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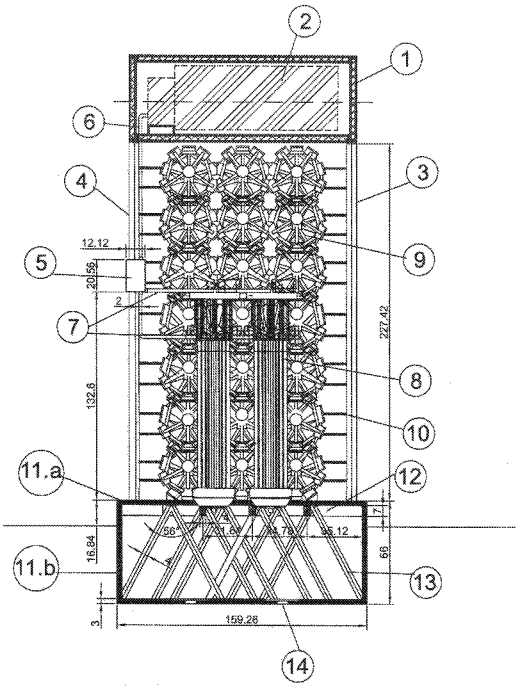
(54) **Title:** SYSTEM FOR GENERATING ELECTRICITY AND WATER



(57) **Abstract:** It is made up of a light, resistant and compact structure. It makes up a compartment with alternating opaque and transparent closing surfaces, capable of collecting and retaining solar radiation energy and causing the air confined inside to overheat. At the top it is closed by T-TIARIS, a casing designed to contain, protect, anchor and support a horizontal micro-wind generator. The transformation of kinetic energy into mechanical rotation energy, for powering the micro wind generator, is entrusted to T-SOFFIONE: 3-bladed wind blade, modification of the Savonius blade. The collection of water by condensation of air humidity is obtained with the installation of T-SENTINAM systems: multi-bend hollow tubing, conducted under depression by an internal piston operated by electric servomotors, up to the dew temperature. A seal moves on the outside of the tubular, driven by a servomotor, collecting the water in the container below.

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SYSTEM FOR GENERATING ELECTRICITY AND WATER

DESCRIPTION of the utility model patent, inventor Anna Poggiani resident in Chiusi (SI) Via Montegrappa n 152, of Italian nationality. Presented on 01/31/2024 with no. 202024000000480".

Purpose:
Provide an "all-inclusive" system for self-generation of water and electricity, easy to transport, assemble, use and monitor even remotely, suitable for all latitudes, altitudes and uses. Decorative, usable even in the most demanding environments. With low environmental impact because it is recyclable at the end of use, reusable and built with minimal energy and virgin materials.

The state of the art:
The following patents could somehow recall today's description. Unfortunately, the lack of drawings sometimes does not allow us to refute how many and which lexical similarities actually correspond in the T-Hydra technique with these other patents.
The following are examples of this.

- MYUI 2020001402
Abstract
(EN) The present invention describes an assembly for use as or with a billboard. The assembly comprises a wind turbine unit (100) comprising a cross-axis wind turbine for harvesting wind energy to generate electrical energy supply, a wind deflector unit (200) for channeling incoming wind towards said wind turbine unit (100) thereby producing wind deflections at a relatively high wind speed, a billboard support frame advertising media attachable to the wind deflector unit (200) having advertising media mounted thereon, a photovoltaic solar panel (300) for collecting solar energy for generating another electrical energy supply and for deflecting incoming wind, and a plurality of sensors connected to a data recorder and an Internet of Things platform to collect assembly data and environmental data and manage the same for assembly and environment monitoring, emergency detection and associated alarm. The whole of the present invention is self-sufficient, powered by hybrid wind-solar energy, and adopts attractive features to enhance the advertising effects of the billboard.

- US20160047136
Abstract
(EN)
Method and apparatus for efficiently using wind energy that "leaks" into a structure during strong winds; to protect that structure from those strong winds. By capturing, channeling, concentrating this wind energy within that structure; directly operate any number, type, shape, size and/or shape of "self-operating" safety valves and/or transfer ports installed on various exterior and interior surfaces. The internal areas of these structures will be constructed as "individual pressure vessels" with sealed external surfaces, where channels are established that allow all rooms, cavities, floors and any other internal areas within the structure to communicate. The prior art applied "controlled openings" only to various external surfaces of the structure and not to any internal surfaces; and they all failed to utilize this uninterrupted, unlimited, free wind energy that "seeps" into structures during all high wind events.

This invention has drawings. In this case the similarity with T-Hydra is that it is a structure crossed by winds inside. The difference is that T-Hydra uses winds produced by the temperature difference caused by solar radiation, directly inside the structure.

Starting the search on the WIPO database with “solar radiation heat capture system”, the results are collected in 11 pages. Below are the most significant ones

- WO/2016/022473
[005] In one or more embodiments, an apparatus for converting solar energy may include a heat capture element that generates thermal energy when exposed to solar radiation. The apparatus may also include a cap arranged around the heat-capturing element and defining a chamber with an intake and an outlet. The canopy may be configured to substantially trap air particles in the vicinity of the heat trapping element via an inlet-to-exit path. A portion of the chamber located near the outlet may have a reduced cross-section. The apparatus may also include a heat transfer system configured to create positive thermal feedback between a portion of the heat trapping element near the outlet and a portion of the heat trapping element near the inlet. The apparatus can also include a horizontal turbine positioned at the outlet. The thermal energy generated by the heat capture element can cause thermal expansion and rise of surrounding air particles within the chamber. The rising air can be directed through the small cross-section portion of the canopy and through the outlet. The rising air can pass through the turbine as it exits the chamber.

This seems to describe T-Hydra potentially, as the wording of the description contains a chain of "could", highlighting that the creator had no knowledge of how what he hypothesized could actually happen.
Hydra provides the answers to all those "coulds", selecting the technical equipment capable of achieving the goal.

Besides there are also:
- WO/2023/183291 System and method for generating water from air with condensers and refrigerators.
- US 4319141 Turbine Configuration Using Wind and Solar Energy. Here the fans are driven by external winds, heated by the sun inside to increase movement.
- 20230304270 System and method for generating water from air.
- WO/2018/167805 Foldable inflatable wind cells. They are inflated, placed in the sun and the wind is left to power a turbine.
- Wo2009126337 Harnesses, amplifies, converts and uses solar energy in windless windmills. Promising idea without explanatory drawings.

Trying to search on WIPO with “water and air humidity and wind and sun and heating”, the results are contained in only two pages, none of which are relevant.

Description:
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 1-3

Several of the hypotheses written in the patents examined in the previous paragraph are recalled in some elements of T-Hydra. With patent 10201900002014 "Tetric Module: holistic way of overcoming emergencies (and others) induced by climate change", today's writer patented a structural component, belonging to spatial reticular structures, of large dimensions and conceived in wood. T-Hydra builds the body with the system of the aforementioned patent with rods of 23.33 cm of calculation length, instead of the 70 cm indicated in the patent 10201900002014. The same resistant structure can be created with just two Tetric Modules with rods of approximately 60 cm of nominal length, or by any other alternative solution.

Updated calculation models, performed with the equilibrium of the nodes in the symmetry plane of the Tetric Module element - therefore with real auctions and virtual auctions, the latter vector sum of other symmetric ones between them, emerging from the symmetric plane - confirm the perfect operation with normal forces in the rods, in compression or traction, without bending moment, modest. Today's sections of the components of the Tetric Module (TAV n1, TAV n 2, TAV n 3, number 9) are therefore calculated as hollow profiles, material thickness 1 mm, initially in aluminum and then in plastic polymers with high softening temperature, what the PC could be like. The transition from aluminum to polymers was born from the need to save material and printing costs, considering that the efforts in the rods and nodes are modest and did not justify the use of such resistant metals.

In T-Hydra the supporting structure of the main body (9) is made with Tetrici Modules, 227.42 cm high, 145.24 cm wide, 114.14 cm deep. The functioning of T-HYDRA is independent of the type of resistant structure, as long as it guarantees adequate transparent and dark surfaces and the free flow of confined air. This structure, light, resistant and hollow, is closed by 4 perimeter doors, indicated with the numbers 3,4, 17 and 19. Doors 3,4 and 19 have a frame and translucent surface made of plastic polymers. These allow the heat brought by solar radiation to be captured within the high volume of vacuum of T-Hydra, heating the confined air. The front, darkened door 17 is also made of a plastic polymer panel and can be opened to allow any necessary maintenance. The shaped door (17) also supports the padding (16) in sheep's wool, T-Coccola.

The purpose of the padding, in addition to avoiding thermal dispersion, is to exploit the adsorption capacity of the sheep's wool: it absorbs humidity during the night and releases it to the air heated by solar radiation during the daytime, now lighter and capable of contain a greater quantity of water; the nocturnal absorption is with heat exchange, i.e. the wool releases Qads heat to the air. The advantage of this measure is that the thermal energy released by the wool during the night - exchanged with adsorption - not only extends the operation of the T-Hydra system until sunset, but also increases the quantity of daily water recoverable by the T-Sentinam group.

The doors are supported by the reticular structure made with Tetric Module, anchored in the nodes with the anchors (10), of different lengths. The same central structure supports the carter (1), the upper closing dome of the T-HYDRA system. The crankcase (1) contains the wind generator (2).
Below the structure is anchored to the T-Roboris foundation, a removable box system (11.a, 11.b, 12, 13 and 14), inserted in the excavation section for the depth of the topsoil, anchored to the ground with special hooks lives in the appropriate accommodations (14), filled with soil recovered from the excavation itself.
T-Roboris is a box (11.b) with walls in solid recycled plastic polymers, 3 cm thick; closed at the top by a lid (11.a) of solid section - 3 cm thick - made of recycled plastic polymers. The lid (11.a) is stiffened by the longitudinal and transversal slats (12) in a rectangular profile filled with the same plastic polymer.

T-Roboris is equipped with full square section struts, inclined in the directions of the load lines (13), placed under each of the three support feet of each Tetric Module, corresponding to as many external anchoring nodes of the Tetric Module, place of the reactions bind.
Two T-Sentinams (8) (in the case of a structure created with 2 Tetric Modules with a rod of approximately 60 cm nominal, the T-Sentinams flow rate could reach the number of 6, increasing the daily water production, at a lower construction cost), are supported by the load-bearing structure of Tetric Modules, tied to these by means of the anchors (10) on the nodes of the Tetric Module. The T-Sentinanìm systems will extract water from the humidity of the air, the 3 servomotors of each T-Sentinam are electrically powered by the electric generator, transforming the

circular motion produced by the T-Soffione fan (2), exploiting the internal wind of the T -Hydra, of the ascending currents of the air heated in it. The system is completed by a modest electrical system, briefly described in TAV N 3, housed in the IP 65 box (5), where the IP 65 tubular channels (6) coming from the wind generator (2) and the tubular channels (7) run. IP 65 to and from the T-Sentinam servomotors (8).

The small panel (5) houses a thermomagnetic switch, 3 differential switches and the electronic processor, protected upstream by an electrical resistance, which analyzes the internal temperature data - air exiting the fan (2) - and external temperature - inlet air from the ducts, protected by anti-intrusion mesh, (20) -, reworking them to instruct the servomotors of the T-Sentinam (8) to carry out the mechanical work useful for obtaining the ideal depression in the T-Sentinam (8), obtaining suitable cooling in the collection tubes and causing the condensate to be collected.

Components:
1) T-Tiaris patent application for utility model 202024000000303 dated 01/23/2024
2) T- Shower head patent application for utility model 202024000000252 dated 19/01/2024
3) right door
4) left door
5) IP65 electrical panel
6) IP 65 electrical conduit from generator to electrical panel
7) IP 65 electrical conduit from the electrical panel to the T-Sentinam servomotors
8) T-Sentinam utility model patent application 202024000000180 dated 01/17/2024
9) Tetric module patent 102019000020014 dated 10/29/2019
10) anchoring of doors
11.a) T-Roboris foundation, cover
11.b) T- Roboris foundation, cash register
12) T- Roboris foundation, strengthening of the lid
13) T-Roboris foundation, strengthening of the cash register
14) T- Roboris foundation, housing screw anchor for ground
15) flexible pipe, water pipe to external storage
16) T-Coccola, sheep's wool padding
17) front door, mobile
18) anchor rod of the generator group
19) front door
20) inward air intake pipe.

Industrial interest:
Obviously the great humanitarian interest of self-producing electricity and water in extreme environments is beyond question. However, the industrial interest is comparable to the lower the production cost of each individual component of T-Hydra. For this reason, today's project adopts recycled plastic materials and limits the use of resources for construction and assembly.

The components in points 1), 2) and 8),
T-Tiaris, T-Soffione and T-Sentinam respectively,
are covered by a patent request for individual utility models.
Below are the specific descriptions.

COMPONENT 1)

TITLE**: “ T-TIARIS: carter per micro generatore eolico, atto a contenere, ancorare e proteggere il corpo macchina e la pala; raccoglie e direzionare il vento verso il generato”**, DESCRIPTION of the utility model patent, inventor Anna Poggiani resident in Chiusi (SI) Via Montegrappa n 152, of Italian nationality. Presented on 01/23/2024 with no. 202024000000303”.

Purpose:
Contain, protect, anchor, support, horizontal micro wind generator. Collect and convey the vertical wind coming from inside a structure towards the horizontal micro-wind generator. Avoid contact of animals with the micro wind generator while it is running or stationary. Accelerate the wind. It can be used on top of buildings and various installations.

The state of the art:
Consulting the WIPO archive with the search words "crankcase and wind generator and direct and wind", no results are obtained. By changing the search criteria to "direct and wind" you get more than 19,000 pages, while with "mono directional and wind and turbine" you get 517 pages. Finally with “wind and channeling” you get 24.
In order to compare the inventions already existing with T-TIARIS, we find the following interesting:

- *WO2014062146, which we will then also find with the extreme W02015192102 and WO/2014/062146 of another inventor. The summary is reported in full: "Abstract - (EN) This invention concerned the acceleration of the air flow in particular in the generation of energy with the wind by channeling it through one or more sheets and condensing the same and the method that provides the transport of the accelerated air flow to the desired region of one or more wheels at a desired angle and the mechanism that applies this method is generally composed of the windproof sheet (1) which provides for the channeling of the wind, its passage from an area of the narrower cross section of the entrance, wheel entrance (2), the passage point located in the narrowest zone of the wind sheet (1) which is the path created with the narrowed cross-section zone with wind channeling, extension of the channeling (2.1), the part of the windproof sheet (1) which provides for the channeling of the wind which tilts inwards from the entrance of the wheel (2), wheel (3) to which the wind energy is transferred and which rotates from its center around the tree, wings of the wheel (3.1) positioned angularly on the wheel (3) and connected longitudinally to the wheel (3), rear cover (4) which avoids the turbulences that are created during the exit of the wind from inside the wheel (3), transmission shaft (5) which provides for the transmission of the motion energy supplied during the passage of the wind by the wheel (3), generator (6) where the motion energy created in the wheel (3) is transmitted with the transmission shaft (5) and which provides for its conversion into electrical energy.”*

The drawings are at times confusing enough to deduce the protective intent of the idea by the inventor Gomez Gomar Josep Lluis, concentrated in the functioning and not in the form.

-EP 2419627 “Horizontal Wind Turbine”, concerns a device with a horizontal Darrieus type fan, mounted in a structure with a very squared design, which recalls in its element 47 the design of T-TIARIS in its “dome” element 7, even if in EP 2419627 it can be opened and is opposite the element 45, fixed, parallel on the external side to 47. In T-TIARIS it does not there is a comparison

with element 45 of the invention EP 2419627. It also appears under the acronyms US 20110250069, CA 2757145 and others.
- US 20060140748 “Method for channeling the wind to produce electricity”, draws in a stylized way, planimetric vision of traditional masonry wall systems, which convey the wind towards large vertical turbines.
- WO/2016/166385, always a system for conveying the wind towards the turbine, at the same time increasing its speed, in this case only designs the lower cap; the large turbine is placed in sequence and not parallel to the cap, it is hoisted on a pole support.
- US 6239507, Wind turbine mounted on the ridge of a two-pitch roof staggered in height, exploits external winds by means of an opening towards the outside equal to approximately ¼ of the perimeter.
- EP 112925 "Horizontal axis wind generator" shows protective casing of the generator mounted in pairs on a vertical support and equipped with a directional fin, equipped with hard lines with some resemblance to T-TIARIS aesthetically but not in use: external wind, the grille resembling element 1) of T-TIARIS collects wind from the outside instead of dissipating it outwards.

- CH706723 “ Fairing to amplify the performance of the wind for example on horizontal axis wind turbines installed on the house creating the illusion of the roof, it has a central wall equipped with side walls, ground to the ceiling with different geometries or cladding”, the title is the description given. There are no drawings for comparison.
- US 5009569 “Wind energy harvesting system”, describable as a horizontal hopper that channels the wind onto a horizontal turbine of the Darrieus type. The system is mounted on a pole and equipped with a directional fin.

Description:
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 4-5

Carter for micro wind generator to be positioned on top of buildings and/or installations of various kinds. It collects the verticalized wind coming from the buildings in which it will be installed and directs it towards the horizontal micro wind generator 2) which it will host. The external shape is a barrel dome 7), i.e. semi-cylindrical, resting on supports 4) belonging not to T-TIARIS but to the construction on which it will be mounted. The dome has an opening 1) protected by an anti-intrusion net, designed to disperse the wind coming from inside to the outside, after having activated the wind generator 2). The lower cap 8) has a curvilinear S-shaped profile and helps to collect and direct the verticalized wind of the building towards the micro-wind generator 2) which it will host.

T-TIARES is closed laterally by semicircular-shaped elements 9), fitted at the ends of the dome 7). The side closures 9), show the bushings 5) towards the outside for fixing the horizontal micro wind generator 2). The electronic part of the generator 2) - where mechanical energy is transformed into electrical energy - will be supported by the support 6), firmly joined to the lower cap 8). The upper dome 7), the lower cap 8) and the two side closures 9), are made of sandwich panel, with thermal insulating material in the internal state. This measure is useful for preserving the heat of the wind as it passes through the blade of the wind generator, limiting the pressure drops of the moving fluid. Generally we can also recognize T-TIARIS for the quality, in its kind of use, of creating a bottleneck in the section near the entrance of the wind turbine, contributing to the increase in wind speed, useful for improving the performance of the generator. Built with waterproof material, it protects the wind generator from premature aging. Equipped with an anti-intrusion net on the

opening 1), it is safe for the user and animals. Compared to similar patented devices, it has a graceful and valuable shape, suitable for installation even in prestigious architecture.

Industrial interest:

T-TIARIS is an indispensable tool for making the best use of a small wind generator, in all those applications that present vertical wind trends, due to natural causes or induced by previous mechanical and/or structural conditions. It can be used for domestic, civil, industrial and recreational applications, therefore it potentially has a huge market.

COMPONENT 2)

TITLE:**“ T-SOFFIONE: modifica di ventola tipo Savonius, per eolico ”, DESCRIPTION of the utility model patent inventor Anna Poggiani, resident in Chiusi (SI) Via Montegrappa n 152, of Italian nationality. Presented on 01/19/2024 with no. 202024000000252”.**

Purpose:
Optimize the Savonius type fan for vertical and horizontal wind applications, lowering the starting point and improving the overall thrust, increasing the torque supplied to the electric generator.

The state of the art:
Consulting the WIPO archive, with the search words "modification and fan and micro and wind and turbine", no results are obtained. By changing the search criteria to "wind turbine", you obtain 7406 pages (therefore approximately 74000 results), concerning large turbine-type generators. Better results were obtained with the search "Savonius rotor", there are 254 documents that have the word Savonius in the title or description. There are many repetitions and affinities between them. The original Savonius has 2 blades, semi-cylindrical, not continuous with each other. This results in a gap in the center/pivot of the device. There are many studies and applications that try to overcome the problem of fan slowdown also caused by this continuity in the central axis. Among the results of the WIPO application query, the 2 and 4 blade shovels are mostly designed and patented. Some documents are not accompanied by drawings, therefore difficult to compare.

By selecting the three-bladed shovels, the field is narrowed down to a few results to pay attention to:
- 3155257 and EP 3126668, three blades on a hollow central node, thin plate blade;
- W02015189155, 2-3 fine blades like previous results;
- CA 2541683, briefly described 3 blades, not accompanied by drawings;
- WO2015150697, CA 2980979, 2/3 blade empty center
- US20070086895, three blades joined in the center, three-section blade straight in the concavity; the only similarity with the blade covered by the following patent is the number of blades and the distribution around the central axis;
- W02011012970, three blades joined in the centre, very thick for a large part of the length, laminar profile only in the terminal part - roughly perpendicular to the first - curved with a large radius;
- CN 102062050, CN 102094750, three single curved blades, joined in the centre, very thin and regular profile;
- JP2007040276, three elliptical blades in height, enveloping the large central cylindrical body;
- DE000004016622 and Fr2968726, three blades detached in the center, of various shapes and thicknesses;
- DE102009004660, three semi-elliptical blades joined at the center;

- KR1020060082794, three fine blades in the circumference of a large central circle, solid (?).
Really similar to T-SOFFIONE, the patent DE000019847965 whose title states "HYDRAULIC turbine with 3 blades", even if the dimensions of the cylindrical central body accentuate the difference between this and T-SOFFIONE, in addition to the use in large boats and the fluid they exploit, in this case water in the movement induced by the movement of the vessel.

Description:
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 6

The original Savonius blade is made up of two or more half-cylinders, opposite and translated with respect to the central circular support. It is a vertical type turbine. Then the wind hits the blade, pushes it and slides inside it, escaping partly on the external side and partly on the internal side, in the place of separation of the two blades. This second movement of the wind causes a disadvantage on the second blade compared to the motion generated by the first blade. This first observation merited the study of as much literature as possible on the Savonius altarpiece, often associated with the Darrieus, precisely to compensate for mutual errors. Among the various studies, I would point out, for its interesting food for thought, the study entitled "CFD Analysis and Theoretical Modeling of Multiblade Small Savonius Wind Turbines" by the AA Research Foundation, published at the following link:

https://www.researchgate.net/figure/The-distribution-of-the-velocity-magnitude_fig4_299130490

Wanting to give an extreme summary, I would say that the original 2-blade Savonius is optimized only in the 90° position with respect to the direction of the wind. Disadvantaged in the others. This characterizes the number of revolutions (effective for electricity generation) reduced to approximately ¼. The same study highlights how 3 is the number of the most effective blades. Starting from this study, T-SOFFIONE was designed with 3 concentric monobloc blades, enveloping the central axis of the turbine. More significant is the modification of the single blade, designed with a non-uniform section, by virtue of the different radius of curvature of the two faces of the same: the radius of the concave side is greater than that of the convex side. This creates a different distribution of the effects of the wind on the blade: the concave part works as a push, while the convex part works as a lift, therefore collaborating with the first to the advantage of the mechanical work. In practice, the negative effects of the blade against the wind have drastically decreased, given that the lift acts in a direction consistent with the thrust blade.

Two different versions are drawn in the table:
a) with 2 curvature radii on the single blade;
b) with 3 radii of curvature on the single blade.
The first version has a surface exposed to the collection of wind pressure - the concave part - which is greater than the second, where the surface that acts in lift - the convex part - prevails. The fan with blades with 3 curvature radii, compared to the one with 2 curvatures, develops greater value in lift, but lower total moment and will be useful in conditions in which you want to recover starting speed.

T- SOFFIONE was created to respond to a specific need, in which unidirectional winds are present.

Industrial interest:

According to conservative estimates, at a wind speed of 5.32 m/sec, the torque developed will be 18.32 N.m for blade a) and 18 N.m for blade b). Associated with a Permanent Magnet current generator, with ferromagnets in the rotor and windings in the stator, with a moment of inertia of 0.032 Kg.m, T-SHOWDER generates rpm 84.21 before the normal mechanical speed multipliers, mounted in a standard way in wind generators. By fitting x5 speed multipliers, the wind generator manufacturers' tables guarantee 1kW of power, certainly an excellent result for a small turbine like T-SOFFIONE, whose blade size is 45.66 cm in diameter and 95 cm in length , to which the size of the electric generator will then be added. Of modest weight, it can be useful in all those domestic or recreational applications that require productivity, lightness and ease of assembly/removal, both horizontally and vertically.

COMPONENT 8)

TITLE:**“ T-SENTINAM: raccolta acqua dall’aria per condensa”,**

DESCRIPTION of the utility model patent, inventor named Anna Poggiani resident in Chiusi (SI) Via Montegrappa n. 152, of Italian nationality. Presented on 01/17/2024 with no. 202024000000180”.

Purpose:

Obtain water from the humidity of the air, causing condensation on the external surface of a tube which has a piston inside, activated by two vacuum servomotors. Consequently, quench people's thirst, free them from slavery induced by the lack of clean water, but also contribute to safeguarding agricultural production and food in the crops of industrialized countries, increasingly affected by climate change.

The state of the art:

By consulting the WIPO archive, with the search words "water and humidity and air and device", you get many results. Among the first relevant ones, there are the following patents:

1. CN 112878429 01/06/2021, confusing and repetitive text including messages in Italian intended to create confusion (require you to contact them); from what we can understand, they use an absorbent material, not specified in nature, which is squeezed by a screw press; the power supply should be from a photovoltaic panel that moves in some way together with the screw; the large enclosure should be the protected place where air is sucked in from the external environment and thus dehumidified. Although there is a brief mention of drought problems, it appears that this deprivation of water from the air helps solar cells work better.

2.CN 110067286 11/07/2019, similar to the previous one, also for the same text (the patent CN 112878429 01/06/2021 the copy from this) of the introduction.

3. 20230211255, 4165254, wo/2021/255568, 3176415, 20230211255, are substantially the same by the same inventor MIKULANDRIC ROBERT, describe a device composed of more than one in-line compressor and an expansion valve, with a system similar to a refrigeration machine reverse.

4. WO/2009/135618, 20160237659, 2014304532, substantially the same, describe cold absorption with a water absorbent medium.

5, WO/2009/043413 has sulfuric acid as a condensation surface

6. 20120205823, IL218058, describe devices with absorption of air humidity with saline solution and subsequent evaporation of water for desalination.

Trying to further detail the search with the criteria "water and humidity and air and depression and plunger", no reliable results were found.

The search for prior art demonstrates the great interest in the search for devices capable of recovering the water resource from the air, yet they do not describe our current application: not in operation, not in instrumental composition, not in design.

Description:
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 7-8

The system is composed of the tube (9) filled with air which has a piston (14) at its upper end. The piston (14) is operated under vacuum by two servomotors (6), connected to it by means of a double connecting rod (13), acting on the rigid mechanical shaft (16). For the reverse Carnout cycle, the rapid adiabatic phase, at constant temperature in the system - inside the tube (9) - sees the increase in the volume of the fluid due to the decrease in pressure, to the detriment of the temperature of the external environment.
The water in the air passing around the tube instantly condenses on the external surface of the tube. The tube (9) is designed to develop a lot of external surface with little volume, this allows improving the performance in liters of water per day, limiting the physical size and at the same time also the stress on the servomotors.

Rhythmically, operated by an electronic control unit - not part of the device now patented -, 11 hollow concentric extensible tubes (5) push the rubber gasket (8) from top to bottom along the entire tube, into the outside, conveying the condensed water inside the collection container (10). The tube (9) is flanged at the bottom by partial truncated cones that trace its perimeter: these facilitate the formation of the drop which will then fall more quickly into the collection container (10). The collection container is designed to protect the last centimeters of the descent of the rubber seal (8), this will limit the evaporation possibly induced in the return phase, ascending in the Carnout cycle.
The unfolding of the 11 hollow concentric extendable tubes (5) is caused by the air pushed into the piston (3) by the piston (18), the upper heads of the hollow concentric extendable tubes (5) being connected to the lower air chamber in the piston (3), under the plunger (18). The action of the plunger is regulated by the servomotor (1), connected to it by a mechanical "connecting rod" arm (2). The collection tank (10), shaped like a funnel, has a 1" lower outlet, to which a normal rubber hose with a tightening fitting will be connected to bring the collected water into the external tank - not part of today's patent - where the water is stored, withdrawn, possibly treated and placed for use.

Components list:
1. servomotor on the extendable hose plunger
2. servomotor levers on the extendable hose plunger
3. piston containing the plunger to the extendable tubes
4. servomotor support for the piston of the extendable hoses
5. concentric extendable tubes
6. servomotor to the depression plunger
7. support for the vacuum piston servomotor
8. descending seal
9. receiving body tube
10. water collection tank

11. outlet on the collection tank
12. vertical connection of the support to the vacuum servomotor
13. vacuum servomotor levers
14. depression plunger
15. support
16. motion transmission arm to the depression plunger
17. flange on the collection tube
18. Extendable tube plunger

Industrial interest:

According to conservative estimates, starting from the calculation data with a condensate thickness of 0.05 mm, 60 cycles per hour, 18 hours per day, T-SENTINAM is capable of collecting more than 40 liters per day. The expected collection is therefore 14,600 liters per year, an important resource for the populations of both rich and poor countries, given the drought induced by climate change even in territories that were protected from this problem until a few years ago. These are the calculations for the 100 cm long hollow tube, but improved results can be obtained with longer lengths, without this constituting an innovation in today's operation. If it is a moral duty to allow clean water (objective no. 6 Agenda 2030) to people in difficulty, it is also a resource capable of protecting many valuable crops in our territory, of which white truffles, olive trees and vines are just non-exhaustive examples.

TITLE:**“ T-HYDRA: Sistema Tutto Incluso di auto-generazione elettrica ed acqua”**,
CLAIMS of the utility model patent, inventor Anna Poggiani resident in Chiusi (SI) Via Montegrappa n 152, of Italian nationality. presented on 01/31/2024 with no. 202024000000480”.
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 1-3

1) conception of the composition of the T-HYDRA system in operation: container of air, however supported, which collects and conserves the heat of solar radiation, naturally converted into kinetic energy of the air, capable of generating an internal wind to be exploited with a generator horizontal wind; use of the electricity produced by the wind generator to power the water collection system from air humidity;

2) conception of the composition of the T-HYDRA system, in the shape, in the choice of components and in the number of these: Tetric Modules of hollow section of plastic polymers and/or aluminum in any number and size; electric generator powered by T-SAFFIONE wind turbine contained inside T-TIARIS casing; water collection system from air humidity for condensation with T-SENTINAM system; box foundation in T-Roboris plastic polymers; translucent and opaque doors, also covered with sheep's wool;

3) devising the design and operation of the rear door covered with sheep's wool, using sheep's wool adsorption to extend the operation time of the T-HYDRA system beyond sunset;

3) conception of the design and functioning of the box foundation, designed to be anchored to the ground on site with special screws, strengthened with inverted V profiles in the exact location to discharge the vertical loads; filled with soil resulting from the same seabed excavation;

4) design of the T-HYDRA electrical management system

Regarding component 1)
“ T-TIARIS: carter per micro generatore eolico, atto a contenere, ancorare e proteggere il corpo macchina e la pala; raccoglie e direzionare il vento verso il generato”
Patent Application for Utility Model n. 202024000000303 of 01/23/2024
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 4-5

5) creation of the barrel vault design of the upper dome 7) associated with the lower cap 8) with a multi-curvilinear S-shaped profile and the semi-circular lateral closures 9);

6) design of the opening 1), duly protected by the anti-intrusion net;

7) conception of the design and operation of T-TIARIS as a protection and anchoring structure of the wind generator to the buildings for which it is intended, by means of the anchoring bushes 5) and the support 6) of the engine;

Regarding component 2)
“ T-SOFFIONE: modifica di ventola tipo Savonius, per eolico ”,
Patent Application for Utility Model n. 202024000000252 of 19/01/2024
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 6

8) conception of the blade design with 3 monobloc concentric blades, enveloping the central axis, having different curvature radii for the convex side and the concave side, of the model a) with two curvature radii, generating the enhanced total torque;

9) creation of the blade design with 3 monobloc concentric blades, enveloping the central axis, having different curvature radii for the convex side and the concave side, of the model b) with three curvature radii, generating the torque with greater effect with lift, capable of lowering the starting speed of the wind;

Regarding component 8)
“ T-SENTINAM: raccolta acqua dall’aria per condensa”,
file “T-HYDRA-Disegni-Unito-INGLESE” PAGE 7-8

10) conception of the design of the tube (9), of the section and of the flange (17) suitable to develop the greater lateral surface with reduced cross-sectional area;

11) design of the piston (14) with the appropriate shape for the tube (9);

12) design of the vertical movement mechanism of the piston for the repeated depression/relaxation cycles, as connected to the two servomotors (6) by means of a rigid mechanical arm (16) and double connecting rod (13);

13) design of the rubber gasket (8) with a shape that adheres to the outside of the tube (9);

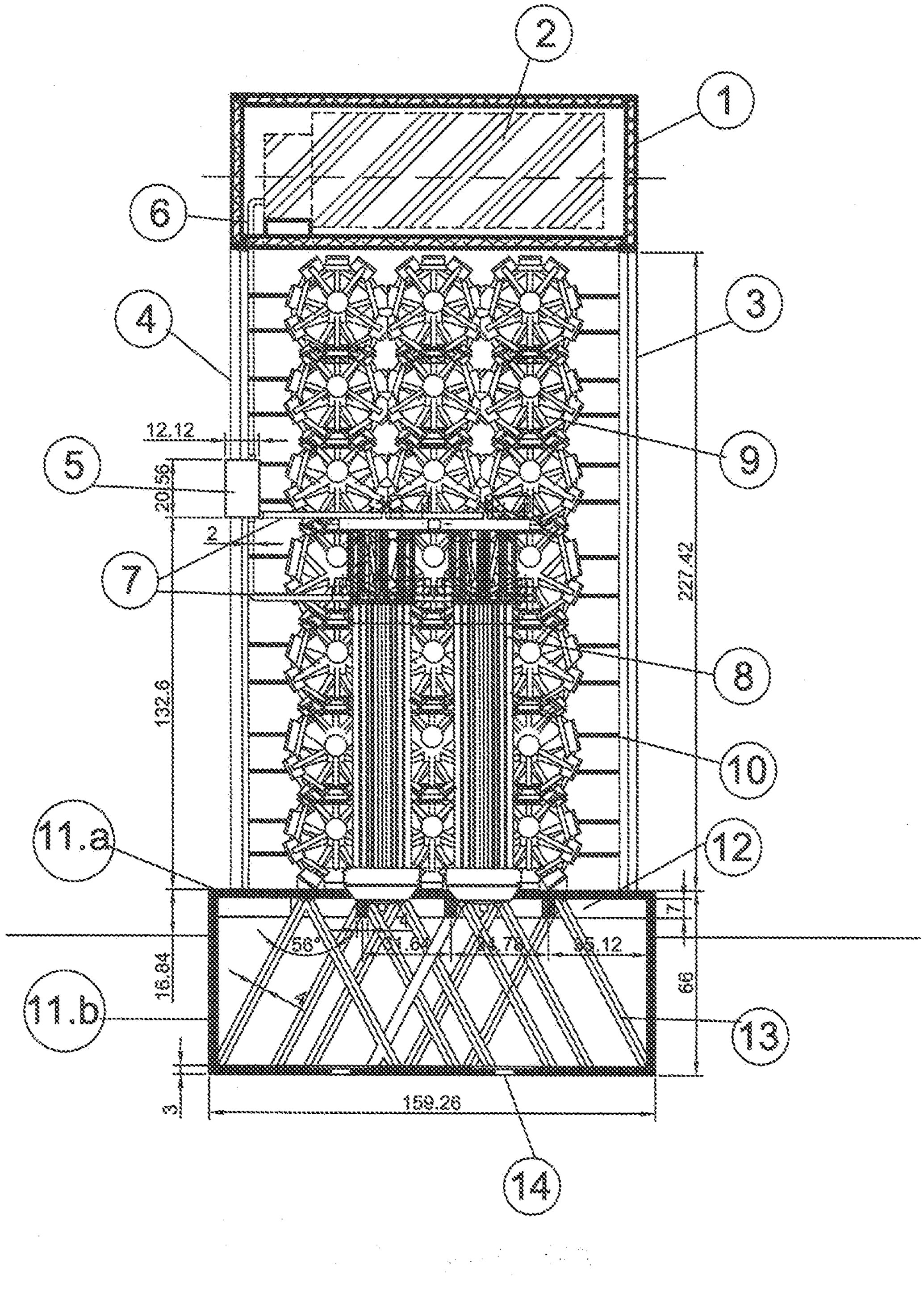
14) design of the vertical movement mechanism of the seal on the outside of the tube (9) by means of 11 concentric extendable tubes (5);

15) design of the deployment/retraction system of the extendable tubes (5) by means of a piston (3) with piston (18) operated by a servomotor and their connection by means of a double connecting rod (13);

16) creation of the design of the support system for the tube (9) and the servomotors, connected to the piston (3)

17) conception of the design and operation of the water collection container (10)

18) design of the T-SENTINAM system composed with the designs in the previous claims, in its form of compact assembly and in its operation, in which the condensation of the water is caused due to the cooling of the external surface of the tube (9), caused by the depression obtained from the movement of the piston (14), driven by the servomotors (6).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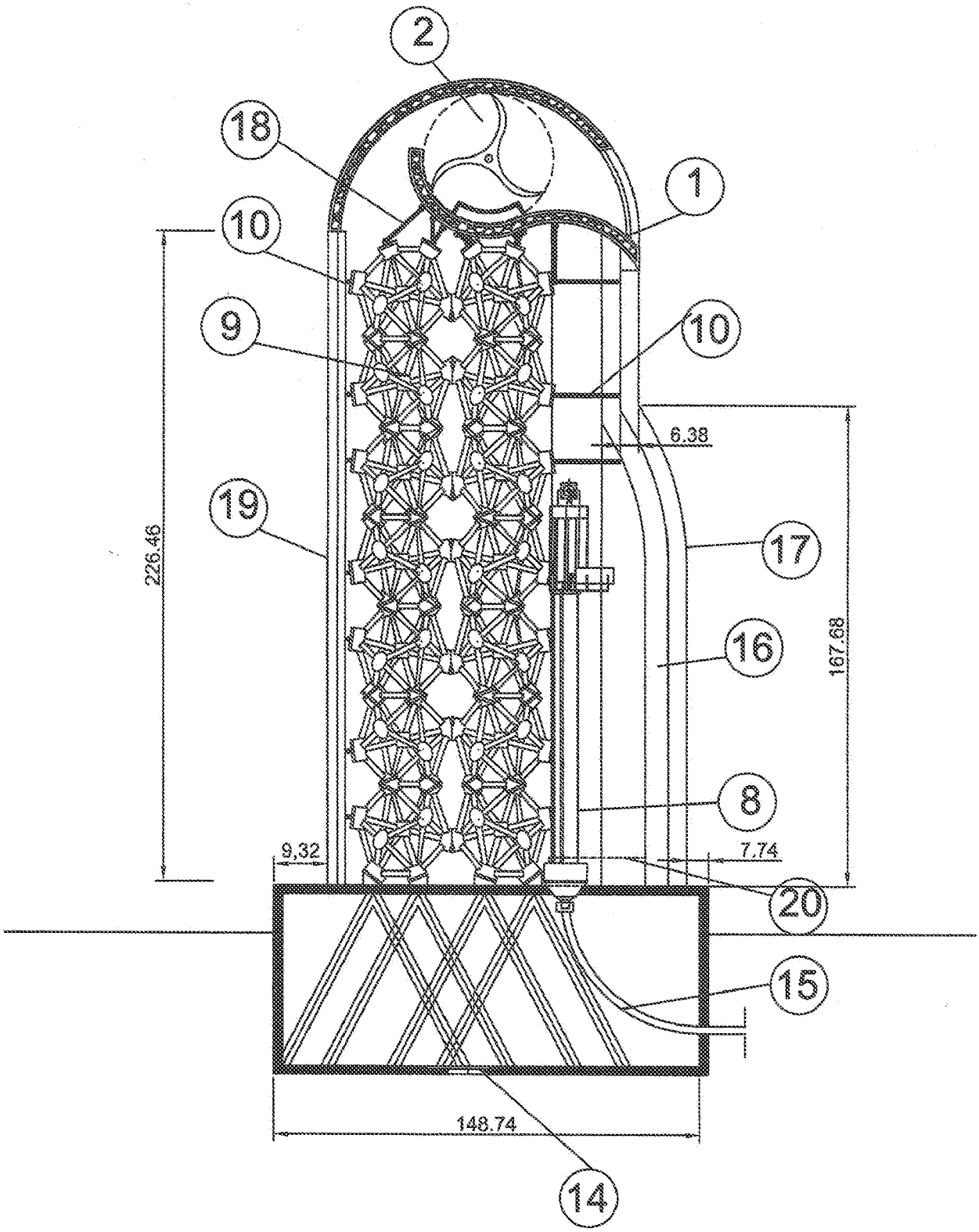
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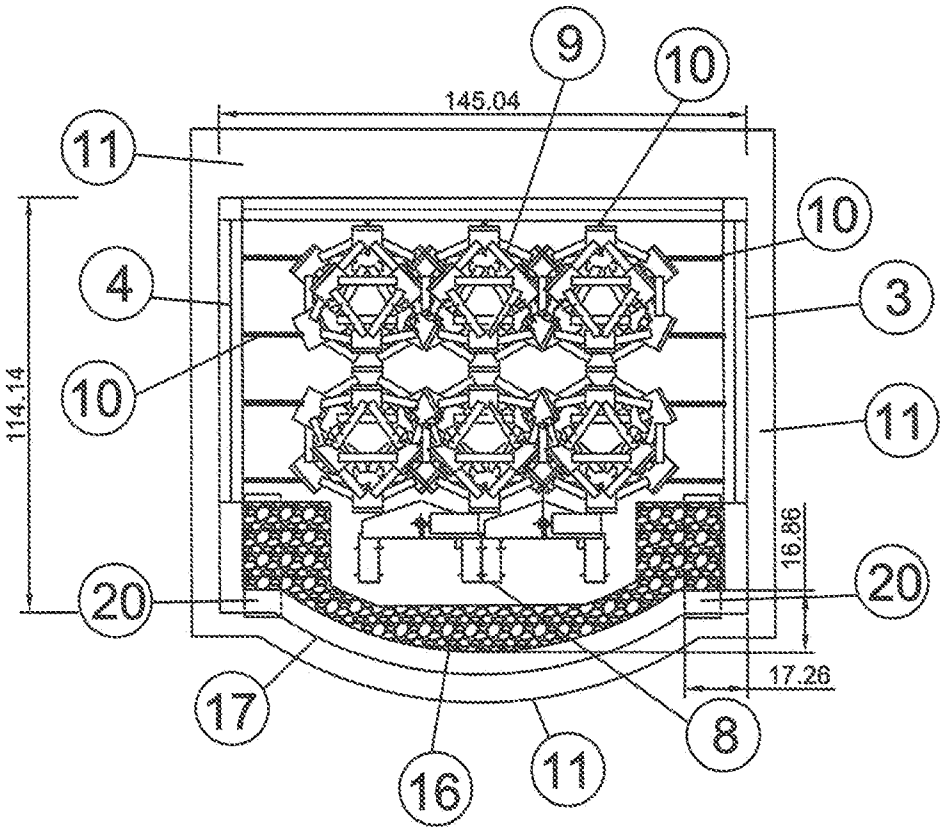
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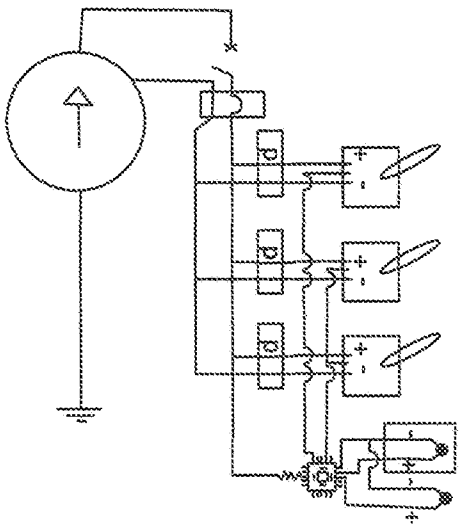

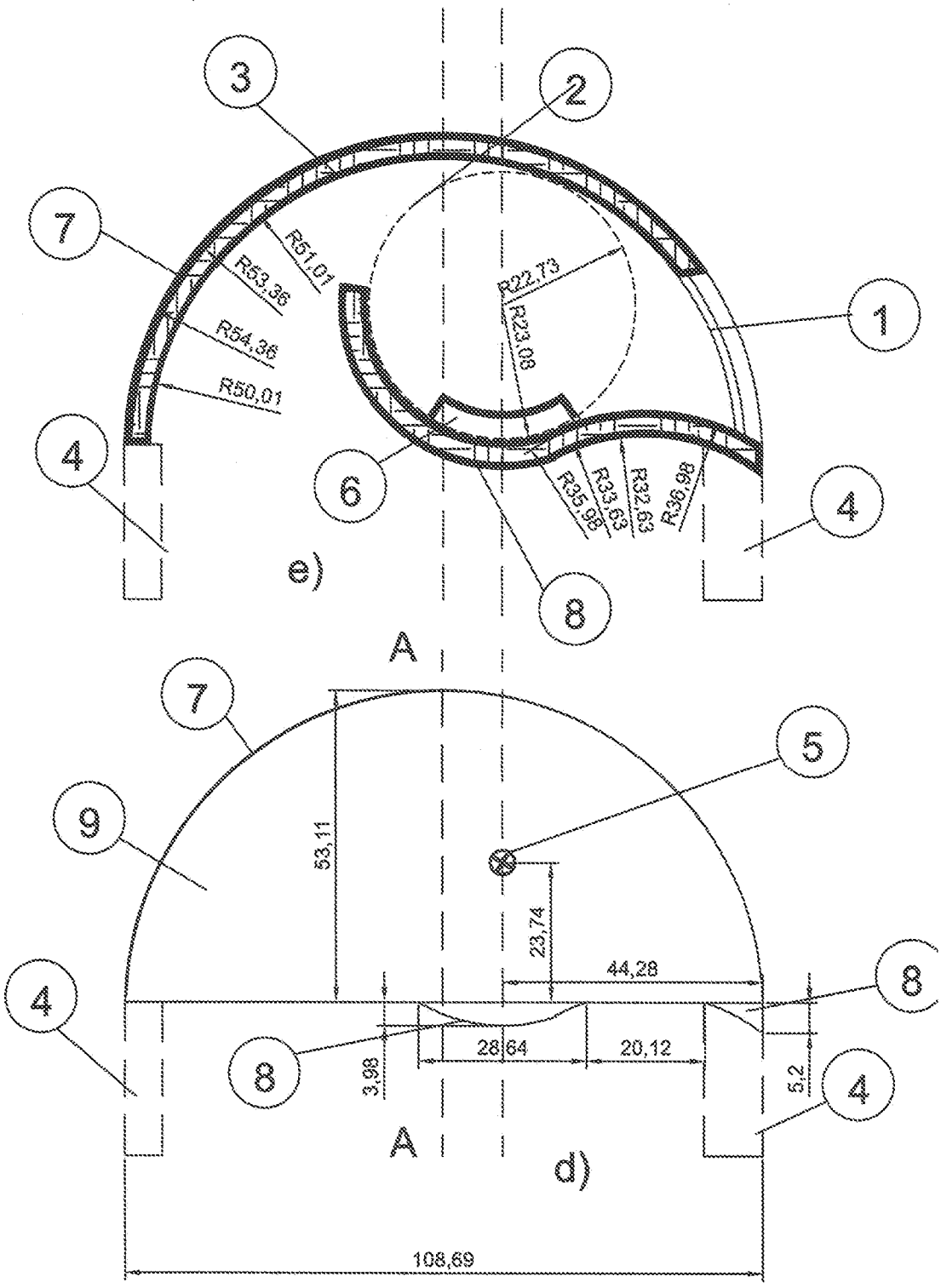
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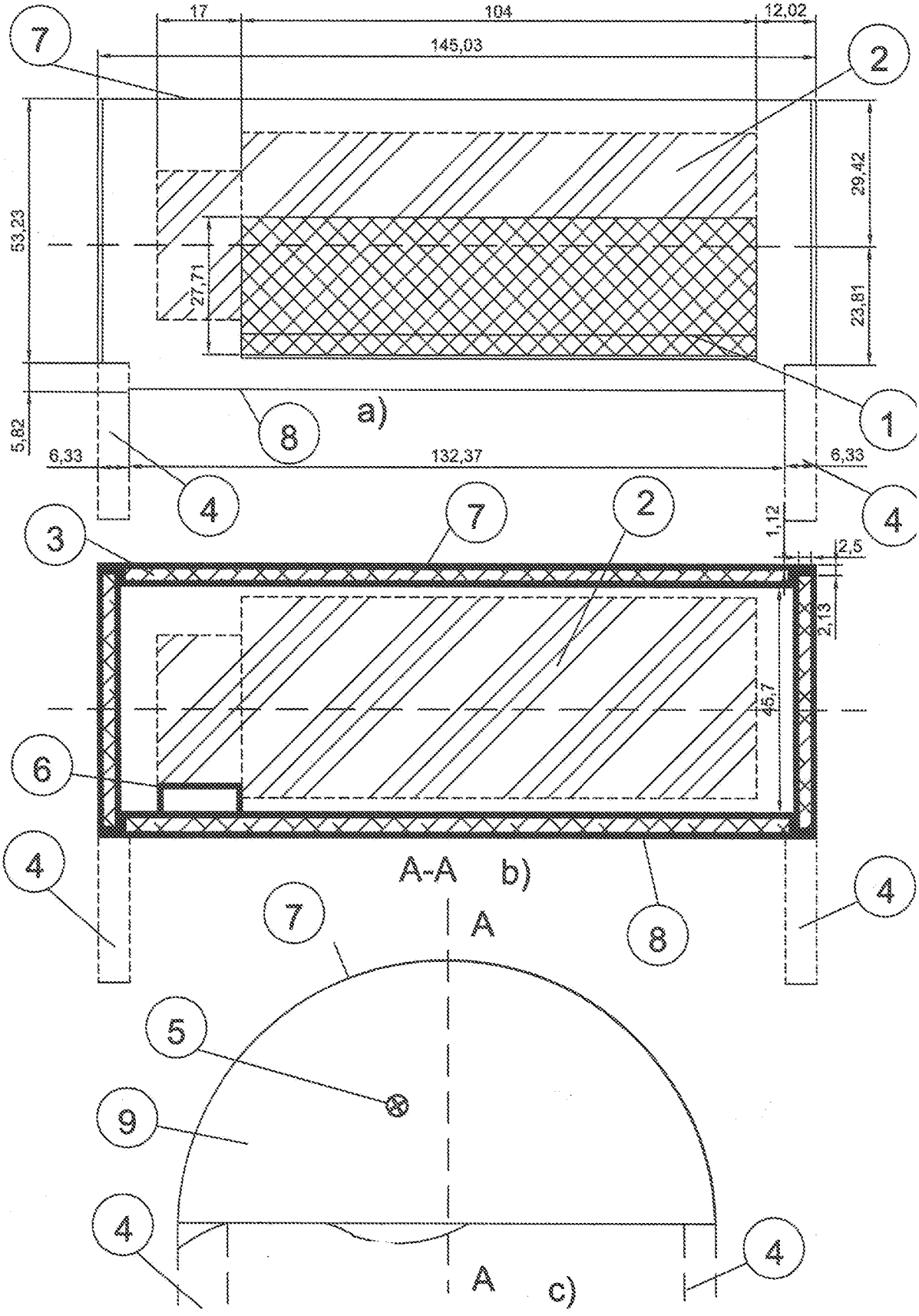
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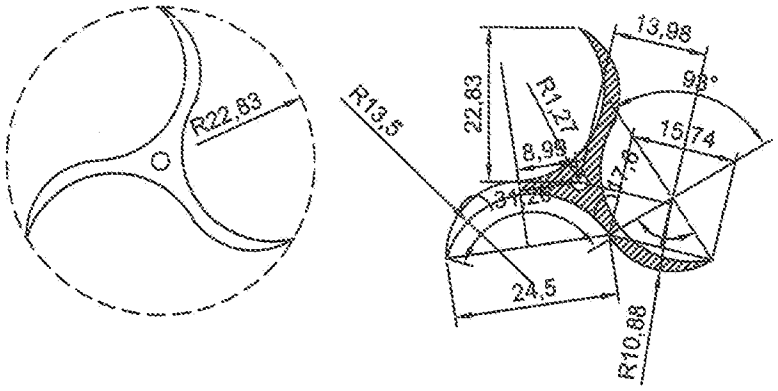
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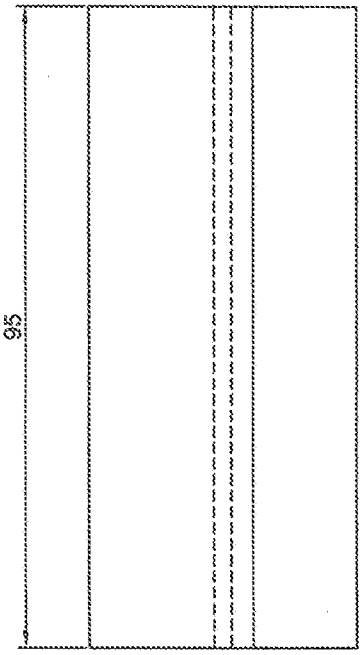
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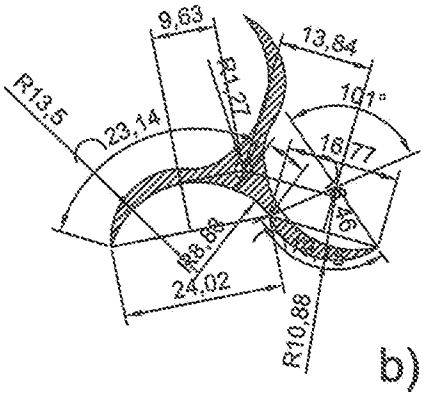
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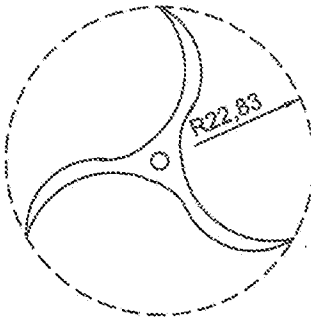
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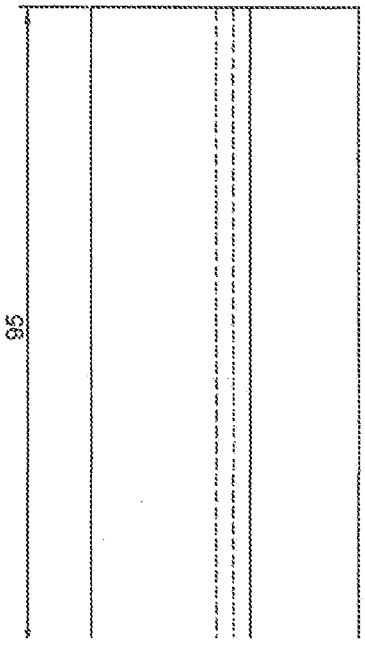
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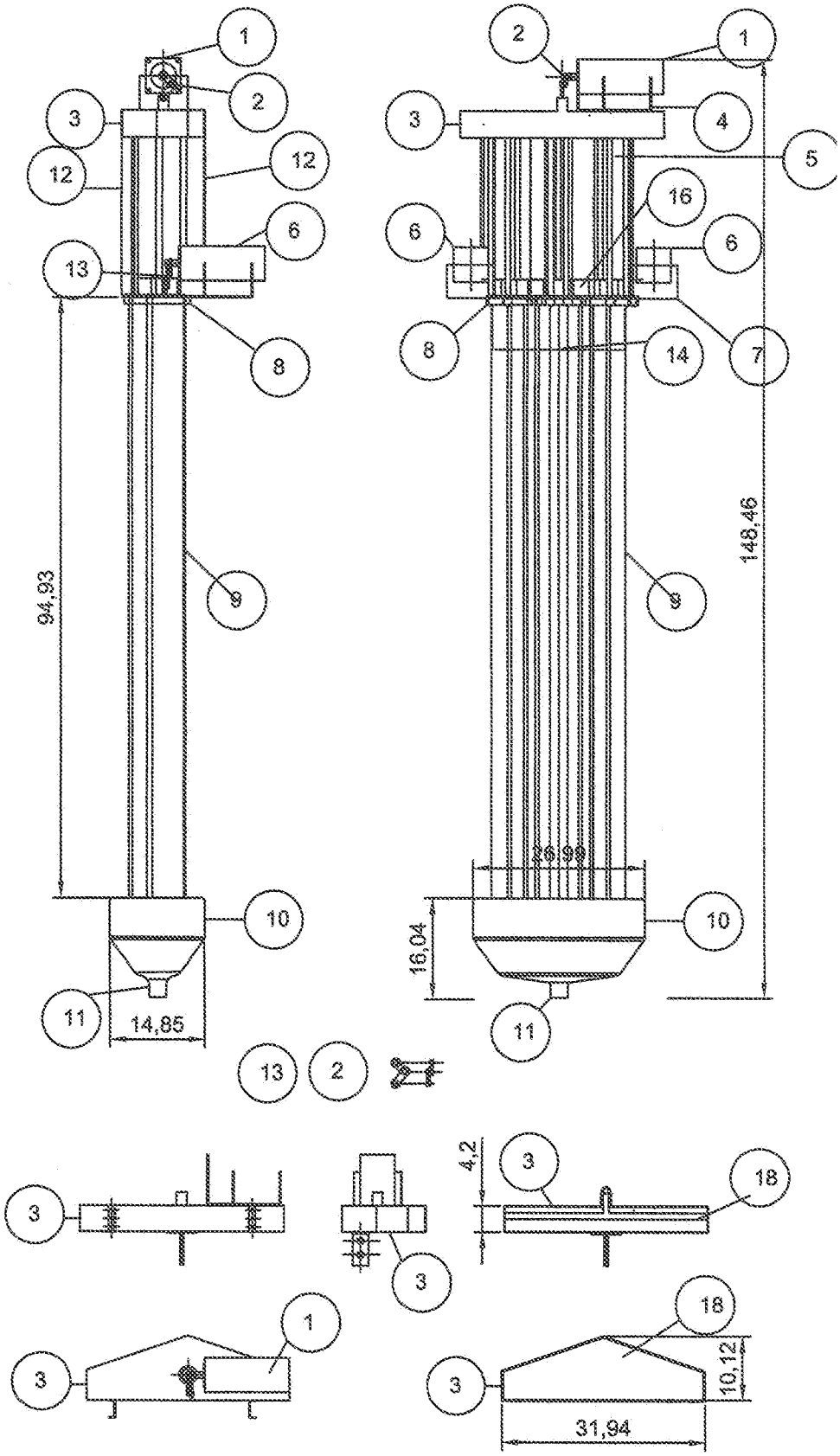
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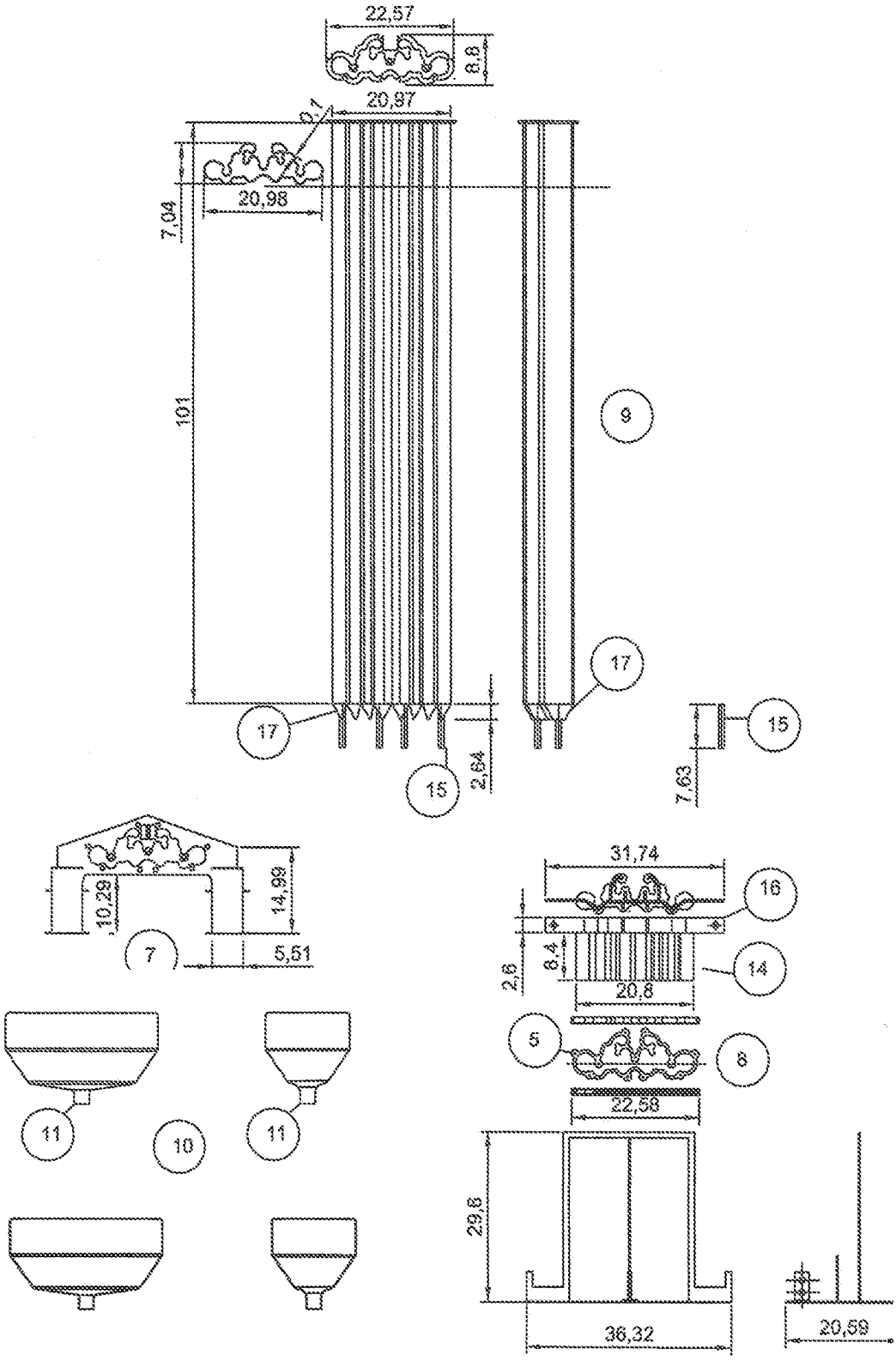
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INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2025/050009

A. CLASSIFICATION OF SUBJECT MATTER
INV. F03D1/04 F03D3/00 F03D9/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7 964 981 B2 (TSAO JASON [US]) 21 June 2011 (2011-06-21) column 9, line 64 - column 16, line 51 figures	1-18
X	DE 10 2012 017707 A1 (DIETZ VOLKER [DE]) 13 March 2014 (2014-03-13) paragraphs [0001] - [0232] figures	1-18
X	US 2010/107633 A1 (TSAO JASON [US]) 6 May 2010 (2010-05-06) paragraphs [0117] - [0168] figures	1-18

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[x] Further documents are listed in the continuation of Box C.

[x] See patent family annex.

* Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2025	07/05/2025

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Rini, Pietro

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Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2025/050009

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	IT 2022 0000 0218 U1 (COSENTINO GIUSEPPE [IT]; RUSSO ALESSANDRO LEOPOLDO [IT] ET AL.) 24 July 2023 (2023-07-24) abstract figures -----	1-18
A	US 9 038 385 B1 (KHIM KYUNG N [US]) 26 May 2015 (2015-05-26) abstract figures -----	1-18

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IT2025/050009

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DE 102012017707 A1	13-03-2014	NONE	
US 2010107633 A1	06-05-2010	NONE	
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