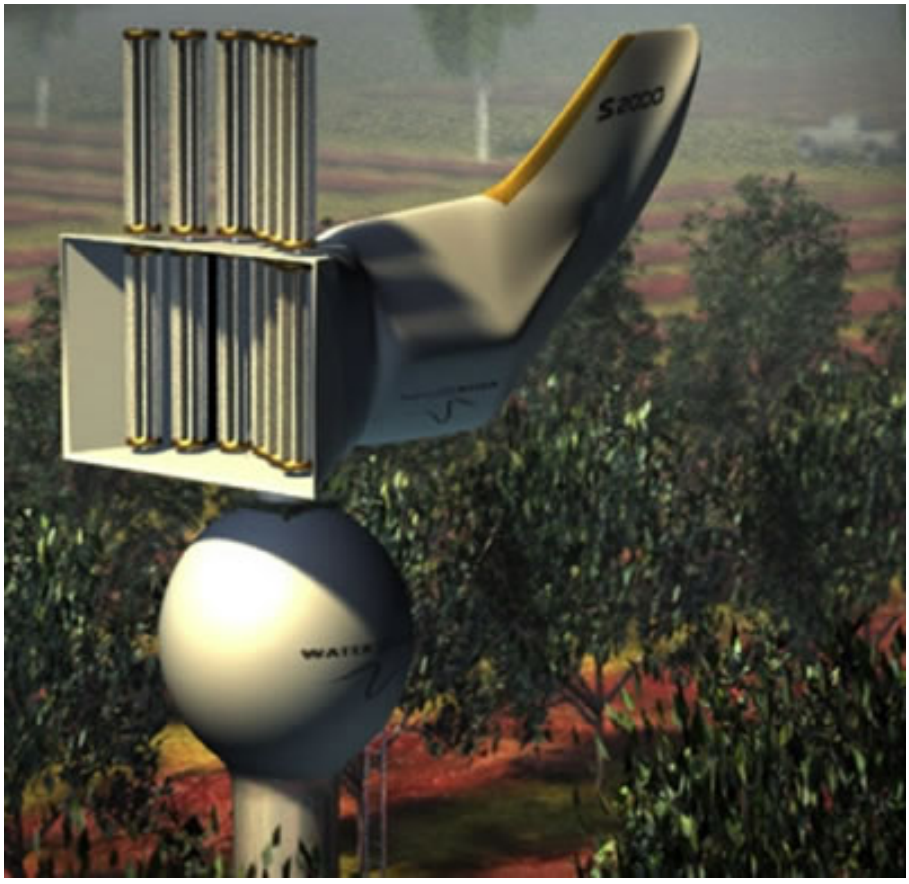
rexresearch.com

Maxwell WHISSON

Air Well

Max-Air



http://www.waterunlimited.com.au/

General Enquires can be fowarded to WATER UNLIMITED.

Postal: PO Box 695
West Perth WA 6872
Australia
Em Telephone: +61 8 9381 2177
Fax +61 8 9486 4944

Introducing the Max Water

Water UN Limited was incorporated to acquire the technology and intellectual property associated with water from ambient air technology, also known as 'the Max Water', from world renowned Perth based inventor Dr Max Whisson.

This breakthrough technology has the potential to produce water from air using a turbine containing refrigerants. If successful, this technology will be capable of supplying commercial quantities of water for a wide variety of uses powered by wind energy alone.

If successful the technology developed by Dr Max Whisson may represent the most important breakthrough in water production in recent years. The commercialisation of Max Water may be by license, direct sales, distributor networks or a combination of these. Under any marketing strategy a percentage of units produced will be donated via appropriate charitable organizations to supply water to areas of extreme poverty in developing economies.

Our company mission is to now build the first complete prototype and hopefully prove the concept.

Video : http://www.waterunlimited.com.au/video.html

Learn more about the Max Water : This short presentation outlines how the Max Water may use only wind power to cool the air and achieve condensation of the contained water. It contains drawings, research and other relevant statistical information. DOWNLOAD PDF (2.8 MB):
http://www.waterunlimited.com.au/images/presentation/WaterUNlimited-MAY.pdf

QuickTime Movie :
http://www.waterunlimited.com.au/images/presentation/WaterUNlimited-MAY-big.mov

YouTube :
http://www.youtube.com/watch?v=Gf0krn99Y20

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http://www.abc.net.au/science/news/stories/2007/1860729.htm
ABC Science Online
(Friday, 2 March 2007)

Making Water Out of Thin Air

Anna Salleh

Could a wind turbine that sucks water out of the air supply enough water for the whole world?

A wind-driven device could provide an unlimited water supply by harvesting water from the air, says its Australian inventor.

But critics are asking if it's too good to be true.

Dr Max Whisson, a retired medical specialist turned inventor, says he has designed a highly efficient wind turbine that can run a refrigeration system to cool air and condense moisture from it.

"The wind carries in the water and [provides] the power required to separate that water from the wind," says Whisson, who is based in Perth.

He says there is a huge amount of water in the atmosphere that is replaced every few hours. This means the whole world could just use water from the air without disrupting the environment.

Whisson says the system would even harvest significant amounts of water in areas with low humidity.

He says a 4 metre square device could extract an average 7500 litres of water a day.

In his design, moisture-laden air enters the system and is cooled by a drop in pressure behind the wind turbine blades, says Whisson.

The air then flows into a chamber containing refrigerated metal plates covered by a non-wettable surface that causes water droplets to run off immediately into a collection point.

Could it work?

Full technical details of the design are not available but at least one mechanical engineer is sceptical.

"I have found in general that inventors tend to enormously overstate the capacities of their devices. They just have a very rosy outlook on what their devices will do," says mechanical engineer Professor John Reizes, an adjunct professor at the University of New South Wales.

"It's not until you've made one that you discover all the problems."

Reizes, who specialises in heat transfer, says he is sceptical because of the huge amount of energy that is needed to condense water.

Whisson says he is well aware that a large amount of energy is required to do the job.

"It's like boiling a kettle in reverse," he says.

But he is confident his wind turbine, still subject to patent applications and yet to be independently tested, is efficient enough.

"The wind turbine is a surprisingly good development. I'm surprised because it performs so well," says Whisson.

And he says the power generating part of the wind turbine can simply be increased to collect the wind power required for the condensation process.

"We've got unlimited power," he says.

But Reizes says wind turbines are so far only about 30% efficient at best and the energy

arriving at them is very diffuse, requiring large devices to collect the energy.

"It may be a fantastic idea on paper and it looks as if it could work," he says.

"However, the thing may have to be so big to drive this device that it becomes impractical."

Drawing moisture from air

One thing seems more certain. If the system does work, it is unlikely to backfire on the environment, says Dr Michael Coughlan, of Australia's Bureau of Meteorology.

He says the amount of water that humans would use is trivial compared with the amount available in the atmosphere.

"If you can tap into it, then go for it, because you would do little to upset the hydrological cycle," says Coughlan.

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http://www.alternate-energy-sources.com/Whisson-windmill.html

The Whisson Windmill - Water From Air, Why Not?

...Dr Whisson himself describes his Whisson Windmill as follows: "The essential principle is that more wind is used for power than for water supply. In other words, the area of power turbines is greater than the area of turbines leading to water harvest. This is all made much easier by the invention of a new kind of wind turbine or 'windmill'. The amount of water available in the air is for all forseeable practical purposes unlimited. The bottom 1 kilometre (in the atmosphere) alone contains about 1.000,000,000,000,000 litres of water and that is turned over every few hours. The "Whisson Windmill" or Max Water From Air device will make it possible to get adequate water anywhere at any time, drought or no drought."

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http://www.abc.net.au/austory/specials/windmills/default.htm

Windmills of Your Mind

PROGRAM TRANSCRIPT: Monday, 21 May , 2007

JAMES O'LOUGHLIN: Hello, I'm James O'Loughlin from "The New Inventors".
Australia has a long tradition of innovation, from the Hills Hoist to the black box flight recorder, and our home grown ideas have often found international markets.
Well, Perth inventor Max Whisson believes he may have come up with a solution to the world's water problems and he has some influential supporters. This is Max Whisson's story.

MAX WHISSON: The state of the world at the moment is, I think, the most dangerous in the evolution of Homo sapiens, for two main reasons. Power is almost entirely in the hands of those who gained power by exercising commercial advantage, and at the same time the ability of modern technology to destroy the world is unprecedented. The destruction of vast ecosystems is happening as we speak: forests being destroyed, catchment areas being

destroyed, rivers being destroyed. We are a highly developed species, can fly to the moon and do all sorts of clever things, and we destroy the rivers all over the planet. I think it's utterly absurd, outrageous. Grassroots action is the only hope to get a healthy world community.

PROFESSOR ROGER DAWKINS, SCIENCE CENTRE DIRECTOR: I know that some people think that Max is a crackpot but he's a very engaging one and he's certainly a very productive one.

MARCUS WHISSON, SON: He can be a bit of a handful, he's an eccentric old bugger, he'd probably say that himself.

PHILLIP ADAMS, FRIEND: I think Max is a reincarnation of an ancient Roman, the Romans were wonderful at water.

MAX WHISSON: It took me a little while to realise that the expanding population of the world cannot rely on surface water which accumulates from rain. We have to find unlimited sources of water and the sea seemed to me to be the obvious source of vast quantities of water. Seventy-one per cent of the Earth's surface at an average depth of four or five kilometres, and I thought, how can you purify that water without fossil fuels or big machines or high technology? And sunlight seemed to be the obvious way. I came up with the idea of the Water Road in about 2002 in a sort of Eureka moment. Most places in need of water are far inland and it would seem so logical to just run the sea water inland over a long distance, producing pure water as it goes. The Water Road is a very simple design. It's just a series of parallel black pipes, preferably to a width of about 10 metres, covered in a transparent cover such as perspex or polycarbonate, and maybe a thousand kilometres long. The sea water heats to 70 or 80 degrees, by my calculation, in about three to four days, heated by the sun, and at intervals the sea water is run into big swimming pools that I call evaporation ponds. The hot, wet air in the evaporation ponds is ducted up to a hilltop where it just condenses in a special condensation shed. So you've got pure water produced at a high point and that greatly assists the distribution to irrigation or to households along the way. A pipeline of that size would produce about 200,000 litres per kilometre per day. The salt from the returning sea water goes back to the sea where it's diluted within minutes to normal sea water. But it could be sent to a salt manufacturer.

COLIN BARBOUTIS, BUSINESS PARTNER: When Max first mentioned the Water Road to me, I thought, this could be an answer for the water problem that we're going to have in Perth in the very near future. Max's mind works very differently to most people. And Max told me this himself, he said, "Colin all my life, I've seen things differently to most people." He said, "You see a glass of water on the table, I see a mathematical calculation for a vessel that holds liquid."

ANNEMARIE WHISSON, WIFE: When he comes to invention he's very, very obsessive and quite stubborn, but in a good way.

MAX WHISSON: I graduated as a doctor in '55. I met Annemarie whilst I was working on cancer research in London.

ANNEMARIE WHISSON: I trained as a medical technologist in Switzerland and I was his research assistant. Oh goodness me, after two weeks, I just fell in love with this man and, and after a while, you know, I could see, he said he liked me too and so we had a little bit lunch

together or coffee and, you know from then on it started, you know, I was just completely besotted with him.

MAX WHISSON: Annemarie and I have two sons and there are four sons from my first marriage.

ALEX WHISSON, SON: I think in many ways my mum's sacrificed her own life to support my dad's inventions and his scientific research work. If it wasn't for my mum, my dad would be a disorganised brain in the ether somewhere. I mean she actually roots him in the earth, she actually grounds him in reality and he'd be completely lost without her.

MARCUS WHISSON, SON: He is an eccentric, the quintessential nutty professor. For a long time I know in the 1980s he had a fairly healthy obsession with solar power from cooling someone's head with a solar-powered hat to allowing a bicycle to be used not by pedal power but by solar power.

MAX WHISSON: I worked for many years as a haematologist at the Red Cross Blood Bank in Western Australia.

PHILLIP ADAMS, FRIEND: By the late '80s the magnitude of the AIDS epidemic was becoming well known and I was concerned about my daughter, the doctor, getting needle stick injuries where she was working in an ER hospital in New York. And I was expressing these concerns to Max, who miraculously was working on a retractable needle.

To any project he examines Max brings a very fresh intelligence and so he looked at the needle again and again and he then came up with a Mark II, a completely different way of solving the issue involving a sleeve rather than a retreating needle.

PROFESSOR ROGER DAWKINS, SCIENCE CENTRE DIRECTOR: It was 1982 in the early days of HIV that I really got to know Max Whisson. He does have some weird and wonderful ideas, there's no doubt about it.

The Needlesleeve seems to be a very good idea and it seems to work very well. I'd like to see it in use.

Max has always been very limited by funds. The country really needs to support people like Max without pressing them to early commercialisation because there are hazards in early commercialisation and many a good project has really been destroyed by the commercial partners.

ALEX WHISSON, SON: There was a very nasty and prolonged court case involving my dad's Needlesleeve invention which basically involved some of his former business associates laying claim to his inventions. And even though he won that case actually on three separate occasions, it has left him a bit bitter.

PHILLIP ADAMS, FRIEND: The saddest thing for Max is that his needle, his wonderful hypodermic that prevents needlestick injury, isn't being manufactured to this day because of the problems he's had in an out of courts. Great shame.

ANNEMARIE WHISSON, WIFE: I think Max is actually a renaissance man. He's so interested in so many things. He's interested in physics, biology, cancer, politics nature, birds.

He loves reading poetry and he writes poetry himself and short stories. He plays the violin in the Fremantle Symphony Orchestra. He enjoys it immensely. Even when he's very, very tired he always goes to rehearsal.

MAX WHISSON: For the last nine years Annemarie and I have lived in separate places. I think at a certain stage of life there is some sense in having a wife down the road. There were quite a lot of conflicts.

ALEX WHISSON, SON: My dad was always a workaholic and he'd often go on extended trips to haematology conferences, medical conferences, and never invite my mother on those trips. She felt excluded, I think, from more and more aspects of his life. And as well, truth be told, he had a wandering eye for other women. My dad's inventions have cost a fortune in patents and that's led to financial difficulties for the family, which has been tough, especially on my mum.

MARCUS WHISSON, SON: It has taken enormous emotional toll and it can be up and down with my parents' relationship, but at the end of the day they're most in love and really support one another.

ANNEMARIE WHISSON, WIFE: We see each other every day. He actually has got less difficult now. I think it makes all sense now in hindsight. '94, '95 he started to get sometimes quite aggressive, verbally, and short-tempered and then it developed even in a kind of paranoia as well. I was really very puzzled about it and I thought, what is going on? And sometimes you know he accused us of things which was completely irrational which he never had done before. And Marcus just said, "I think dad is going senile."

ALEX WHISSON, SON: Strange things started happening with my dad's brain. He'd be able to read the start of a paragraph but not the end of it. He couldn't distinguish left from right, he'd get lost driving from Subiaco to Nedlands on a route that he'd travelled a thousand times before.

ANNEMARIE WHISSON, WIFE: And then again we said, "Please go to the doctor. We can't do anything." And he said very aggressively, "I don't need your advice."

MARCUS WHISSON, SON: It was August the 17th 2000, the day after my mother's birthday. It was a blessing in disguise for him. My father was involved in an accident where he hit a parked ute and he was given a scan and they found a tumour the size of my fist, a huge tumour in the back of his head, pressing against his visual cortex.

ALEX WHISSON, SON: And suddenly it was like a revelation for all of us because we all realised sort of what had been happening with his brain over these past few years.

MARCUS WHISSON, SON: It was a benign tumour but they realised that they had to operate immediately because there was every chance that it would break through his skull.

MAX WHISSON: An incredibly, I tell you, extraordinarily skilful set of surgeons, got this whole thing out intact. And my whole brain kind of went, "Ah, now I can work again." It was quite amazing.

ALEX WHISSON, SON: The amount of energy my dad has is phenomenal. He's 76 now, he still works probably 12, 14 hours a day. I have tremendous admiration for my dad's

inventions. It’s never just something trivial. It's the fact that they’re inventions that are all geared towards actually improving human welfare, improving the standards of life, the conditions of life. It’s never something like, I don’t know, a faster car or something that is just economically viable.

MAX WHISSON: I suppose it’s occurred to me a little bit that I haven’t got much time to do all the things that I really want to do. Do I feel like an old man in a hurry? Yeah. My grandfather was an irrigation controller in the little town of Dingee, just not far from Bendigo in Victoria. So that I suppose gave me an interest in water.
(Outdoors, standing near a dried up lake)
This was quite a lovely lake, a little lake, and I used to visit it quite a lot, lots of birds came here, walk around and see these beautiful things. It’s really tragic to see it like this. You can’t look at this without being dreadfully upset, especially knowing that it’s not just a one off and it’s not really accidental. It’s because we’ve not taken care of these things. The water table has gone down so that the lake is worse because of that because everyone’s sucking up water to keep their lawns healthy. The bores have gone down deeper in Perth as in almost every city in the world.

I don’t really know where I get my ideas but I do read widely in scientific books and in things like "New Scientist". I do look very carefully at what has gone before. I’m not an expert on anything, but I throw things around and I sometimes kind of turn ideas upside down and you suddenly find you’ve got a really interesting answer that’s been staring people in the face for centuries, you know? After working on the Water Road for some time, I did some calculations which showed that there’s heaps of water in the air. And so I began to think, why bother with the sea water? So why not just collect water from the air and you can collect the water anywhere, in any small community or out in the desert or on the coast, wherever you want.

PHILLIP ADAMS, FRIEND: The water that’s in the air goes up for about a hundred miles, constantly replenished by evaporation from the ocean. Water is constantly extracted from the air in the form of dew. The technology of extracting it is known. The American army, for example, uses great thundering diesel machines to pull it out of the air, but that’s not very appropriate technology for a world suffering climate change. Max thinks, no, no, no, I can use the air to produce the power to produce the water.

MAX WHISSON: The key to the process is to refrigerate the air as quickly as possible so that water separates from the air and condenses as drops which will run down into a collection tank.

The best place to remove heat quickly is as the air hits a windmill. Now existing windmills did not work out at all well so I invented a new one and I’ve arranged to have it refrigerated so that as soon as the wind hits that windmill it gets cooled.

PHILLIP ADAMS, FRIEND: The astonishing thing is if you even breathe near one of Max’s windmills, the windmill starts spinning furiously. And the theory is, the more air you can pass through that windmill, the more air is available for cooling and for dispensing the water within it. So it’s a very elegant, very simple but tricky idea.

MAX WHISSON: There was a point where I had a bit of a hitch. I could achieve fairly rapid condensation of water on a cold plate but it would just stick as little droplets and not run off the plate quickly so that water could be collected. And then I came across this little chap, the

little beetle called Stenocara. It's quite amazing how creatures over millions of years evolve clever techniques which are ahead of us.

COLIN BARBOUTIS, BUSINESS PARTNER: I was at Max's house one day, and Max said, "Well, if I tell you, you're going to think I'm completely mad." And we had the discussion about the little African beetle that pops out of the sand in the early morning, does a headstand, faces his tummy into the breeze, sits there most of the day and a little droplet of water collects on the fibres on his tummy, runs down his nose and into his mouth and he's back into his burrow. So, he's self sufficient in water. And he said, "See, I told you you'd think I was mad." And I said, "Well I actually don't know that you're mad, tell me a little bit more." And he went into more detail about how he'd been thinking about this for a little while and that it was do-able. He said, "Often the simplest things in this world are the hardest to invent."

MAX WHISSON: Observing nature has taught me a lot. Now I have a surface on the plates which is very like the surface on this little beetle, the water touches the plates and just runs quickly off. And so the little beetle has helped a great deal and I'd like to thank him.

COLIN BARBOUTIS, BUSINESS PARTNER: I believe it will take us another 12 months to fully develop this unit, to test it, to see if the working prototypes do work. I guess Max is a bit of a crackpot but then again, you'd have to be to come up with some of these wonderful inventions. I've put my money on that one out there. I think this water project is something that's very unique. I absolutely believe in Max's abilities and have blind faith that he can do this and he'll get it right. I may be wrong but that's my thought.

PHILLIP ADAMS, FRIEND: I'm a great enthusiast for the theory of the windmill, and I write a newspaper column about my old friend's bright new idea. And in all my born days in over 50 years of writing columns, rarely seen a response like it - a couple of thousand, a couple of thousand rapturous emails, some sceptical, but mostly thrilled to the back teeth, from every nook and cranny on the planet. From the Middle East, from Venezuela, from Russia, from India, everyone thinks this is it.

SEAN BLOCKSIDGE, WINE COMPANY MANAGER: Sustainable farming's something that we're looking at more and more. It's an imperative, particularly as a wine business. Certainly we do have some fairly good, consistent rainfall but we're certainly seeing decreases. We've looked at the more traditional sources of water in the past. One thing Margaret River doesn't have a shortage of is wind and certainly Max Whisson's invention is something worth investigating. We're also regenerating large tracts of land around the estate and we don't necessarily have the capacity to irrigate re-vegetation projects, so to be able to put one of these windmills out there and have it producing water would be fantastic.

PHILLIP ADAMS, FRIEND: I've got a feeling there are many Max Whissons around. At the moment of course he's tilting at his windmills, a bit like Don Quixote, because governments are remarkably uninterested, but everyone else is.

MAX WHISSON: The question whether the Water Road idea is now redundant because of the Water Windmill is one that several people have asked. I see the Water Road as a much more practical national or large-scale water producing system.

PHILLIP ADAMS, FRIEND: And provided Max can live another 10 years and work out a few little minor details, it's going to be fantastic. A freeway, not just a Water Road, a freeway

of fresh water - wouldn't that be fantastic? And Max wouldn't even want to charge toll, so it would be a freeway not a tollway.

ANNEMARIE WHISSON, WIFE: I think I would quite like to live with Max again and I think he probably would like to live with me. I still love him. It's just, it's a different love, after, my goodness, forty years. You know, we were incredibly passionately in love but it's, it has become a very comfortable love.

MAX WHISSON: Certainly I feel bad that I haven't provided a secure life. I suppose, yeah, I probably haven't been a perfect husband or father. But I think it's important to follow your geist, your spirit, what you think you're good at.

Patents

APPARATUS AND METHOD FOR COOLING OF AIR
US2007204633

AU2005274673 // CN101014817 // BRPI0515188
Abstract -- A wind turbine apparatus for cooling of air having a wind turbine axially connected to a refrigeration compressor arranged to compress refrigerant, at least one tube for conducting compressed refrigerant centrifugally outwards, a construction for causing the compressed refrigerant to lose pressure so as to cool fades of the wind turbine, and a conduit for returning spent refrigerant centripetally to the compressor.
Correspondence Name and Address: BACHMAN & LAPOINTE, P.C.-- 900 CHAPEL STREET -- SUITE 1201, NEW HAVEN CT 06510 US
U.S. Current Class: 62/93; 62/401; 62/404; 62/426; 62/498
U.S. Class at Publication: 062/093; 062/404; 062/426; 062/401; 062/498
Intern'l Class: F25D 17/06 20060101 F25D017/06; F25D 9/00 20060101 F25D009/00;

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus and method for cooling air.

SUMMARY OF THE INVENTION

[0002] In accordance with one aspect of the present invention there is provided a wind turbine apparatus for cooling of air characterised by comprising a wind turbine axially connected to a refrigeration compressor arranged to compress refrigerant, means for conducting compressed refrigerant centrifugally outwards, means for causing the compressed refrigerant to lose pressure so as to cool blades of the wind turbine, and means for returning spent refrigerant centripetally to the compressor.

[0003] In accordance with a further aspect of the present invention there is provided a method of condensing water from ambient air, which comprises driving, by means of ambient wind, a wind turbine apparatus in accordance with the present invention mounted in a duct by ambient wind so as to cause blades of the wind turbine to be cooled and to thereby cool ambient wind air passing through the duct and the wind turbine, and causing water

vapour in the ambient wind air to condense to form liquid water, and collecting the liquid water.

[0004] In accordance with a yet further aspect of the present invention there is provided a wind turbine having at least one blade mounted to a compressor housing mounted on a shaft for axial rotation relative to the shaft, and means for conducting compressed refrigerant outward centrifugally and means for returning the refrigerant centripetally through the or each blade with loss of pressure and change of phase from liquid to gas so as to cool the or each blade.

DESCRIPTION OF THE DRAWINGS

[0005] The present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

[0006] **FIG. 1** is a schematic plan view of a wind turbine of the present invention showing a single turbine blade;

[0007] **FIG. 2** is a further schematic plan view similar to FIG. 1 showing a plurality of turbine blades;

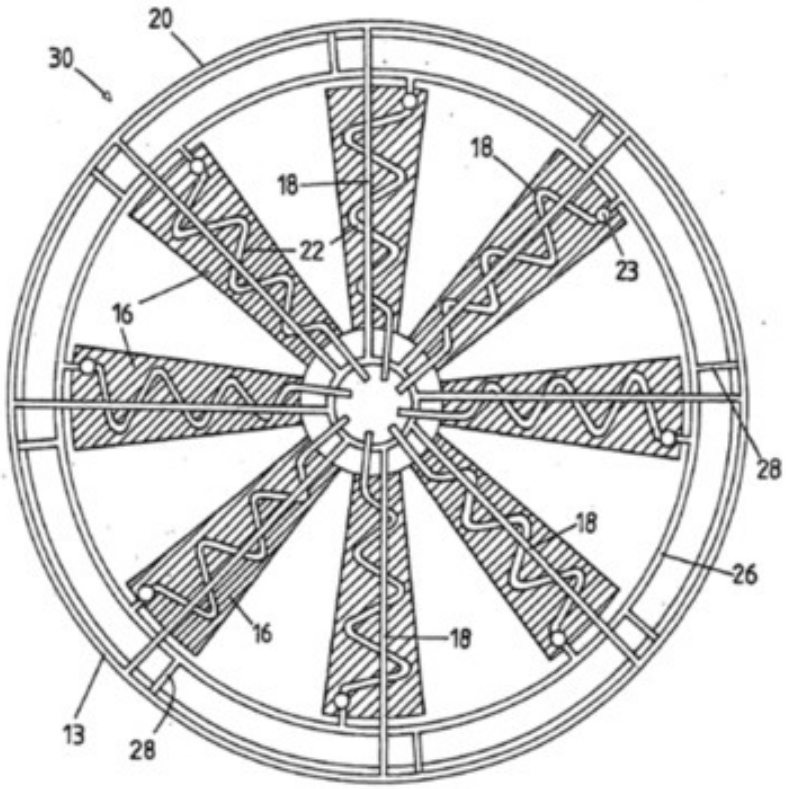


FIG. 2

[0008] **FIG. 3** is a schematic side elevation of a first embodiment of an apparatus to convey air in accordance with the present invention;

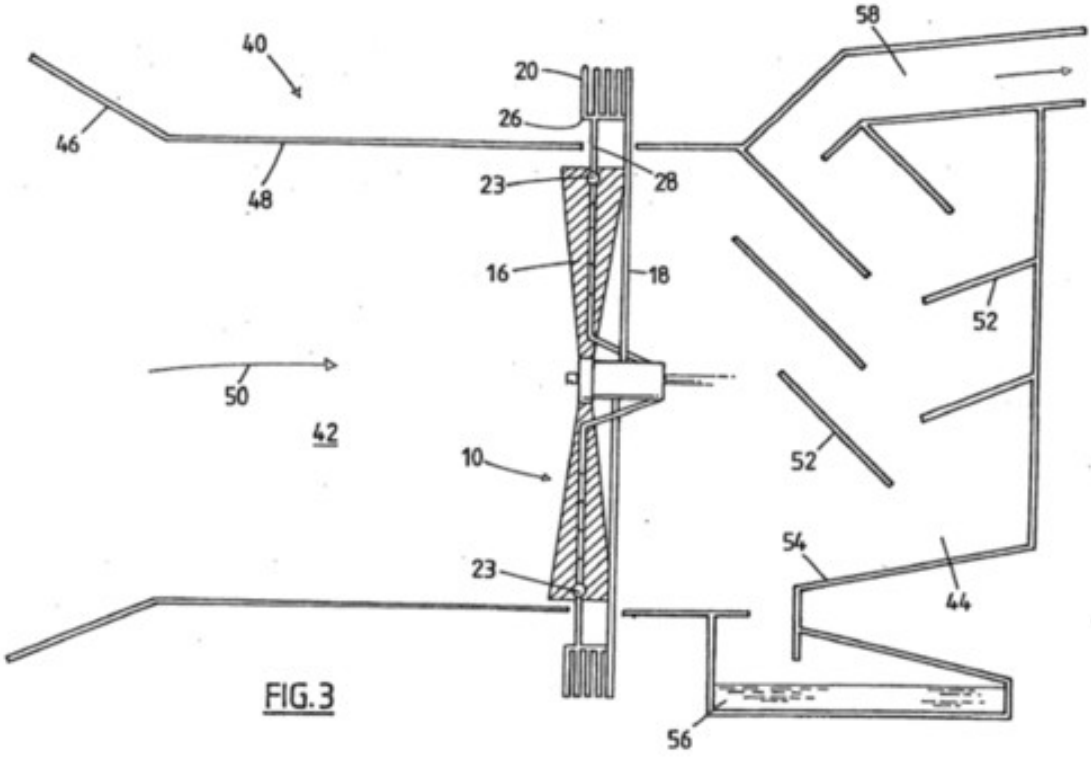


FIG.3

[0009] **FIG. 4** is a view similar to FIG. 3 showing a second embodiment of an apparatus of the present invention;

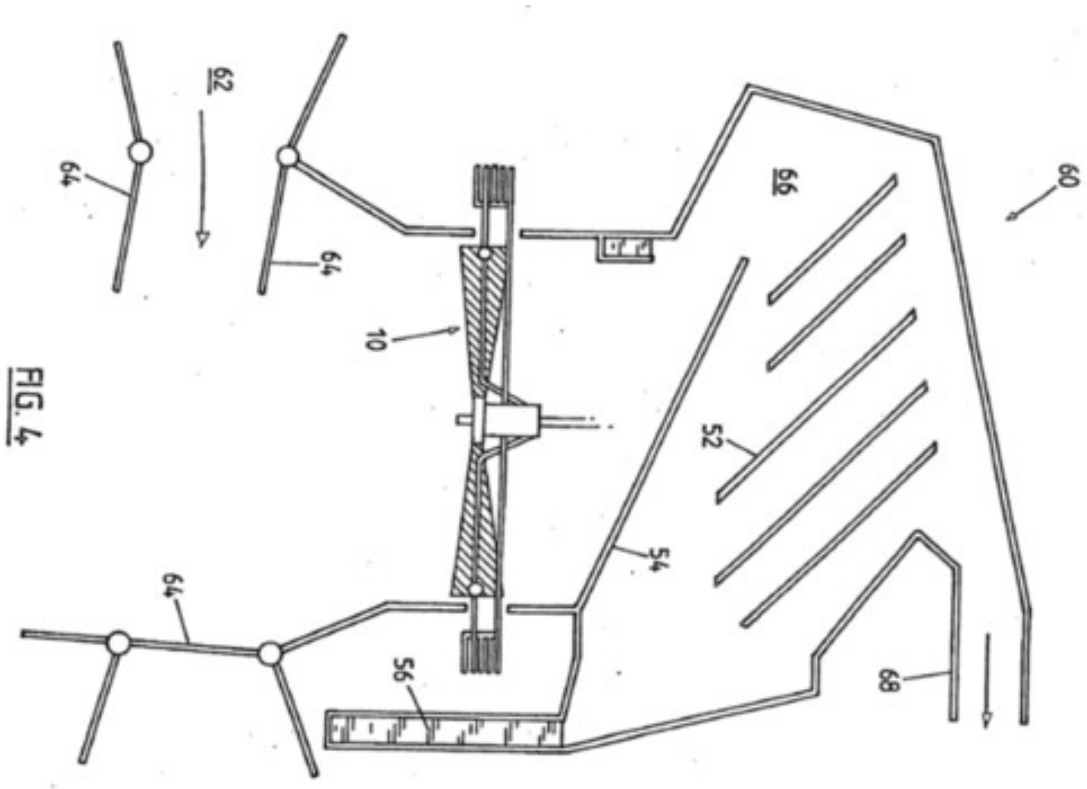
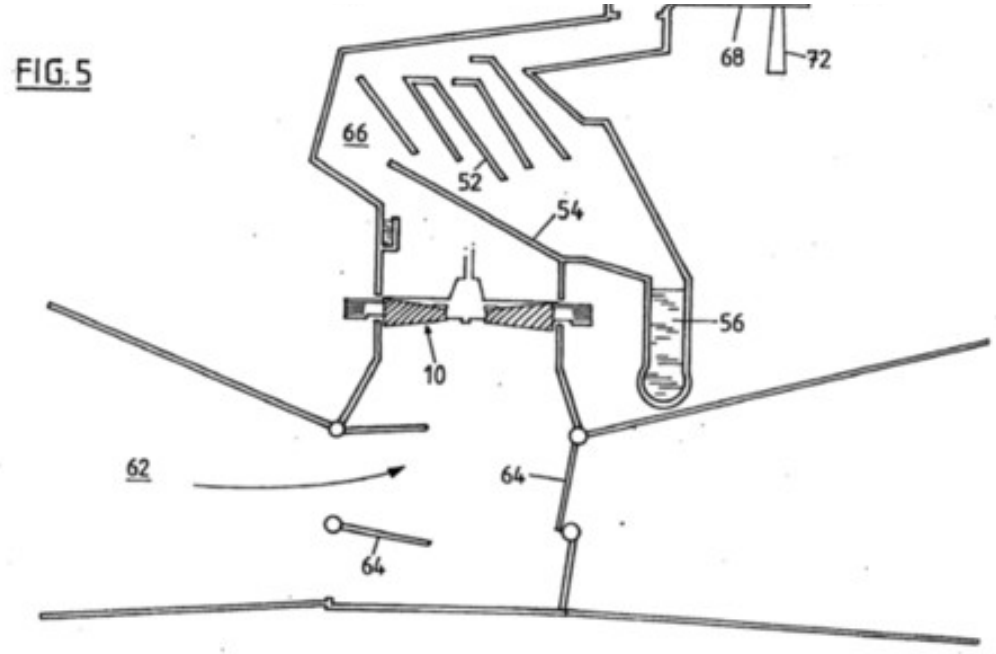


FIG. 4

[0010] **FIG. 5** is a side elevation of a third embodiment of an apparatus of the present invention;



[0011] **FIG. 6** is a plan view of a further embodiment of a wind turbine of the present invention as used in the third embodiment of apparatus illustrated in FIG. 5;

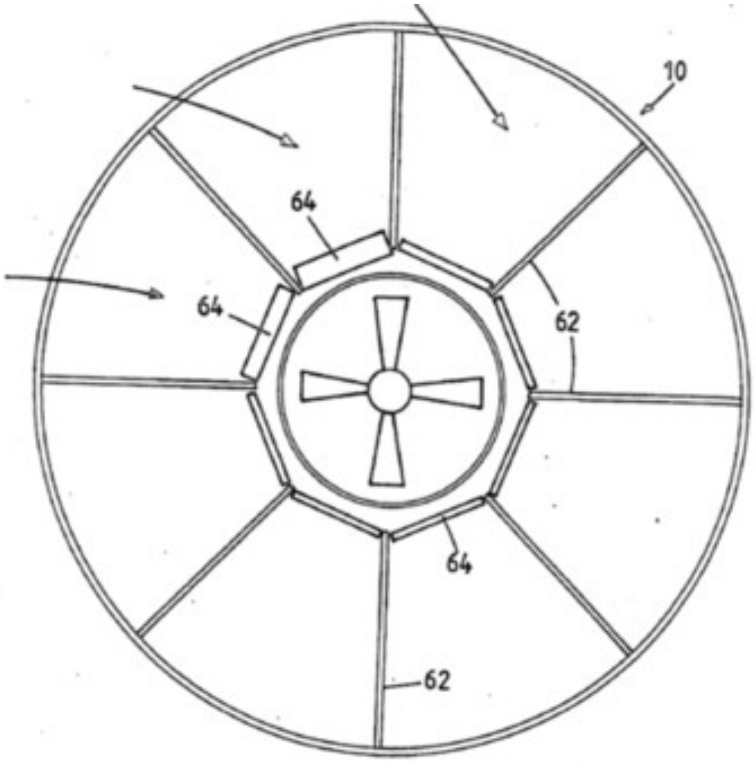
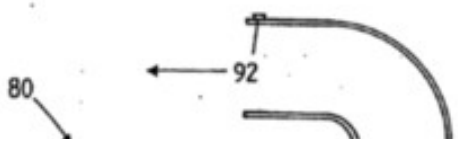


FIG.6

[0012] **FIG. 7** is a side elevation of a fourth embodiment of an apparatus of the present invention;



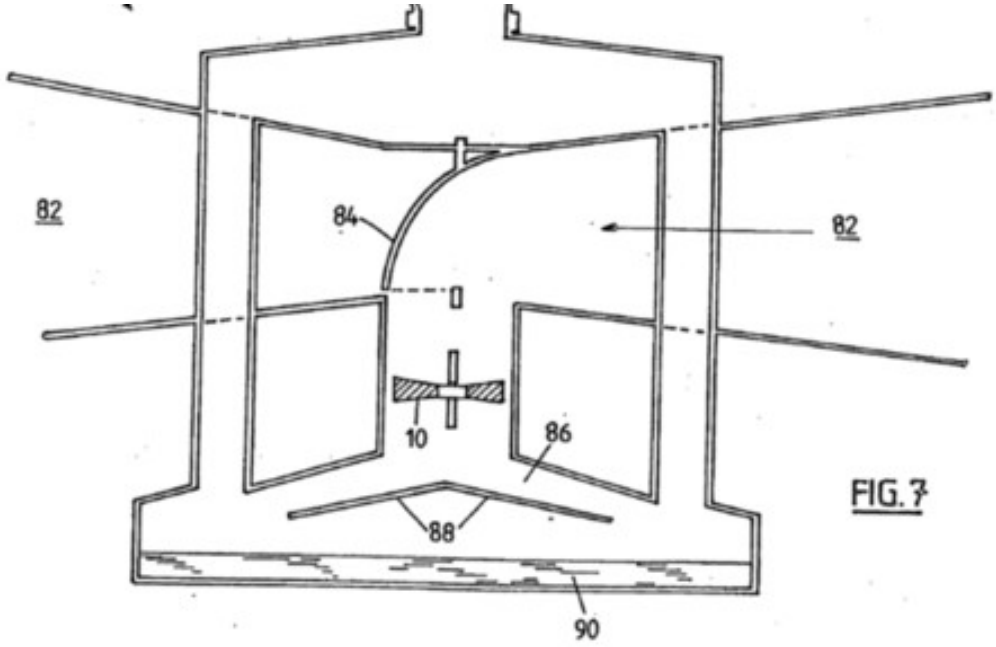


FIG. 7

[0013] **FIG. 8** is a plan view of a yet further embodiment of a wind turbine of the present invention used in the fourth embodiment of apparatus illustrated in FIG. 7;

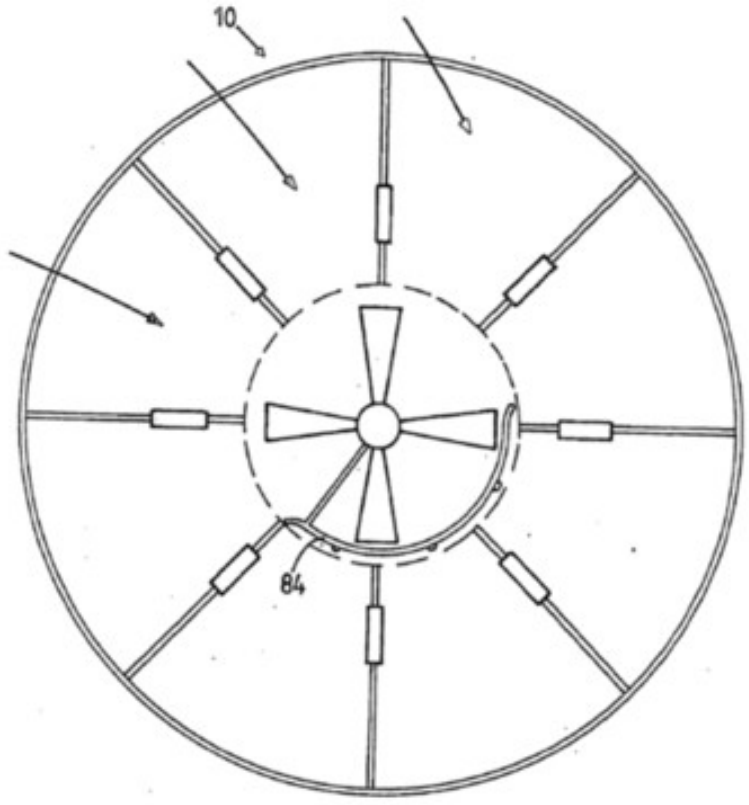


FIG. 8

[0014] **FIG. 9** is a schematic side elevation of a compressor used in the air cooling apparatus of the present invention;

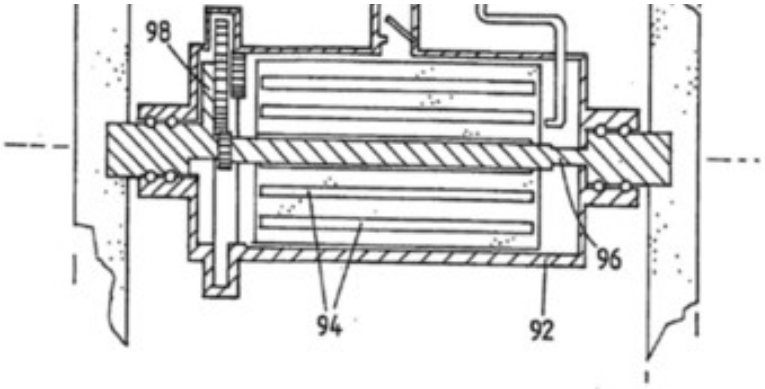
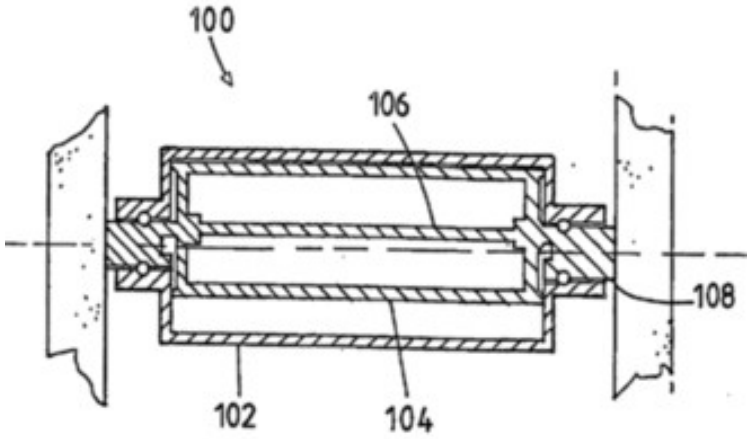
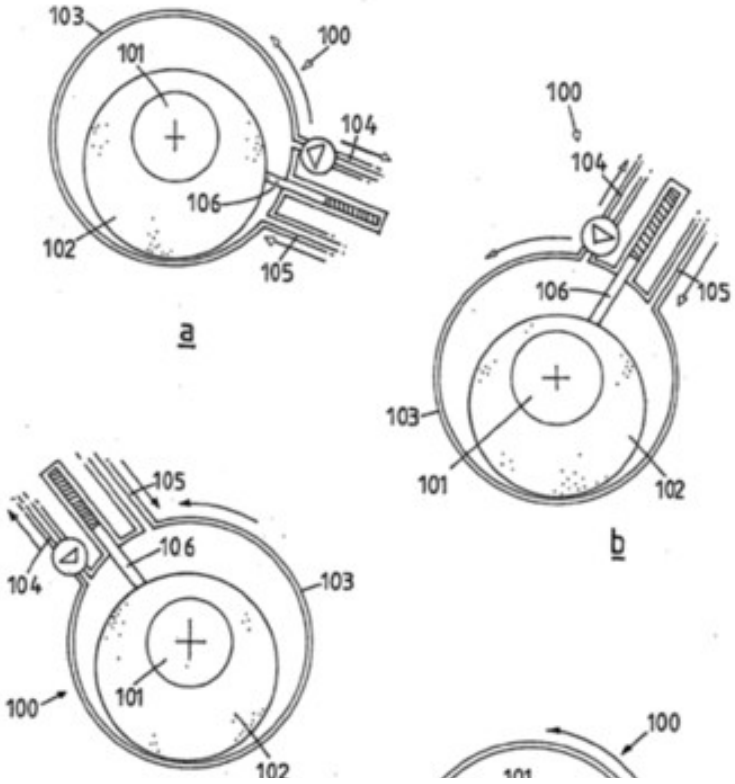


FIG. 9

[0015] **FIG. 10** is a schematic side-elevation of a further embodiment of a compressor used in the air cooling apparatus of the present invention;



[0016] **FIGS. 11a, b, c and d** are various views of the compressor of FIG. 10;



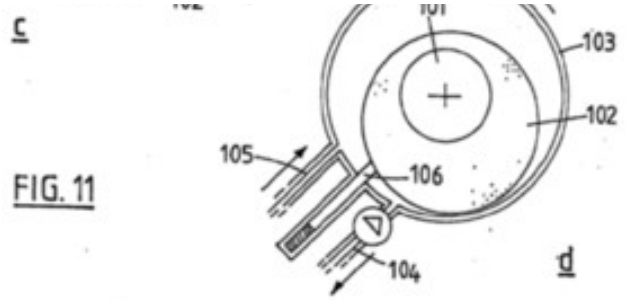


FIG. 11

[0017] **FIG. 12** is a schematic side elevation of a yet further embodiment of a compressor used in the air cooling apparatus of the present invention;

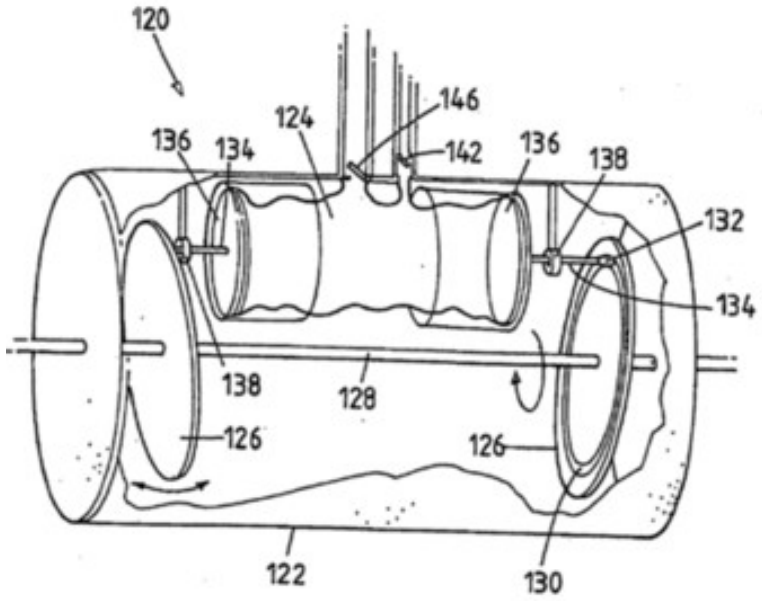
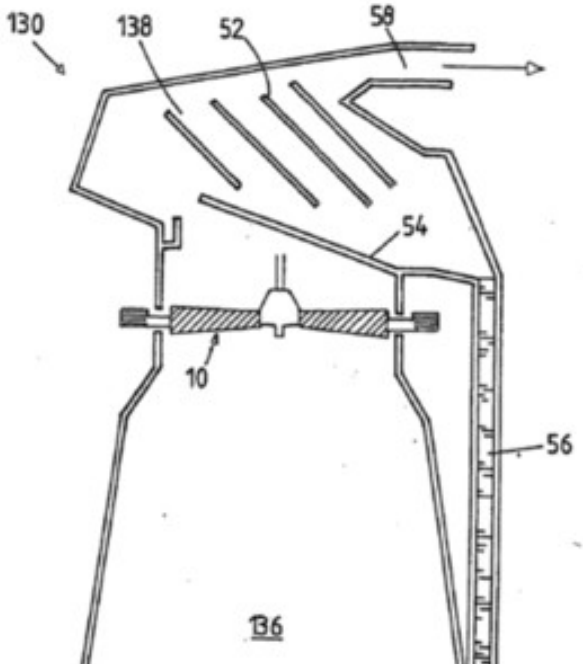


FIG. 12

[0018] **FIG. 13** is a view similar to FIG. 3 showing a fifth embodiment of an apparatus of the present invention;



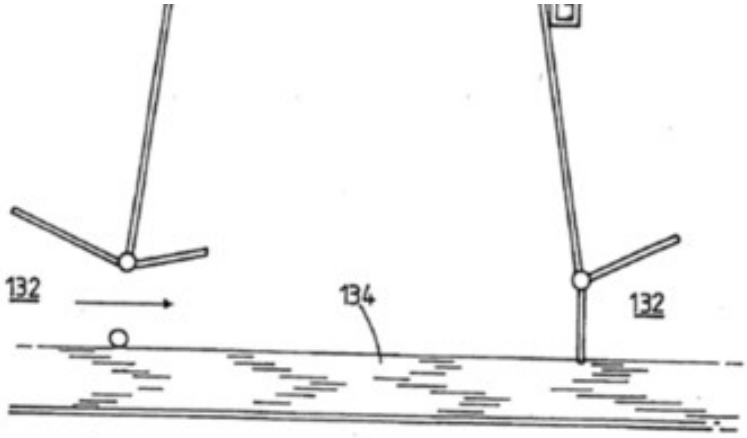


FIG.13

[0019] **FIGS. 14A, 14B and 14C** show schematically a scroll refrigerant compressor useful in the present invention in various positions;

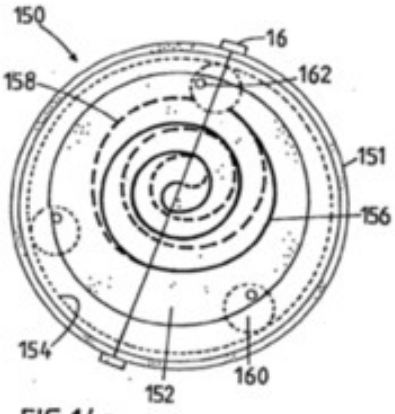


FIG.14a

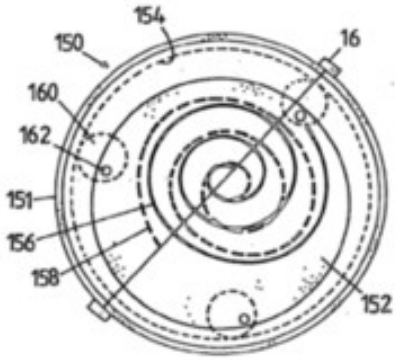


FIG.14b

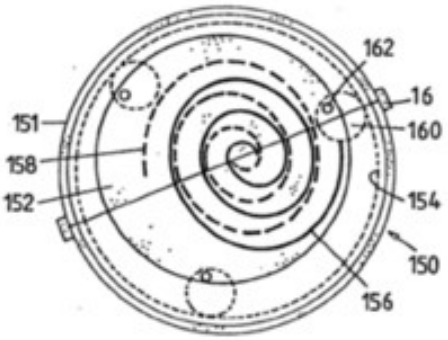
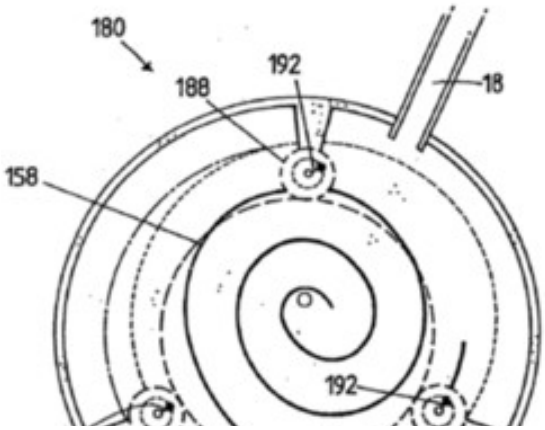


FIG.14c

[0020] **FIG. 15A** is a plan view of an alternative form of scroll compressor useful in the present invention; and



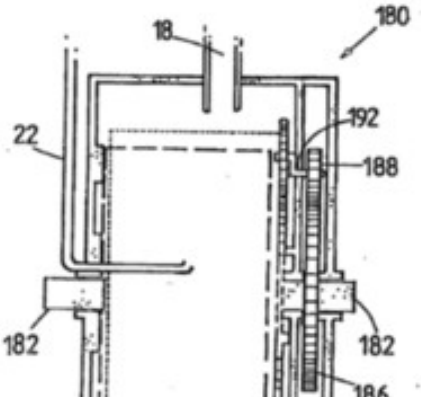


FIG.15a

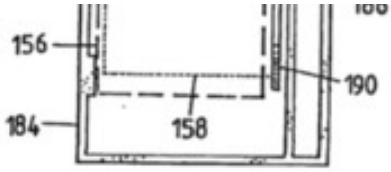


FIG.15b

[0021] **FIG. 15B** is a side view of the scroll compressor of FIG. 15A.

DESCRIPTION OF THE INVENTION

[0022] In FIG. 1 of the accompanying drawings, there is shown a wind turbine apparatus 10 comprising a central shaft 12 having a compressor 13 comprising a housing 14 mounted thereabout. The compressor housing 14 is arranged to rotate axially relative to the shaft 12. Further, a plurality of turbine blades 16 (only one of which is shown) are mounted to the compressor housing 14. As shown, a tube 18 extends outwardly from the housing 14 to a peripheral cooling coil 20. A convoluted pipe 22 extends from the cooling coil 20 back to the housing 14. There is a constriction 23 at a part in the pipe 22 adjacent the cooling coil 20.

[0023] In use, the turbine blade 16 is caused to rotate axially about the shaft 12 by the kinetic energy of ambient wind air. Rotation of the blade 16 causes rotation of the compressor housing 14 and refrigerant in the compressor housing 14 to be compressed so as to undergo a phase change from gas to liquid. The compressed liquid refrigerant flows outwardly driven by the compressor and assisted by centrifugal force along the tube 18 to the cooling coil 20 which acts as a manifold.

[0024] As shown, the refrigerant has to travel almost in a complete circle to reach the pipe 22. This enables the compressed refrigerant to be cooled during its residence in the cooling coil 20.

[0025] The refrigerant leaves the cooling coil 20 through the constriction 23 which leads into the pipe 22. At this point the refrigerant undergoes a rapid loss of pressure and thus evaporates back to the gaseous phase and causes the blade 16 to be cooled. The spent refrigerant then passes centripetally back to the housing 14 on a low pressure line of the compressor 13.

[0026] The cooling of the blade 16 causes ambient wind air to be cooled which has useful effects as will be described.

[0027] In FIG. 2, there is shown an apparatus 30 similar to that in FIG. 1. In FIG. 2 there can be seen a plurality of turbine blades 16, a plurality of tubes 18, a cooling coil 20 and a plurality of pipes 22. In this embodiment, the compressed refrigerant passes along the tubes 18 to the cooling coil 20. From the cooling coil 20 the compressed refrigerant passes through a plurality of short tubes 28 to an inner manifold 26. From the inner manifold 26 the compressed refrigerant passes through the constrictions 23 into the tubes 22 as described hereinabove. Thus the compressed refrigerant does not enter the tubes 22 directly and therefore is cooled by its residence in the cooling coil 20 and the tubes 28 and the inner manifold 26.

[0028] In FIG. 3, there is shown an apparatus 40 which comprises a wind turbine 10. There is also shown a respective inner manifold 26 adjacent an outer end of each blade 16. The compressed liquid refrigerant passes initially from the cooling coil 20 to each inner manifold 26 through short tubes 28. The refrigerant then passes through constrictions 23 into the pipes 22 as described hereinabove.

[0029] Further, there is shown in FIG. 3, a wind collecting duct 42 and an outlet condensation chamber 44. The duct 42 includes an outer wide portion 46 and an inner relatively narrow portion 48. The combination of the wide portion 46 and the narrow portion 48 increases air velocity in the duct 42.

[0030] Ambient wind air blowing in the direction of an arrow 50 flows through the wind turbine 10 so as to cause the latter to rotate such that the blades 16 are cooled. This causes the air temperature to fall below the condensation point or dew point and water vapour to condense from the ambient air to form liquid water. This is enhanced by the presence of baffles 52 which impede the flow of air and induce liquid water to collect thereon. The liquid water flows from the baffles 52 onto a sloping floor portion 54 from which the liquid water flows into a collection trough 56. The cooled air from which water has been removed is exhausted through an upper outlet 58. As can be seen in FIG. 3, the coil 20 is located externally of the duct 42 so that heat lost from the compressed refrigerant is dispersed into the ambient air rather than inside the duct 42.

[0031] In FIG. 4, there is shown an apparatus 60 similar to that in FIG. 3, except that an inlet 62 is lowermost and is provided with flaps 64. In this case, the flaps 64 are only opened, as shown, on the windward side of the apparatus 60. Wind air flows upwardly through the turbine 10 and then through a condensation chamber 66 to exhaust through a top vent 68. Once again liquid water collects on baffles 52 and then flows along a sloping floor 54 to collect in a trough 56.

[0032] In FIG. 5, there is shown an apparatus 70 similar to that in FIG. 4, except that the exhaust vent 68 is provided with an additional wind turbine 72 to reduce pressure in the exhaust vent 68 and enhance removal of exhaust air. Power obtained from the wind turbine is available for any useful purpose.

[0033] In FIG. 6, there is shown a wind turbine 10 having wind guides 62 with flaps 64 between adjacent pairs of wind guides 62. The flaps 64 are arranged to be opened as shown by the wider oblong shape when the flaps face in the direction of the ambient wind.

[0034] In FIG. 7, there is shown an alternative form of the apparatus of the present invention

[0035] In this Figure there is shown an apparatus 80 having a funnel 82 at an intermediate level and a downwardly directed deviation device 84. The device 84 is arranged to pivot about a substantially vertical axis so as to orientate itself, in use, into a position which is most effective in directing the ambient wind air through a wind turbine 10. Cooled air can then enter a condensation chamber 86 below the wind turbine 10 and deposit moisture on baffles 88. The deposited moisture can then flow into a collection trough 90. The cooled air depleted of moisture can then pass upwardly to an upper vent 92.

[0036] In FIG. 8, there is shown a wind turbine 10 similar to that shown in FIG. 7. As shown, the device 84 faces the incoming ambient wind. The wind air is directed into the wind turbine 10.

[0037] In FIG. 9, there is shown a preferred form of compressor 90 of the present invention. The compressor 90 has a central rotating cylindrical hub or housing 92 on which is mounted the blades 16 and refrigerant carrying tubes of the wind turbine 10 as described herein. The compressor 90 includes compressor blades 94 mounted on a drive shaft 96. The blades 94 are arranged to be driven at high speed by a gear train 98 fitted to an inner wall of the hub 92. Used refrigerant returning centripetally to the compressor 90 as described above is recompressed and sent out centrifugally as described above.

[0038] In FIG. 10 there is shown an alternative form of compressor 100 mounted within a cylindrical hub or housing 102. In this embodiment refrigerant is displaced by a roller 104 mounted eccentrically on a shaft 106 relative to a main shaft 108 of the compressor 100.

[0039] As shown in FIGS. 11a, 11b, 11c and 11d, the compressor 100 operates as follows. The compressor 100 comprises a central shaft 101 having an eccentric 102 mounted thereon. A rotatable housing 103 is mounted about the eccentric 102. A tube 104 leads away from the housing 103 and a pipe 105 leads into the housing 103. A spring biased vane 106 extends through a wall of the housing 103 and contacts an outer surface of the eccentric 102. Rotation of the housing 103 causes refrigerant contained therein to be compressed and exited through the tube 104. Similarly, used refrigerant returns to the housing 103 through the pipe 105. This is facilitated by the vane 106 which is spring biased into engagement with the outer surface of the eccentric 102.

[0040] In FIG. 12 there is shown a further alternative form of compressor 120 mounted within a cylindrical hub 122. In this embodiment refrigerant is contained in an elastic chamber 124. The chamber 124 is alternately contracted and expanded. This is done by eccentric discs 126 fixedly mounted on a central shaft 128. Each disc 126 has a circular channel 130 formed on an inner side thereof A slidable bearing 132 is mounted in each channel 130. A respective rod 134 extends from each bearing 132 to a respective end plate 136 of the chamber 124. Each rod 134 is constrained by a circular guide member 138.

[0041] In use, a hub 122 rotates axially about the shaft 128 and the chamber 124 rotates with the hub 122. This movement causes the bearings 132 to slide in the channels 130 and the rods 134 to reciprocate correspondingly in the guide member 138. In this way the chamber 124 is expanded and retracted so alternately compressing and driving out compressed refrigerant through a one way valve 140 and allowing ingress of used refrigerant through a one way valve 142.

[0042] In FIG. 13, there is shown a wind turbine apparatus 130 which is similar to that shown in FIGS. 4 and 5. In this embodiment, wind funnels 132 are arranged to direct ambient wind air over a water surface 134. The water may be brackish or fresh water. The wind air then passes upwardly through an upright tube 136 (or a sloping duct on a hillside) to pass through a wind turbine 10 and thence a condensation chamber 138 having baffles 52 and a sloping floor 54 from which water flows into a collection trough 56. Exhaust air is vented through an outlet 58. Absolute humidity of air entering the apparatus 130 increases and the density of the air is therefore lowered. Thus, flow of air due to the wind is augmented by convection as the wet air rises to the wind turbine 10.

[0043] It is also envisaged that the refrigeration compressor used in the apparatus of the present inventions could be in the form of a scroll compressor.

[0044] This embodiment of the present invention is illustrated in FIGS. 14A, 14B and 14C of the accompanying drawings.

[0045] In FIG. 14 there is shown a scroll compressor 150 having a housing 151 having mounted therein a circular plate 152. Further, an internal ring gear 154 mounted on a wind turbine axial shaft (not shown) extends around the internal periphery of the housing 151. Turbine blades 16 are mounted to the housing 151 and cause wind to effect axial rotation of the housing 151 on a fixed shaft (not shown).

[0046] The housing 151 is rotated, in use, by rotation of blades of a wind turbine as described hereinabove.

[0047] As indicated above, the scroll compressor 150 is mounted on a bearing on the fixed axial shaft (not shown). One scroll 156 is attached to the housing 151 whilst another 158 is driven by three planetary gears 160 mounted on the housing 151 disposed at the apex of an equilateral triangle. The gears 160 are driven by the ring gear 154. The scroll 158 maybe described as a wobbling scroll.

[0048] The gears 160 are asymmetrically connected to the plate 152 by means of respective pivotal connections 162. In use the housing 151 is axially rotated by the wind turbine. This causes the planetary gears to be turned by engagement with the fixed ring gear 154. This causes the ring gear 154 to rotate and thereby cause rotation of the planetary gears 160. Rotation of the planetary gears 160 causes the plate 152 to move in a wobbling motion which causes the scroll 158 to move correspondingly.

[0049] As shown in FIGS. 14A to 14C this causes gaps between the two scrolls 156 and 158 to be alternately opened up and closed in a progressive manner. This action leads to compression of refrigerant vapour contained between the scrolls such that the vapour is subjected to increased pressure and is converted-to liquid form.

[0050] As described hereinabove, the compressed liquid refrigerant is thus urged outwardly of the compressor housing 151 through a tube (not shown) by centrifugal-force. Further, as described hereinabove, the spent refrigerant returns through pipes (not shown) to the interior of housing 151 where it enters the gap between the scrolls 156 and 158.

[0051] In FIGS. 15A and 15B there is shown an alternative arrangement of scroll compressor 180 useful in the present invention compared to the scroll compressor of FIG. 14. Like reference numerals denote like parts. It should be noted in FIG. 15A that only the scroll 158 is shown.

[0052] In this embodiment there is a central shaft 182 having mounted thereon a housing 184. The housing is mounted on a bearing on the shaft 182. The shaft 182 may or may not be continuous. A central gear wheel 186 is fixedly mounted about the shaft 182. The gear wheel 186 is connected to three planetary gears 188.

[0053] Further, as can be seen in FIG. 15B one scroll 156 is fixed to the housing 184 by any suitable means such as an end plate (not shown). The other scroll 158 is mounted on an end plate 190 and is connected to the planetary gears 188 through eccentric pins 192.

[0054] The shaft 182 and the gear wheel 186 are fixed in position. The housing 184 is arranged to rotate about the shaft 182 as described hereinabove. The planetary gears 188

engage with the gear wheel 186 and are thereby caused to rotate as the housing 184 rotates. This rotation of the planetary gears 188 causes the scroll 158 to move on the plates 190 by means of the pins 192 such that the scroll 158 undergoes a wobbly motion as described hereinabove.

[0055] Modifications and variations as would be apparent to a skilled addressee are deemed to be within the scope of the present invention.

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http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=EP1907637&F=0
GUST WATER TRAP APPARATUS
EP1907637
2008-04-09
Also published as: WO2007009184 (A1) // EP1907637 (A0) // AU2006272459

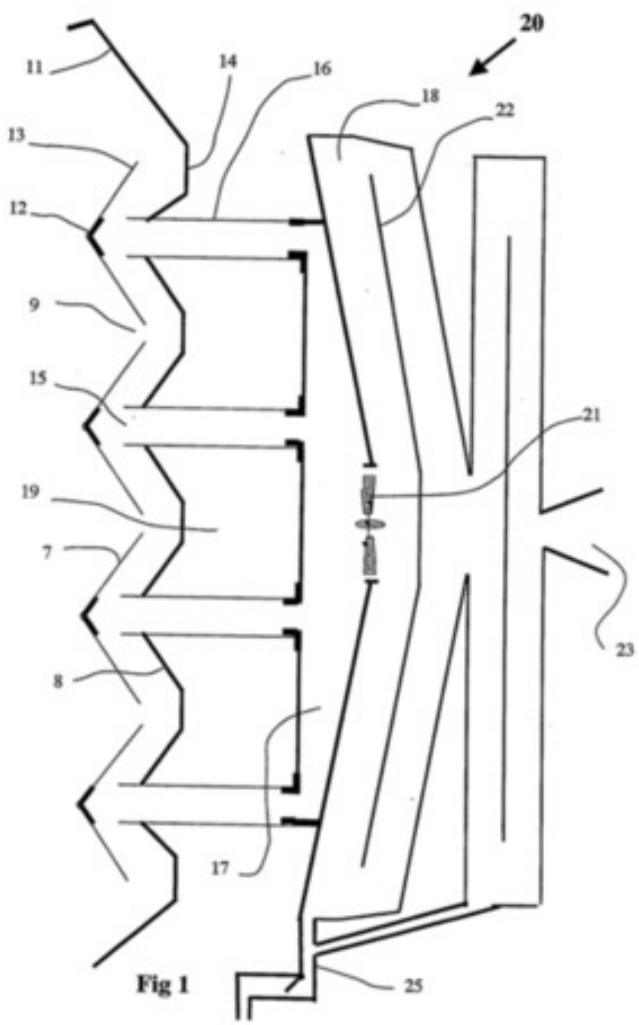


Fig 1

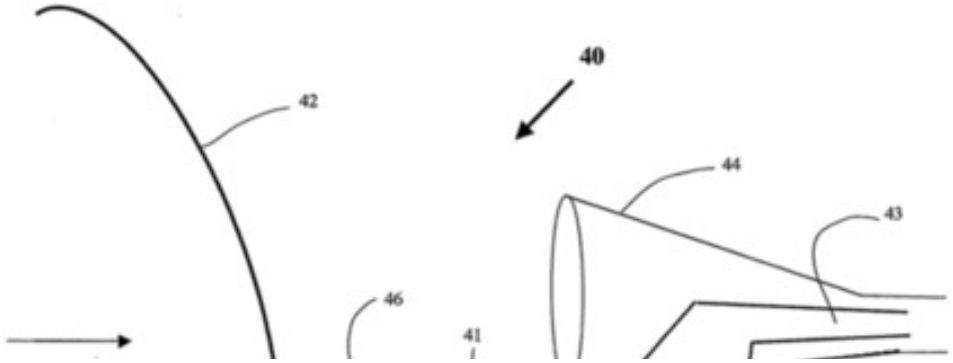


Fig 2

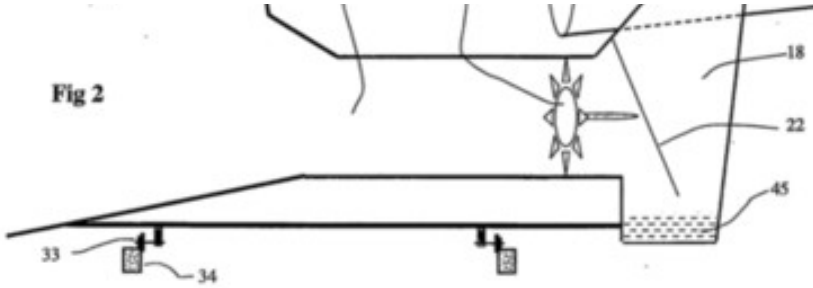
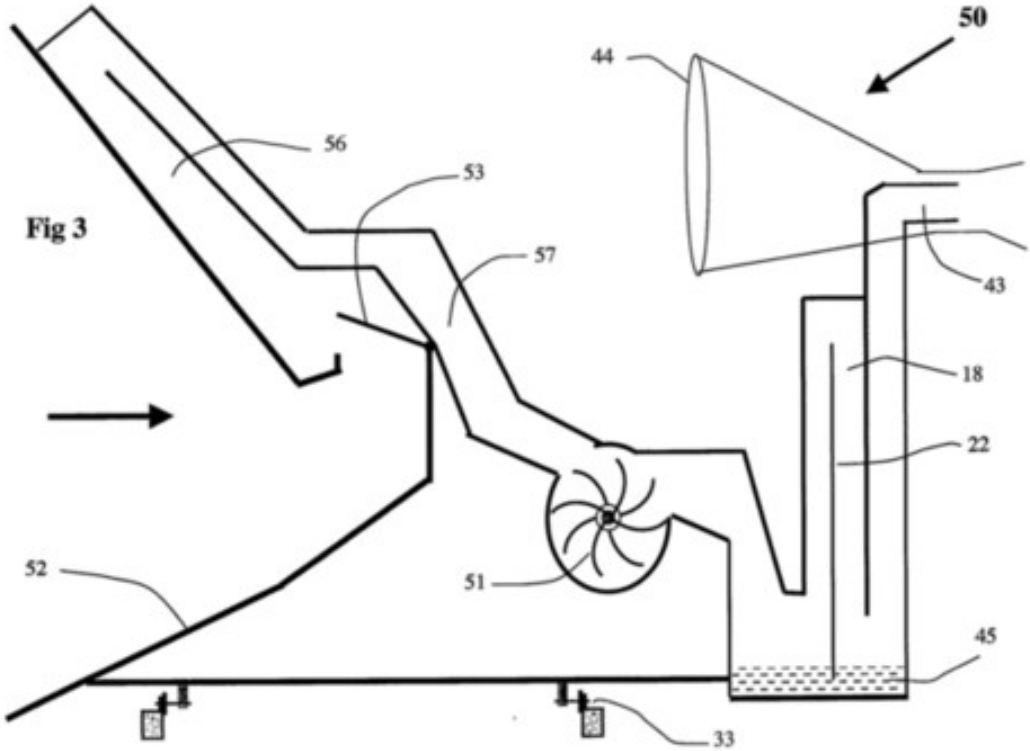


Fig 3



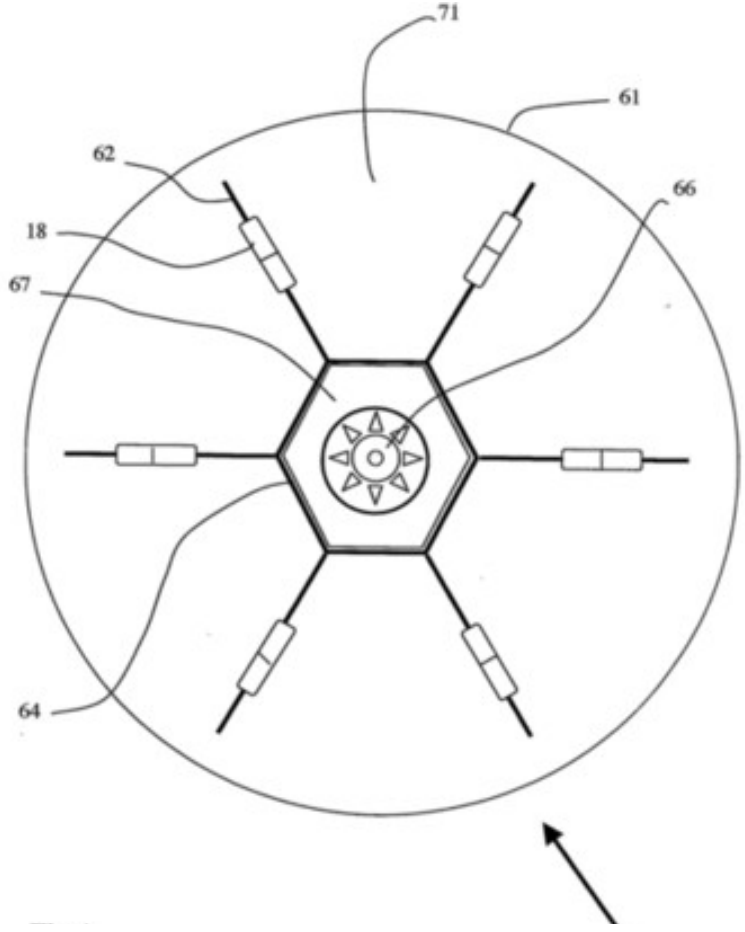


Fig 4

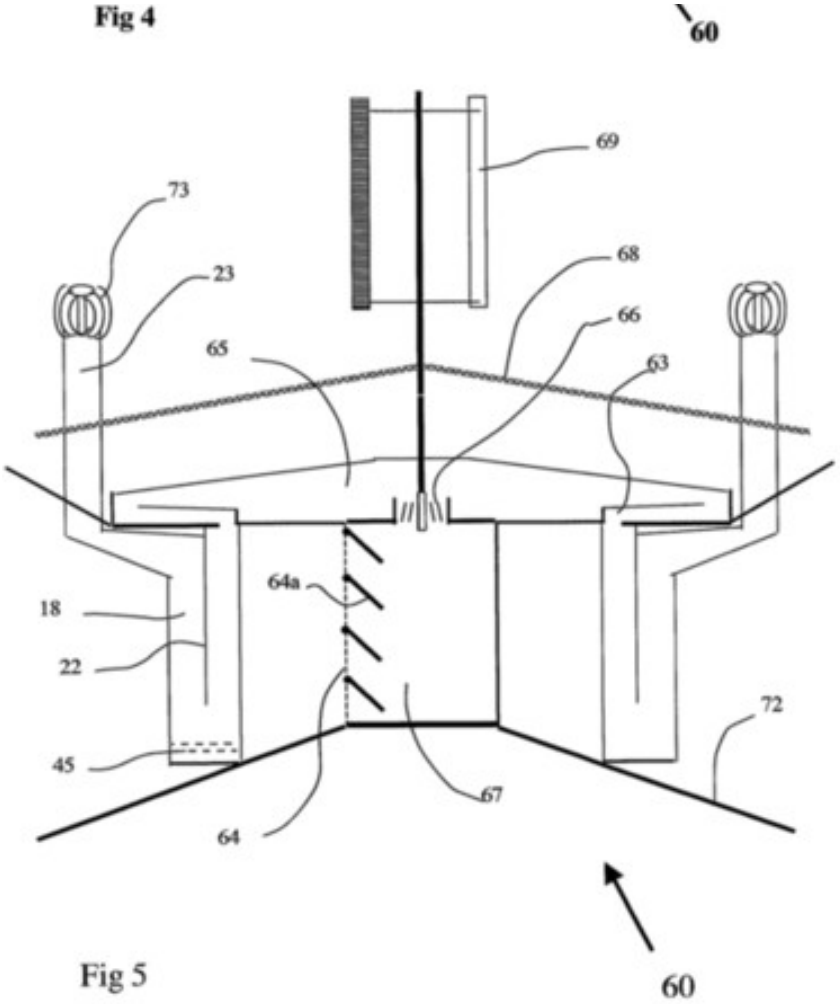


Fig 5

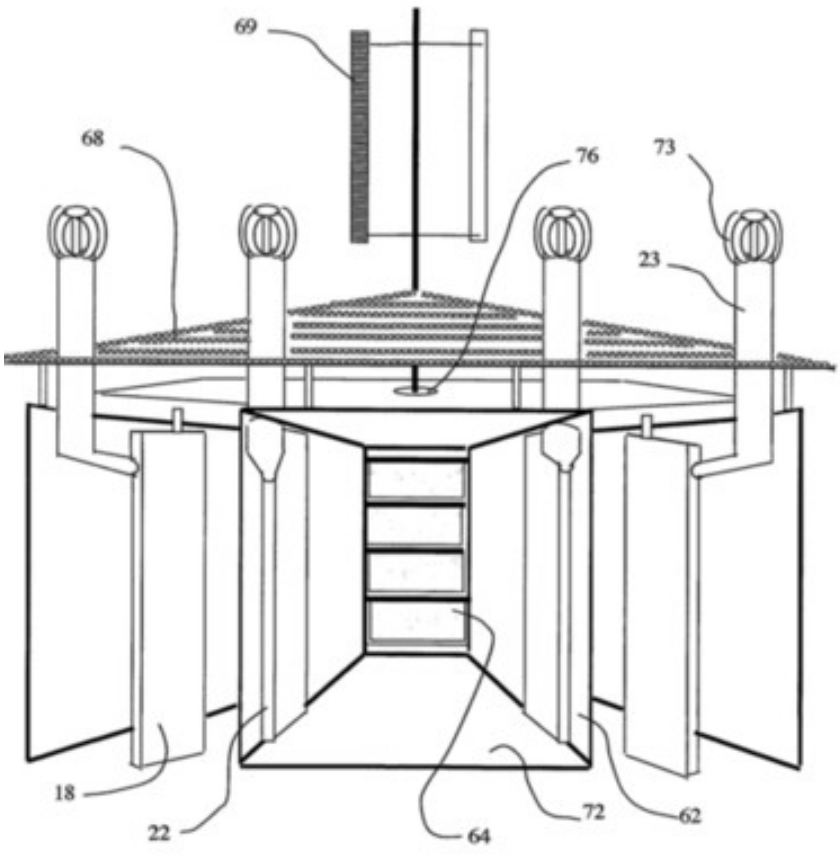
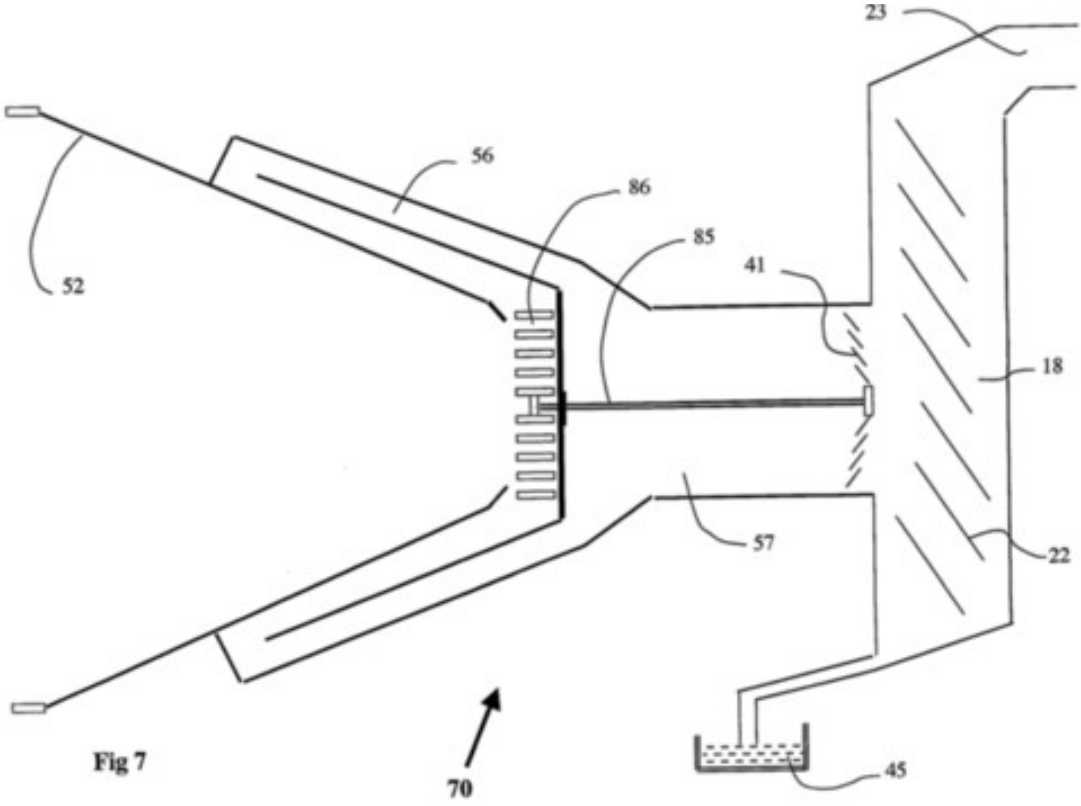


Fig 6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70

Fig 7

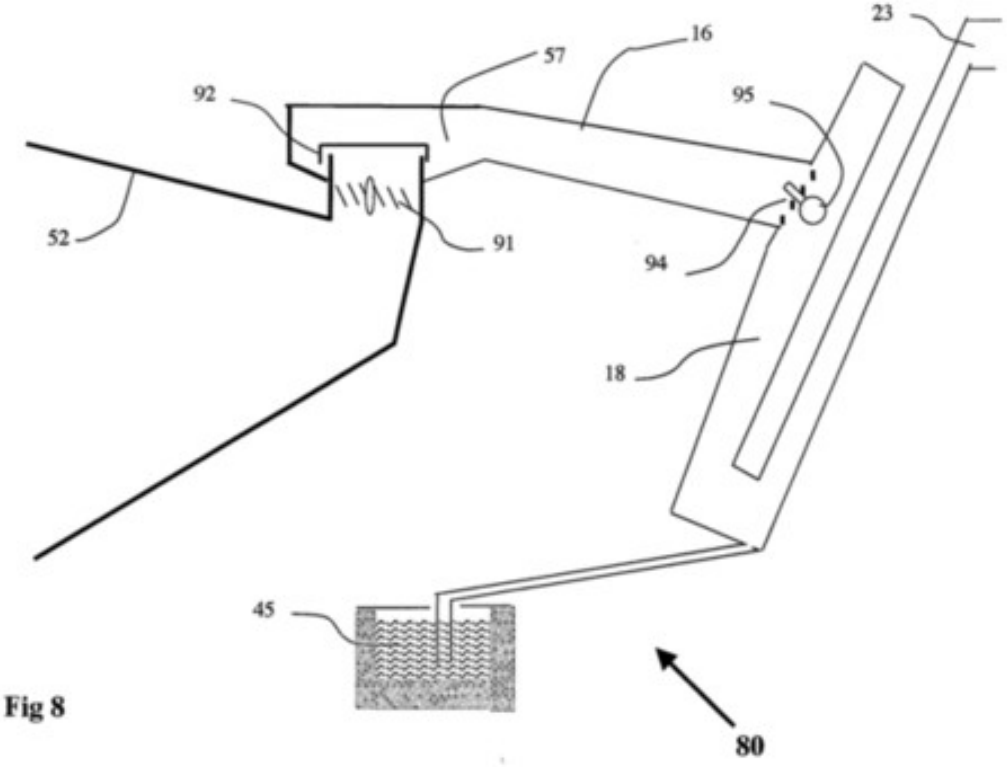
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Fig 8

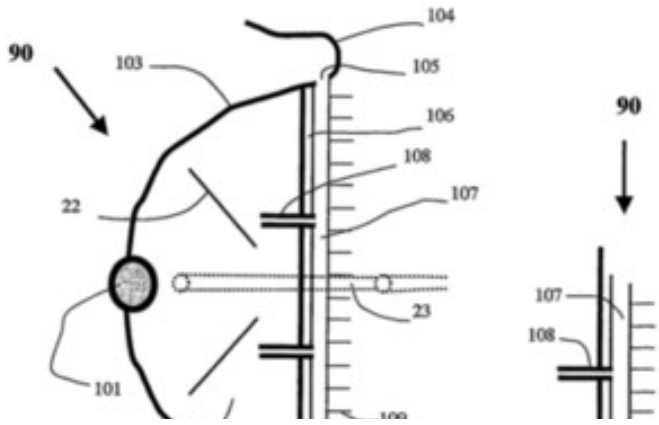
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Fig 9

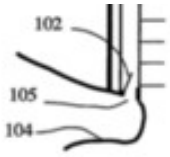


Fig 9a

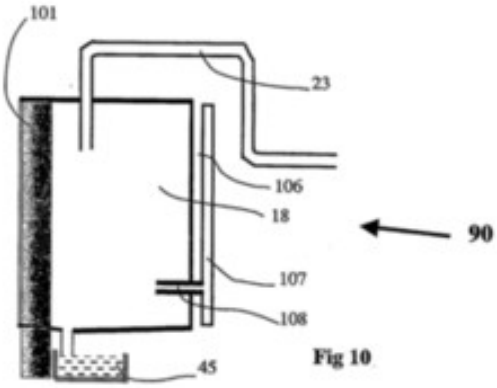


Fig 10

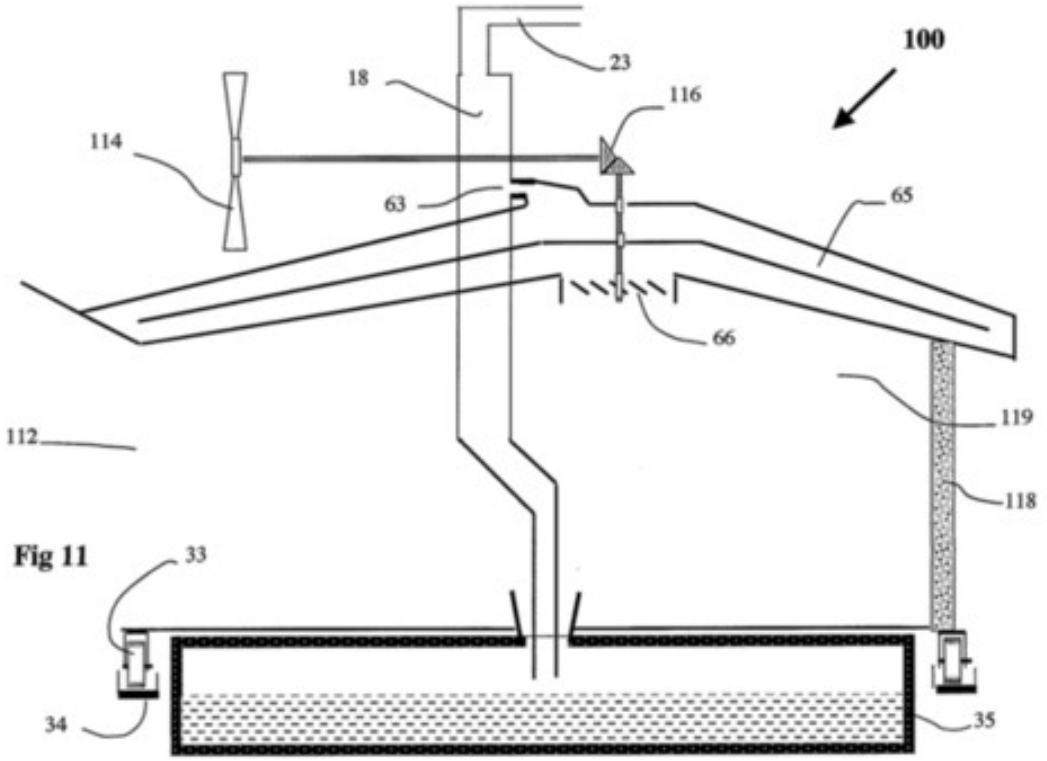
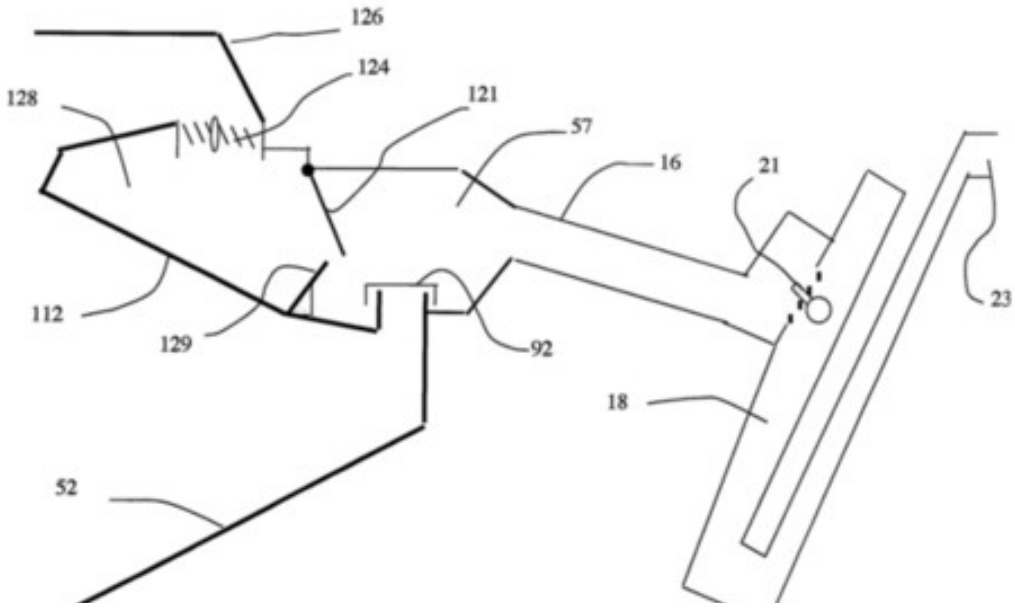


Fig 11



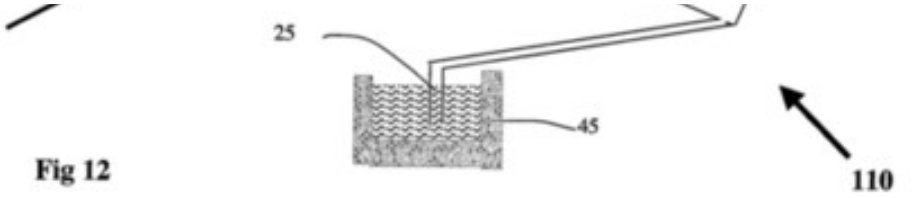


Fig 12

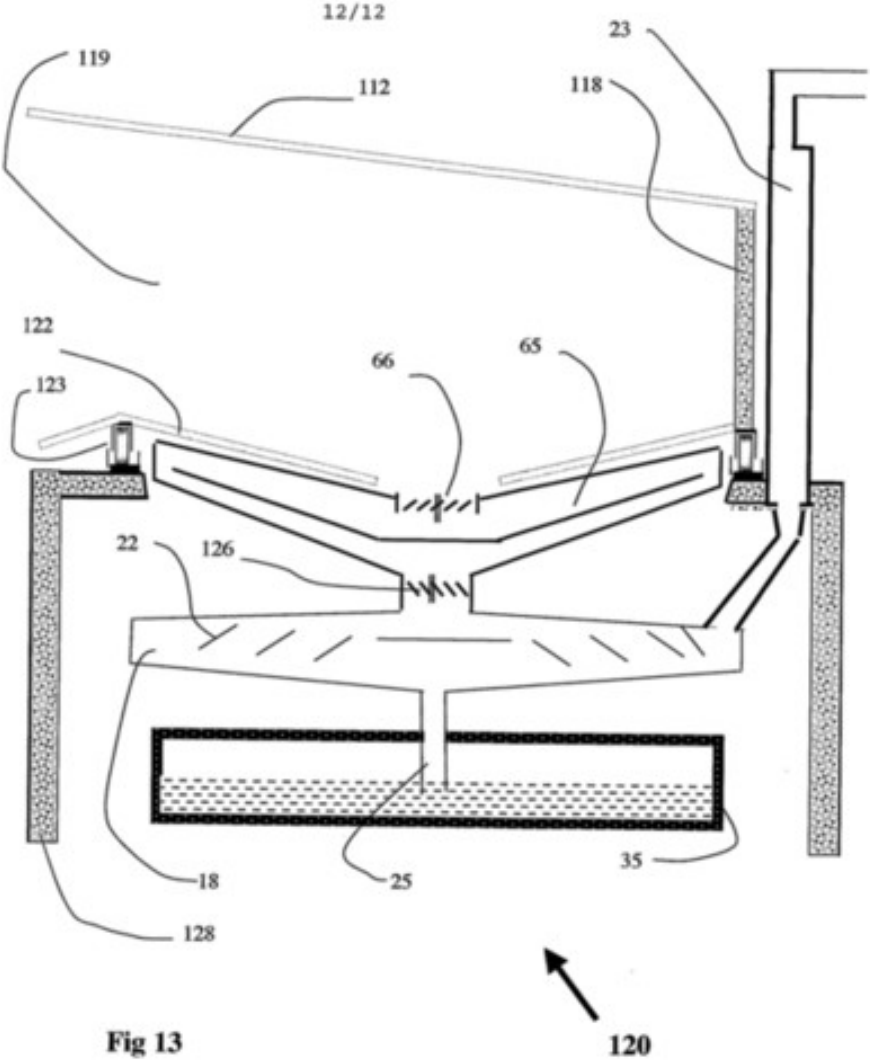


Fig 13

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http://v3.espacenet.com/textdoc?DB=EPODOC&IDX=WO2007098534&F=0
APPARATUS FOR PURIFICATION OF WATER
WO2007098534
2007-09-07
Apparatus for purification or water having an evaporation chamber (3), a roof (5) and a condensation chamber (8) and wind air inlet means (14, 15). The evaporation chamber (3) contains a body of impure water (2) and the roof (5) can transmit solar radiation. The solar radiation heats the impure water, increases evaporation and wind air from the wind air inlet (14, 15) moves the water laden air into the condensation chamber (8) where water condenses.

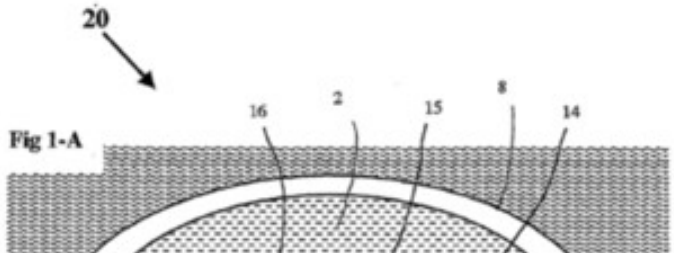
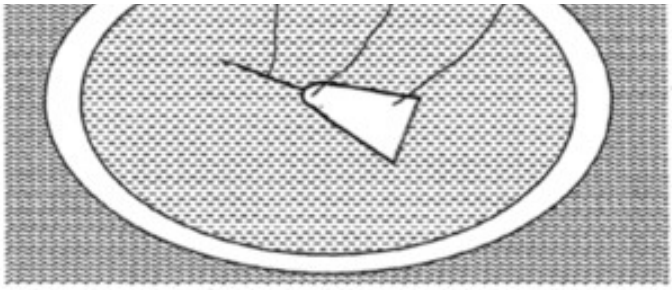


Fig 1-A



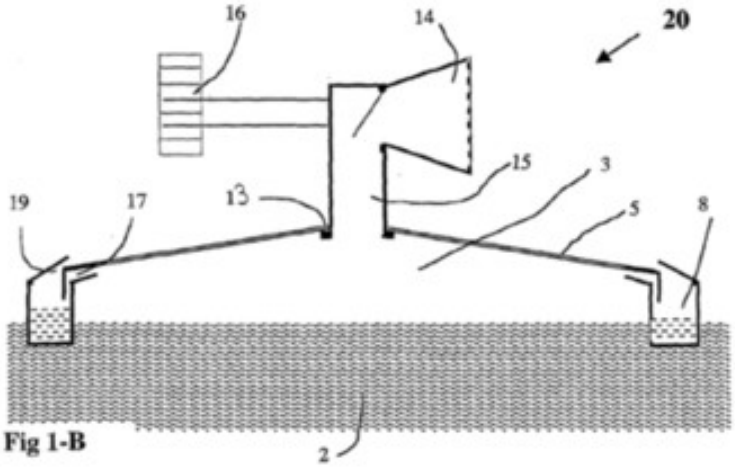

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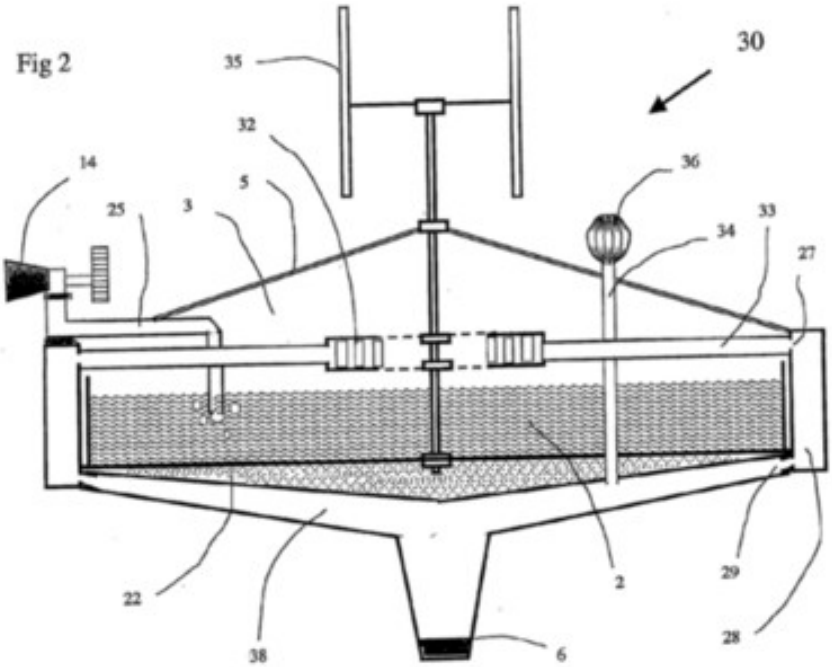
Fig 1-B

Fig 2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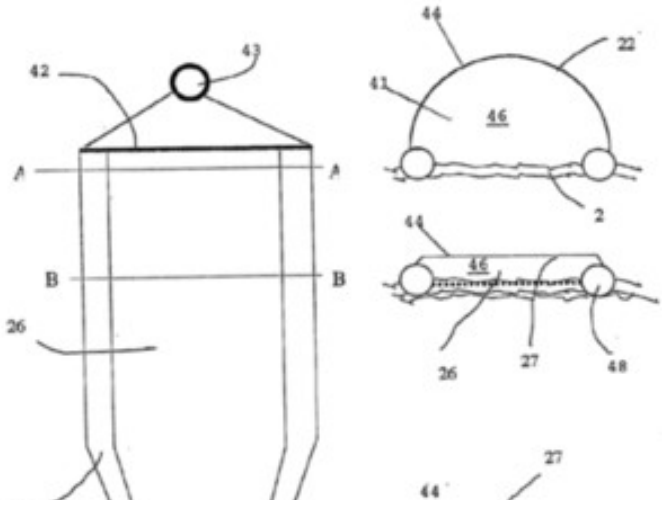
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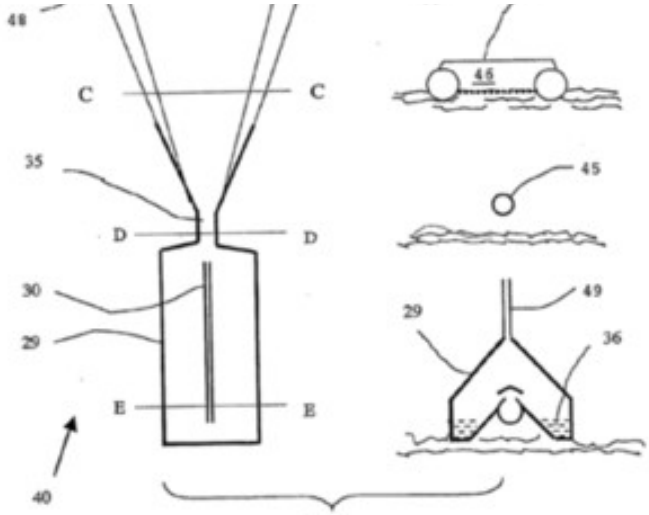


Fig 3

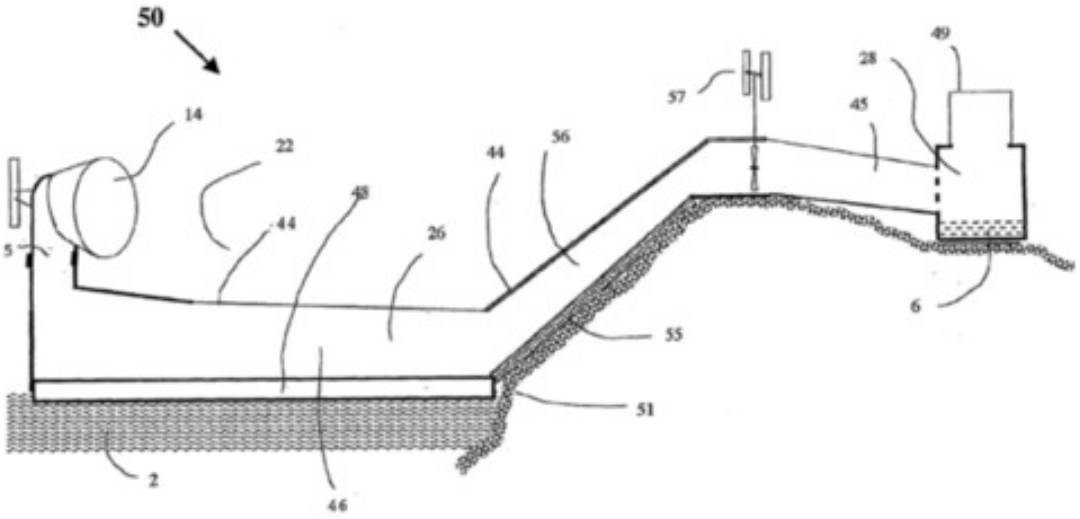


Fig 4

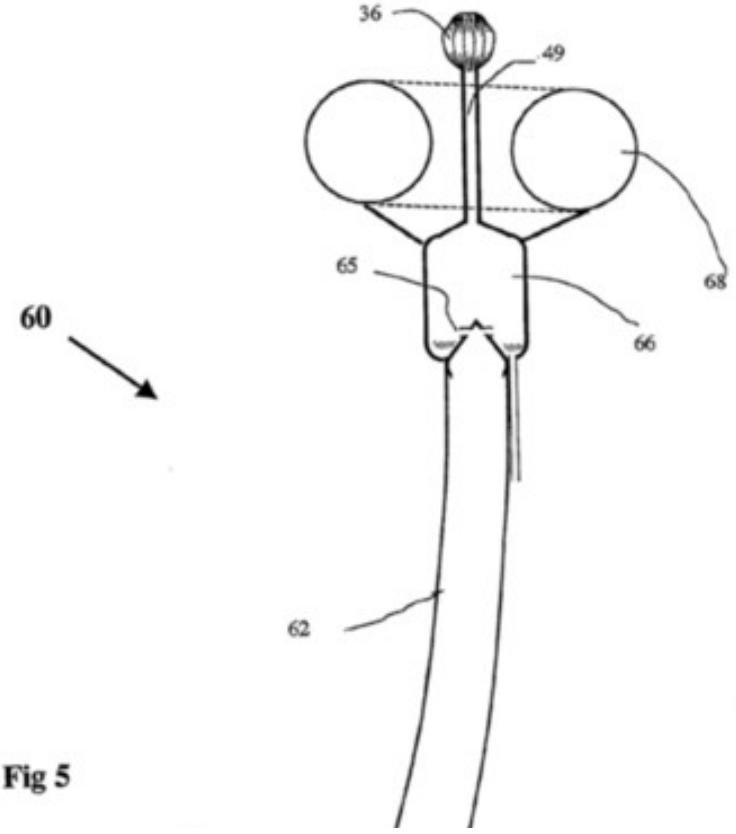
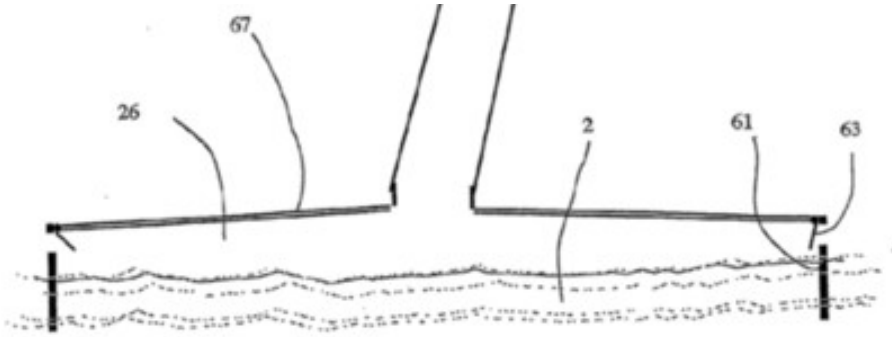


Fig 5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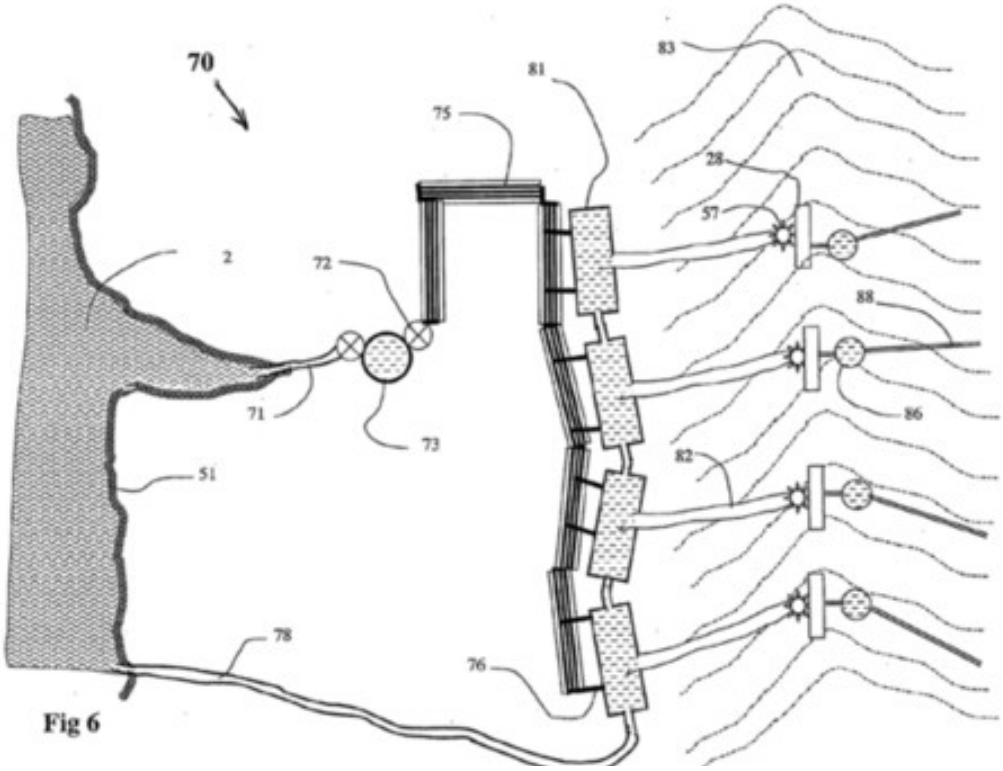
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Fig 6

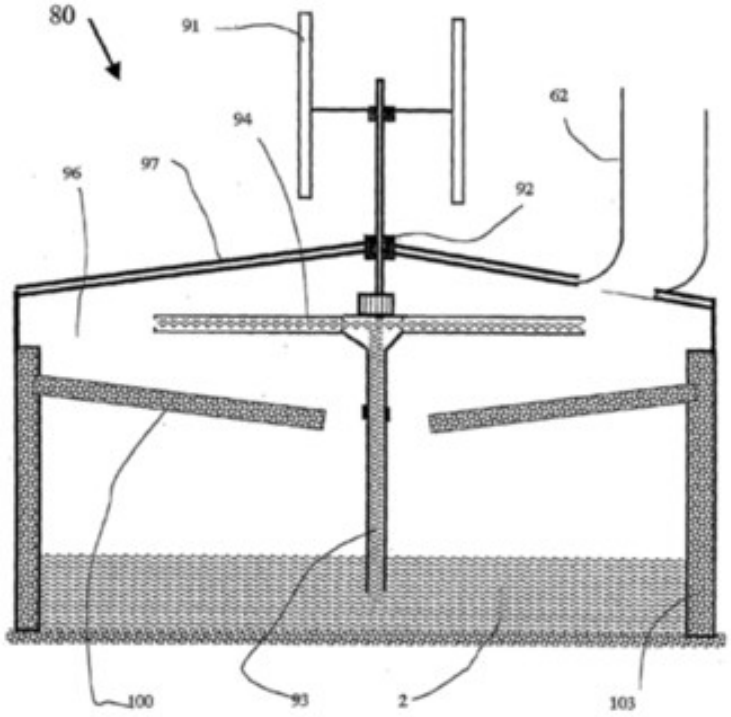
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Fig 7

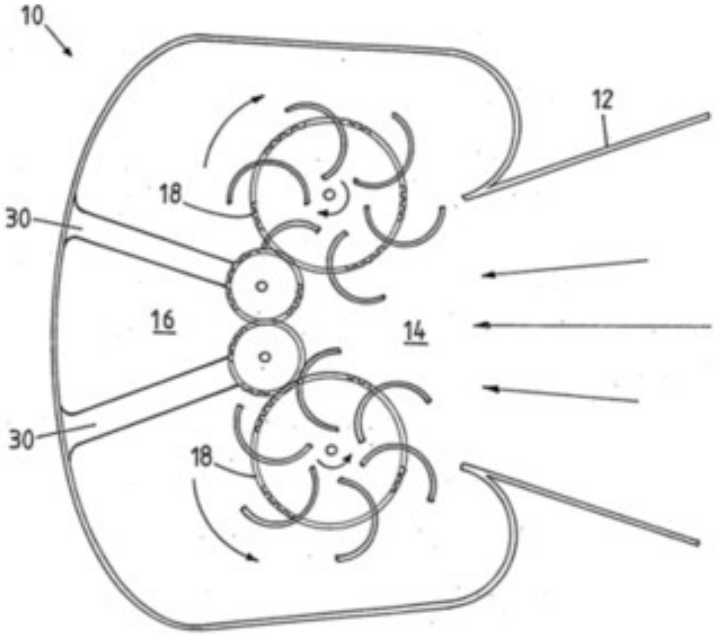
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FIG. 8

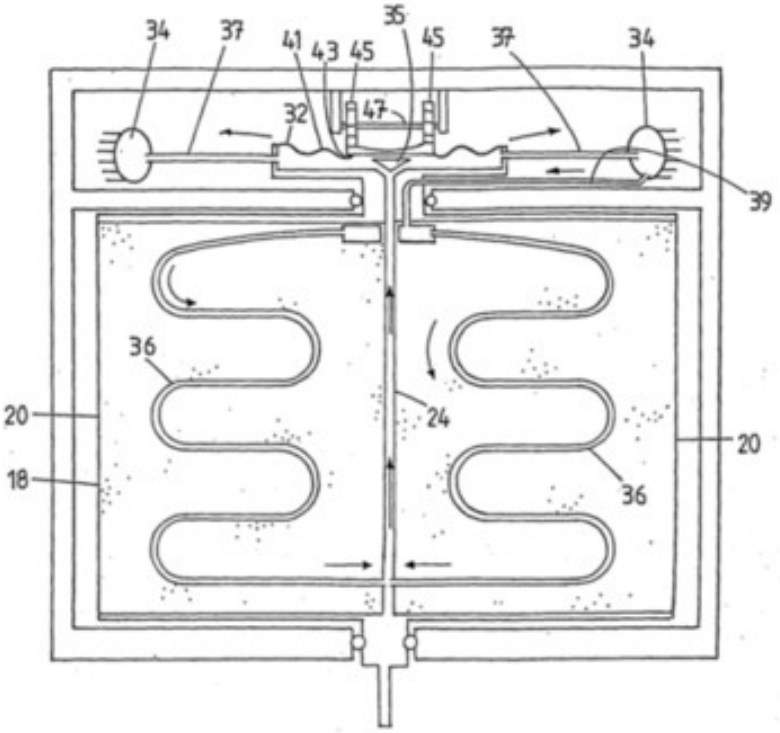
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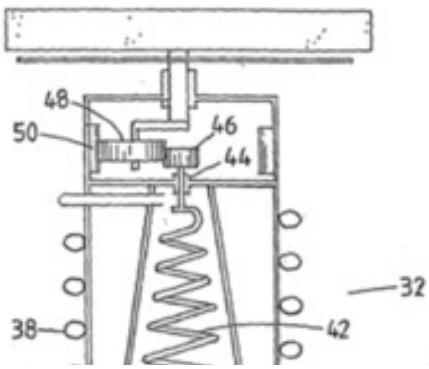
FIG.9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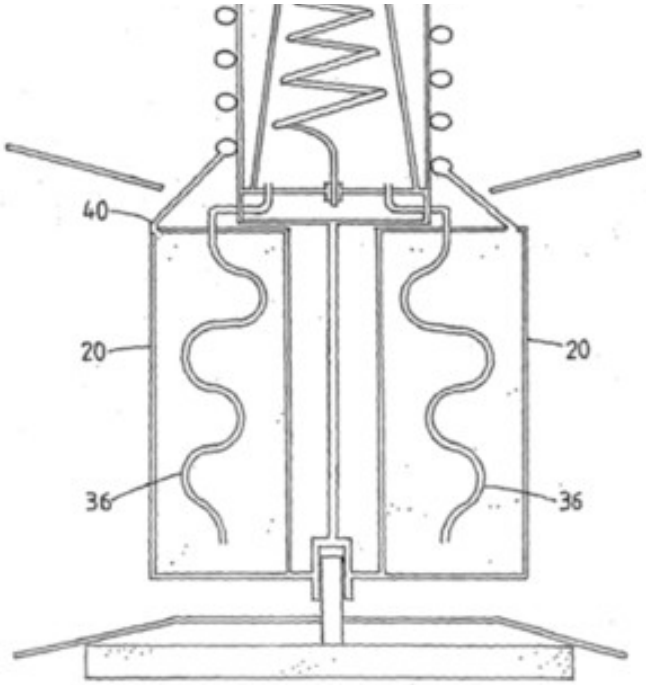

FIG. 10

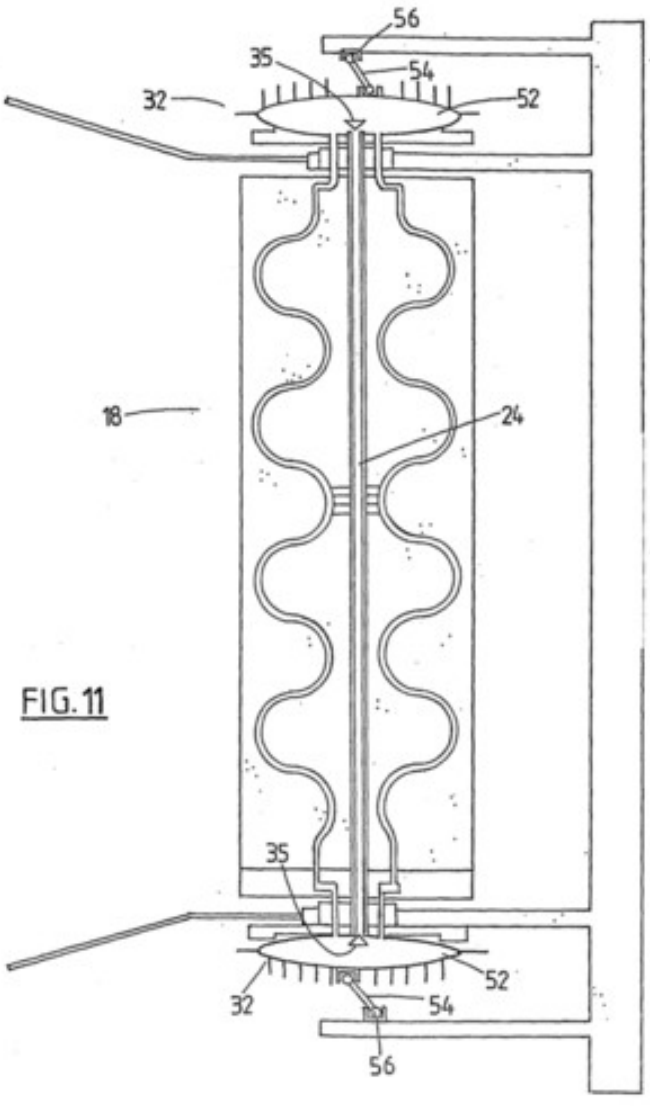

FIG. 11

FIG. 12

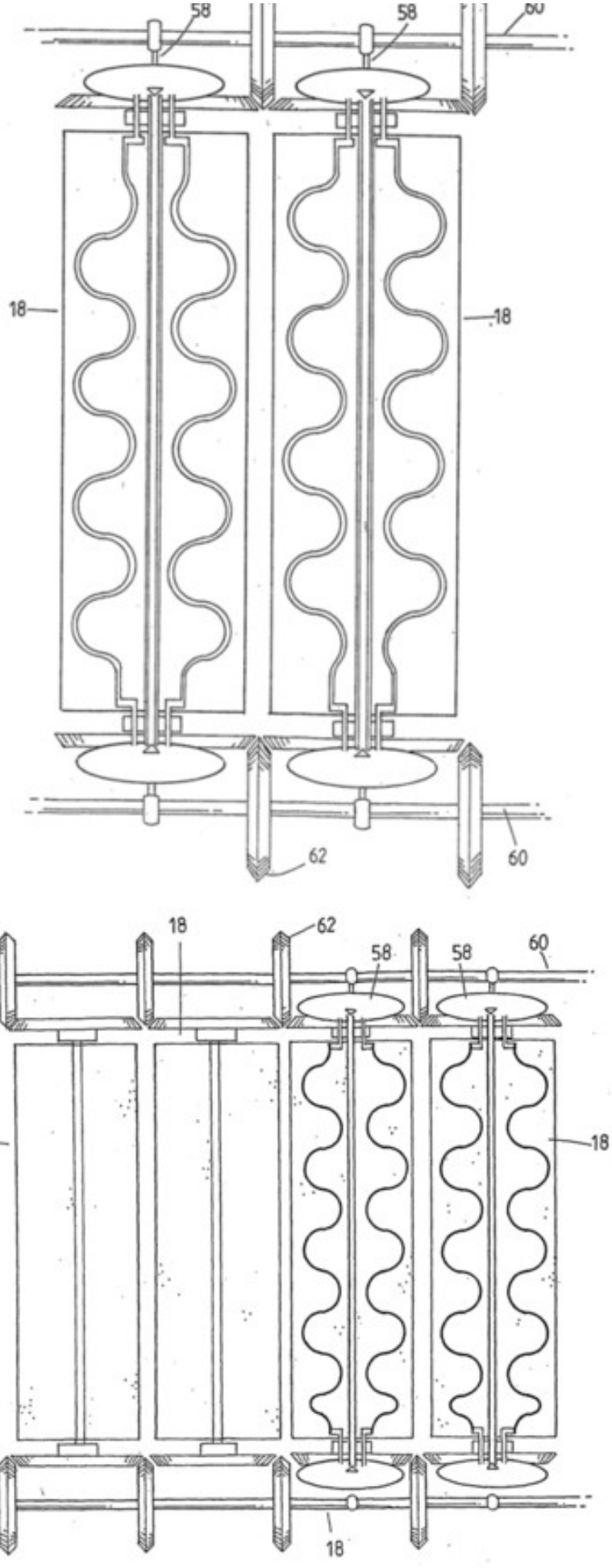
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FIG. 13

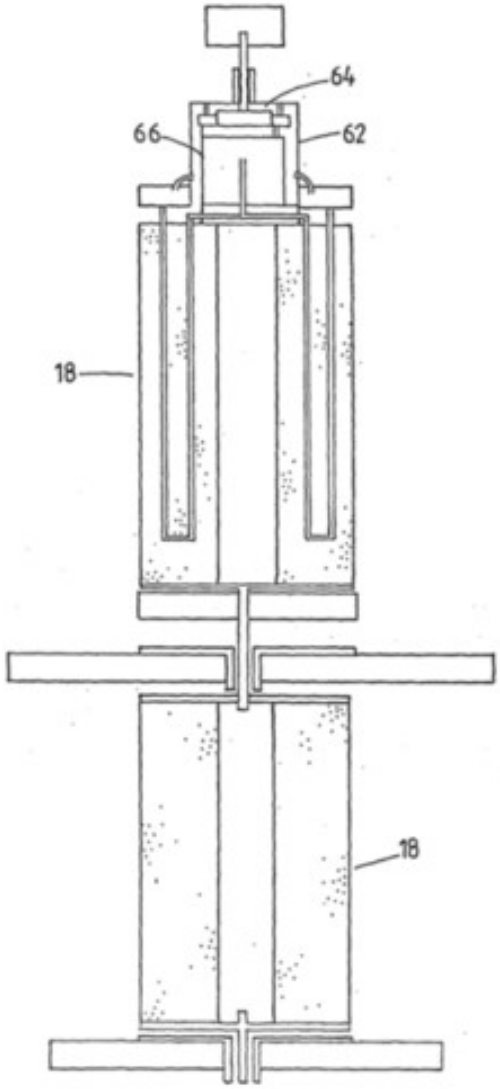


FIG. 14

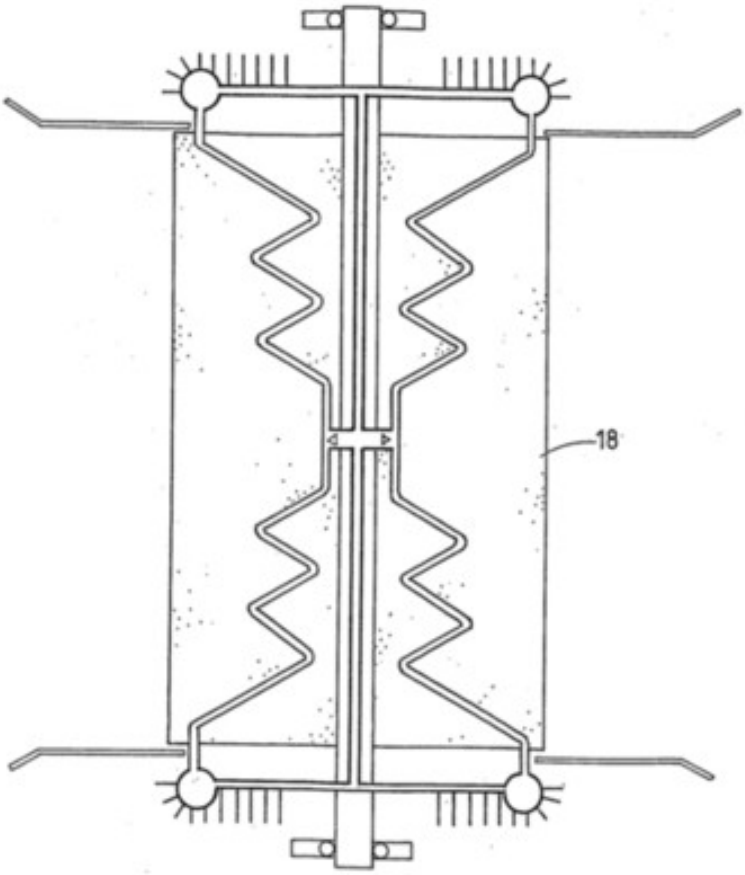
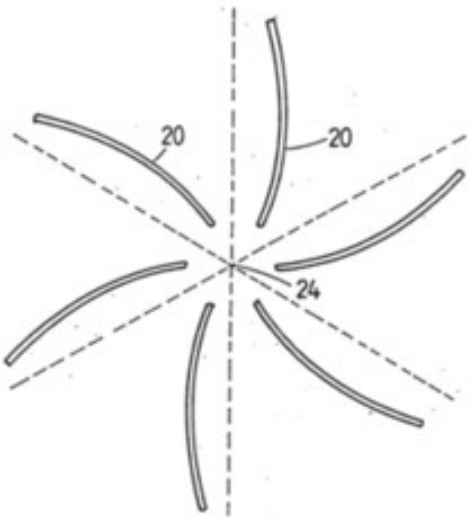


FIG. 15



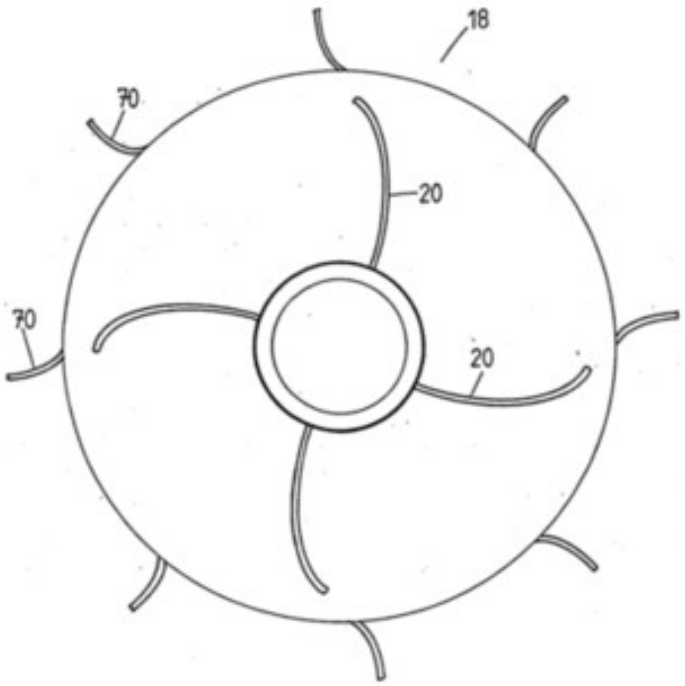


FIG.16

FIG.17

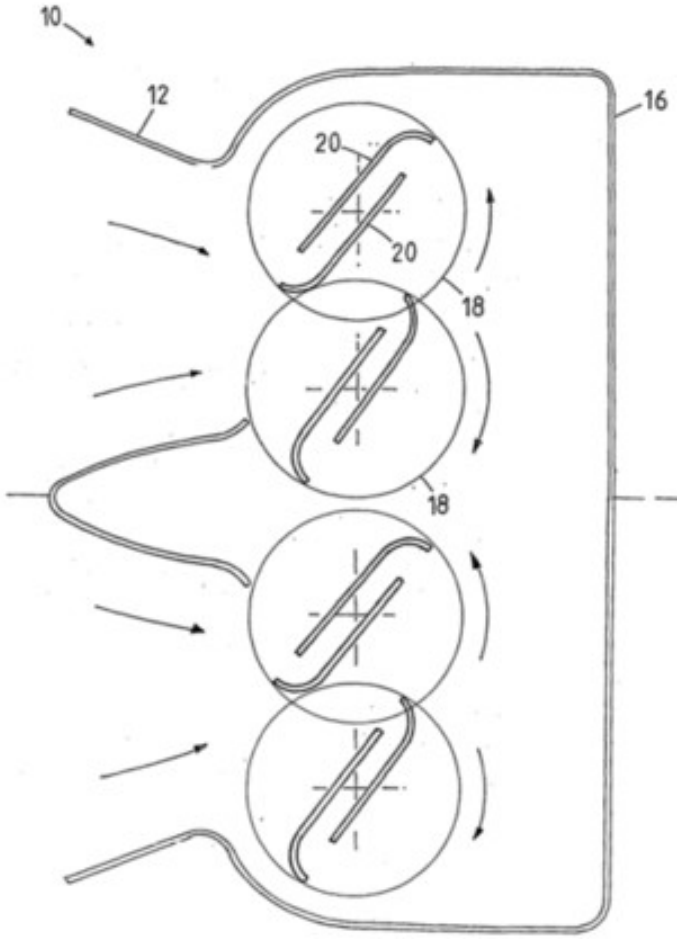


FIG.18

CROSS-AXIS WIND TURBINE ENERGY CONVERTER
WO2007068054

2007-06-21

The invention relates to a wind energy converter apparatus (10) which comprises an incoming wind guide (12), a cross-axis wind turbine (18), a wind containing region (16) and a wind outlet (24). Preferably, means is provided for cooling the wind air to enhance precipitation of moisture from the wind air in the apparatus.

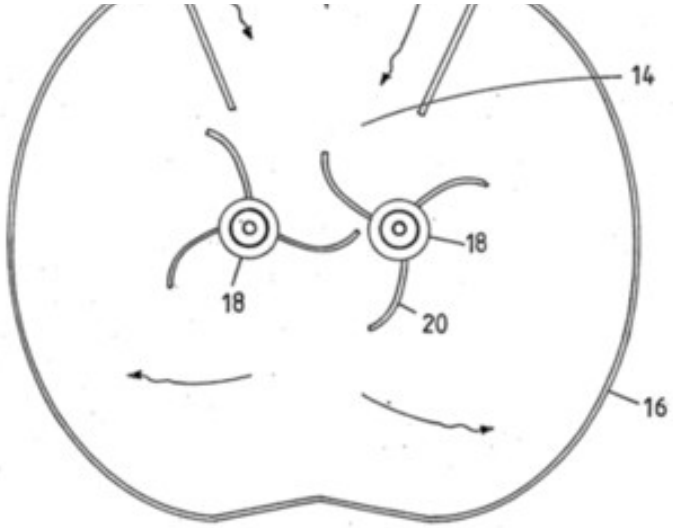


FIG. 1

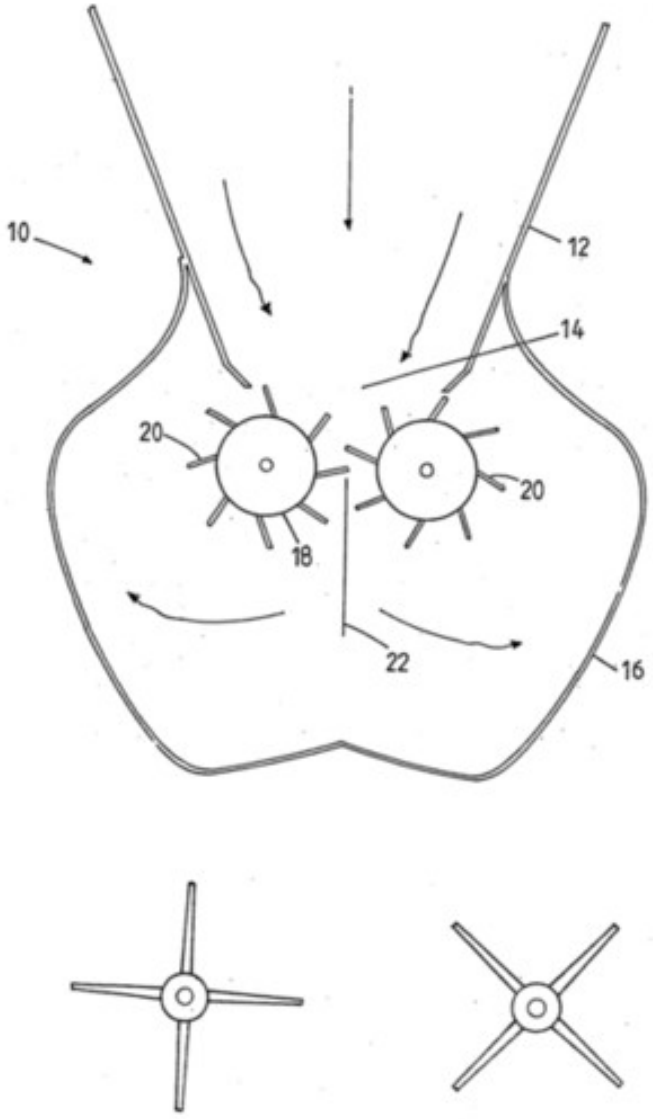
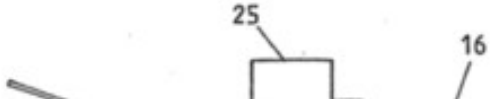


FIG. 2



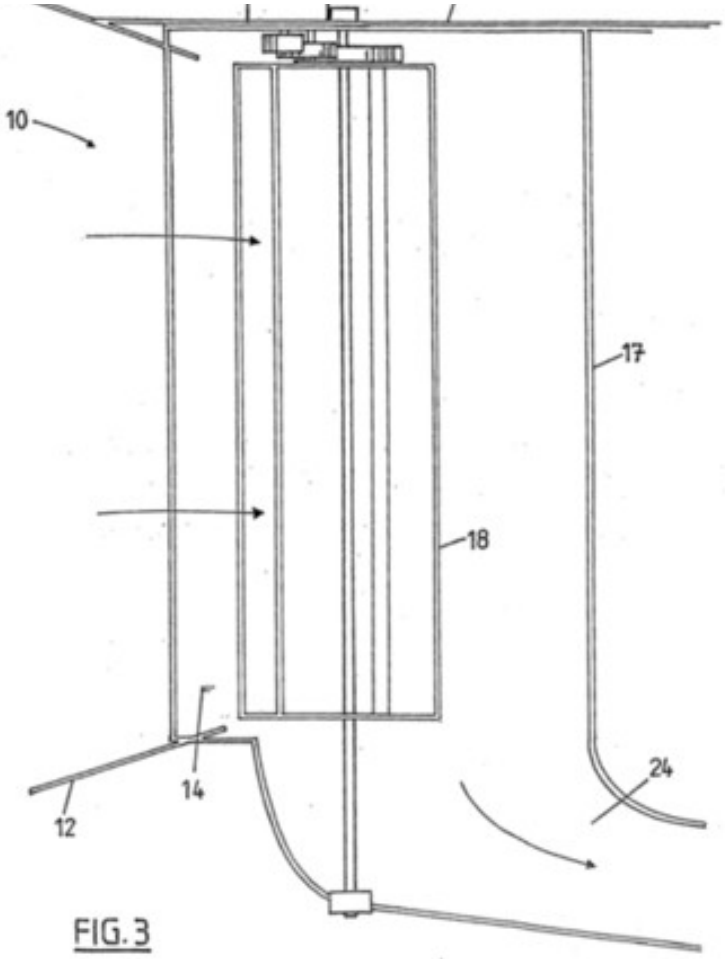


FIG. 3

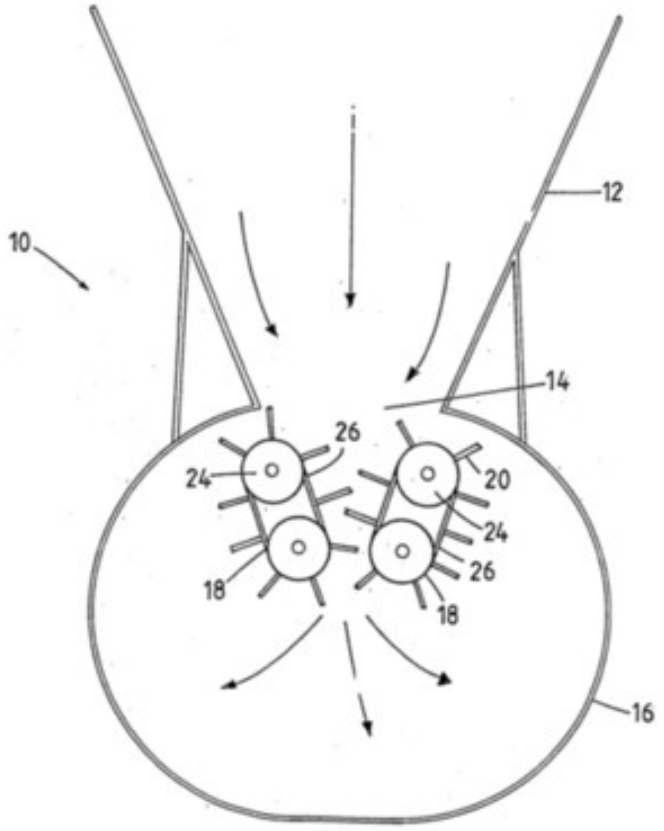


FIG. 4

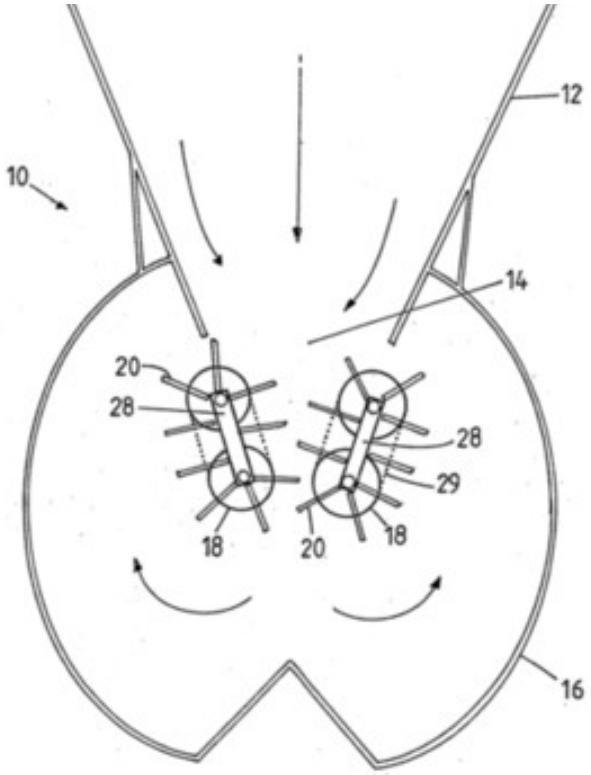


FIG. 5

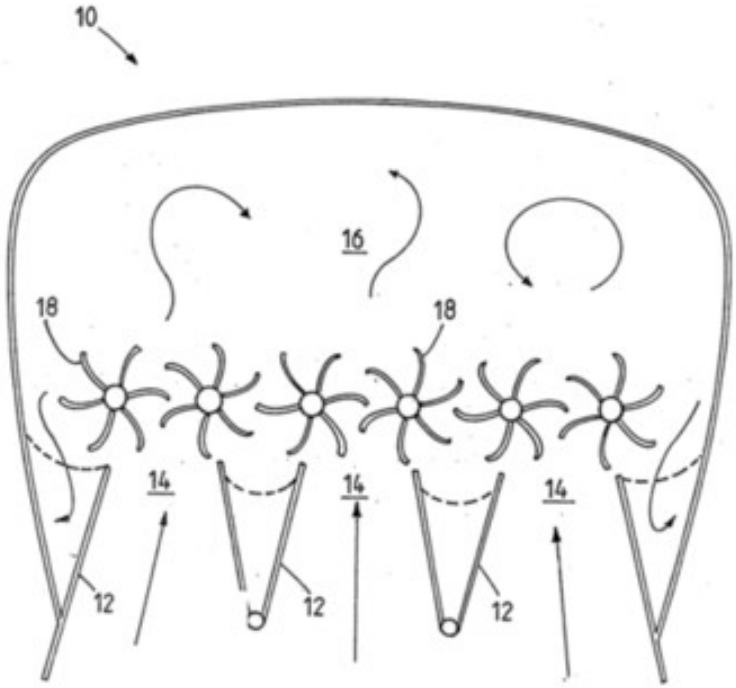
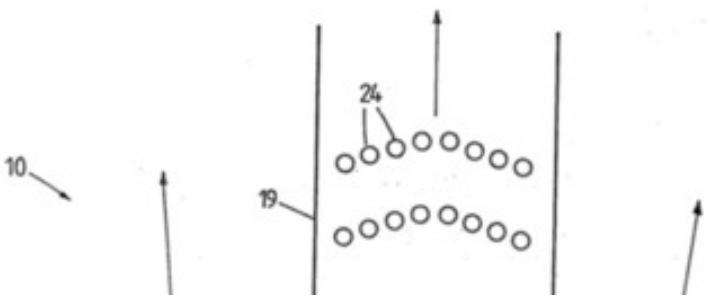


FIG. 6



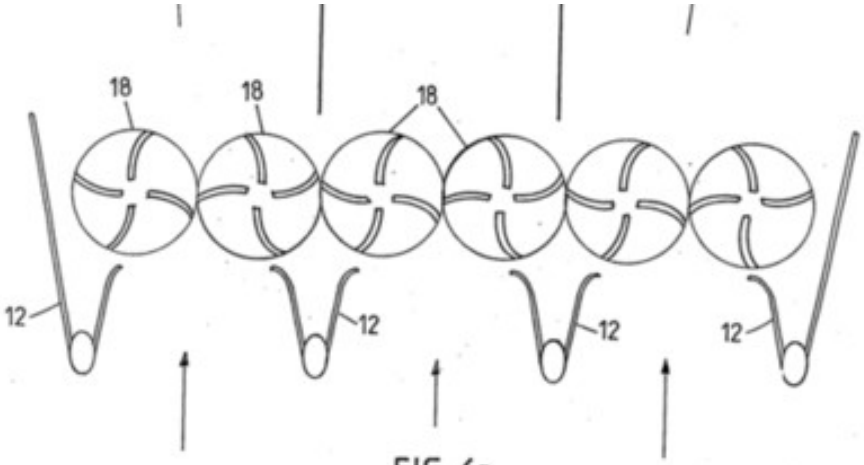
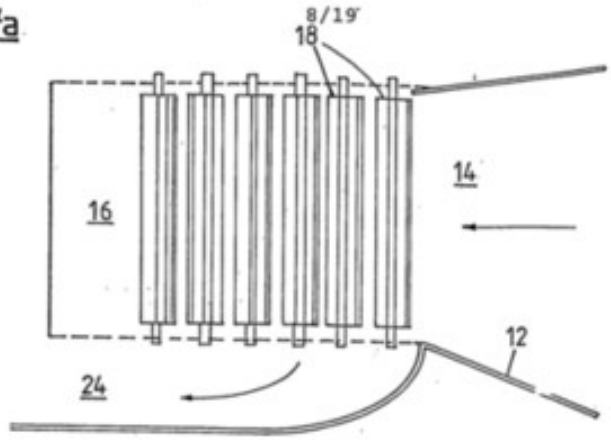


FIG. 6a

FIG.7a



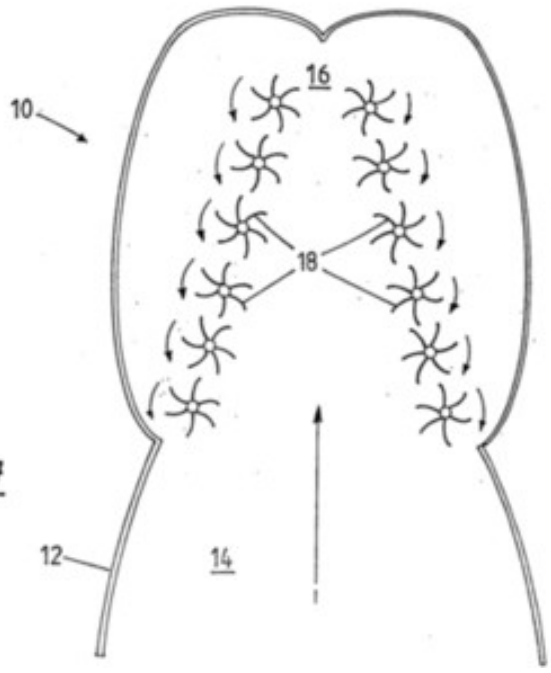


FIG.7

Apparatus and method for cooling of air
AU2005274673
CN101014817

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