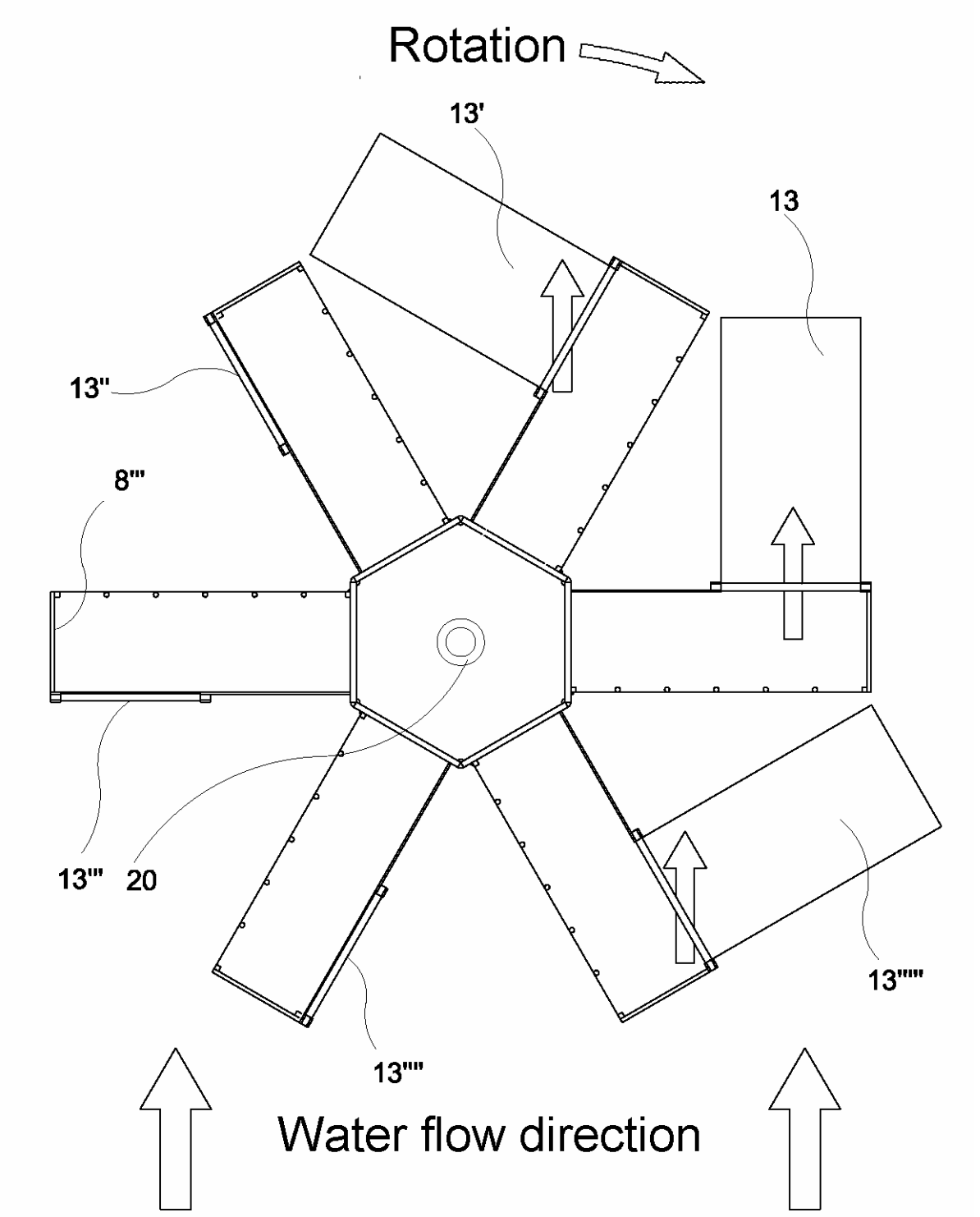

Figure 12/15

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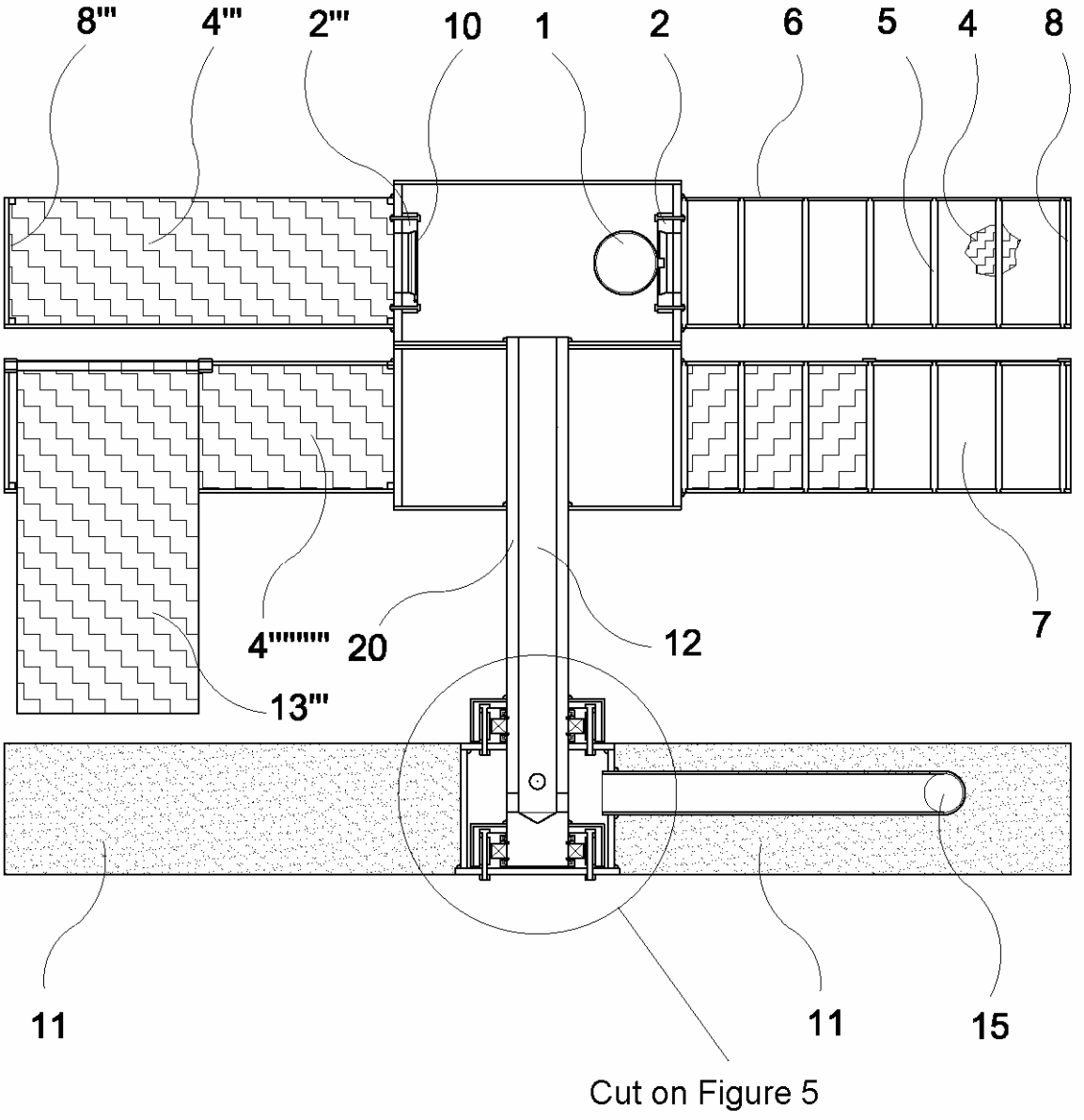

Figure 13/15

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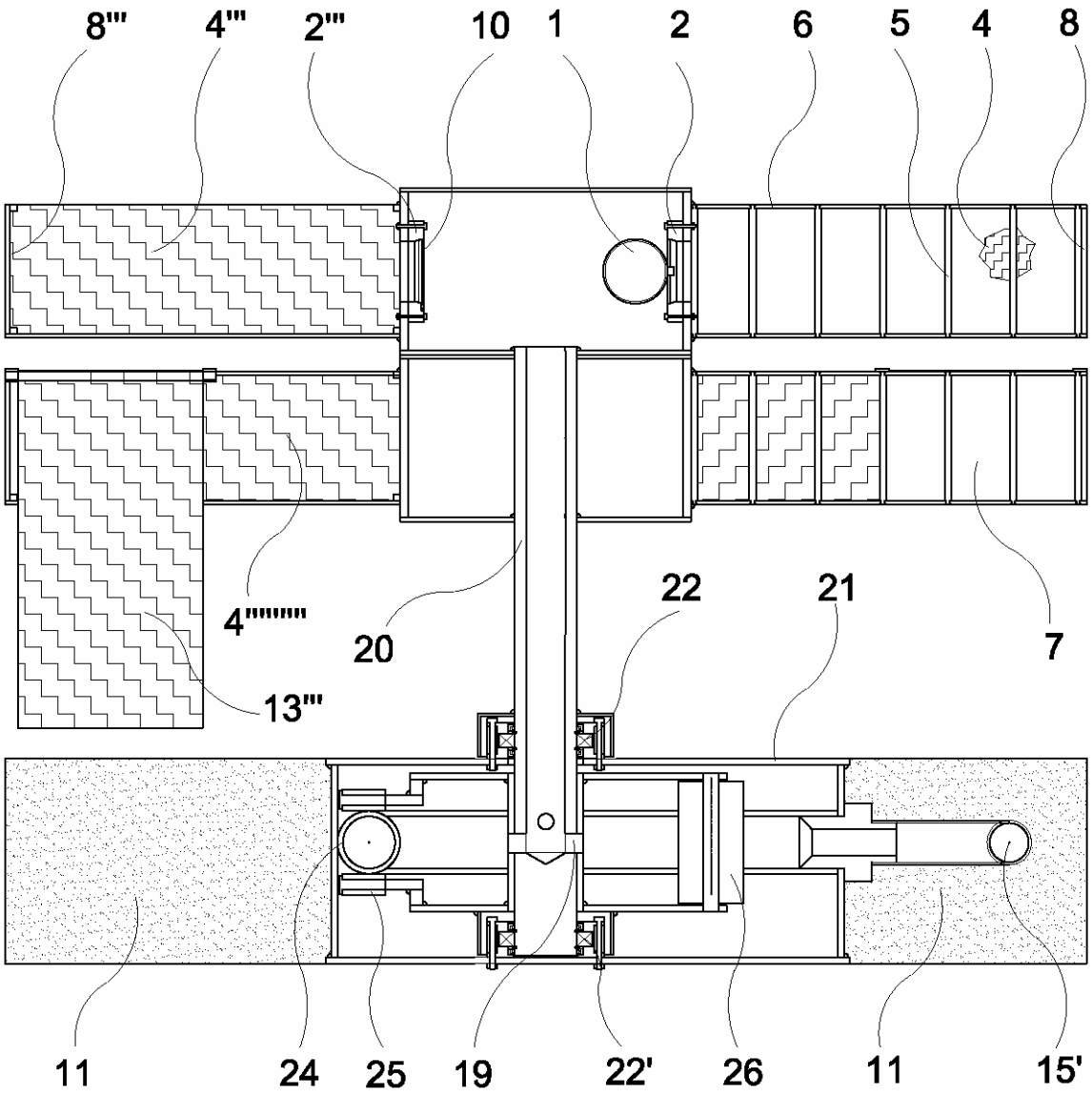

Figure 14/15

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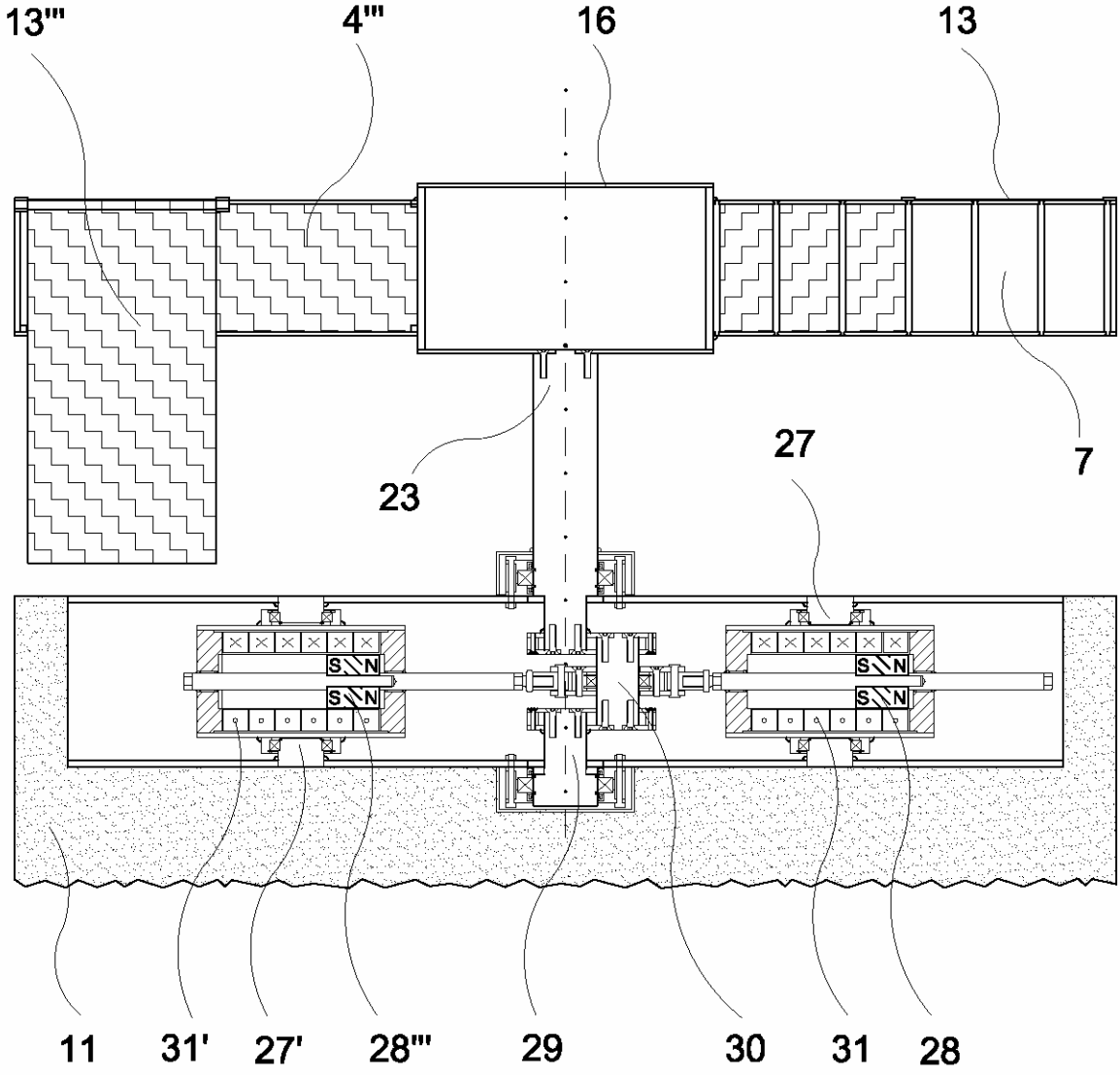

Figure 15/15

Markovic Vladimir

ABSTRACT

The subject of the present invention is submergible radial turbine, which as propellant uses the hydrodynamic energy of moving water masses, and even without additional pressure pump allows ejection of water on the surface. The turbine consists of driving and ladle hands, composed from several in box shaped working hands, which provides rotation by their specific form, embedded one direction Check Valves and installed swinging flaps, which changes their driving surface depending on the direction of hydrodynamic forces of water stream.