

IRRIGATION DRAINING AND HEATING SYSTEM OF NATURAL GRASS SPORT FIELDS

NEW METHOD FOR TURF MANAGEMENT WITH WIDESPREAD AND HOMOGENEOUS HYGROTHERMIC CONDITIONING OF THE GROUND BELOW IT

national patent application for utility model no. MI2014U000304 - European patent for invention n. 14425121.2 - PCT International Patent System EP2015/072714 relating to the invention developed by dr Lavanga

with treatments of
BIOLOGICAL FERTIGATION

EPO project
Energy Process Optimization



FEATURES

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- thermally and homogeneously conditioned area (hot/cold)
- optimal drainage in any weather situation with elimination of radical asphyxia caused by stagnant water
- use of facilities for 365 days/year
- respect of the environment:
 - high energy efficiency at very competitive costs compared to the solutions currently adopted
 - drastic reduction (70%) of water consumption through water recycling and its integration directly from rainfall



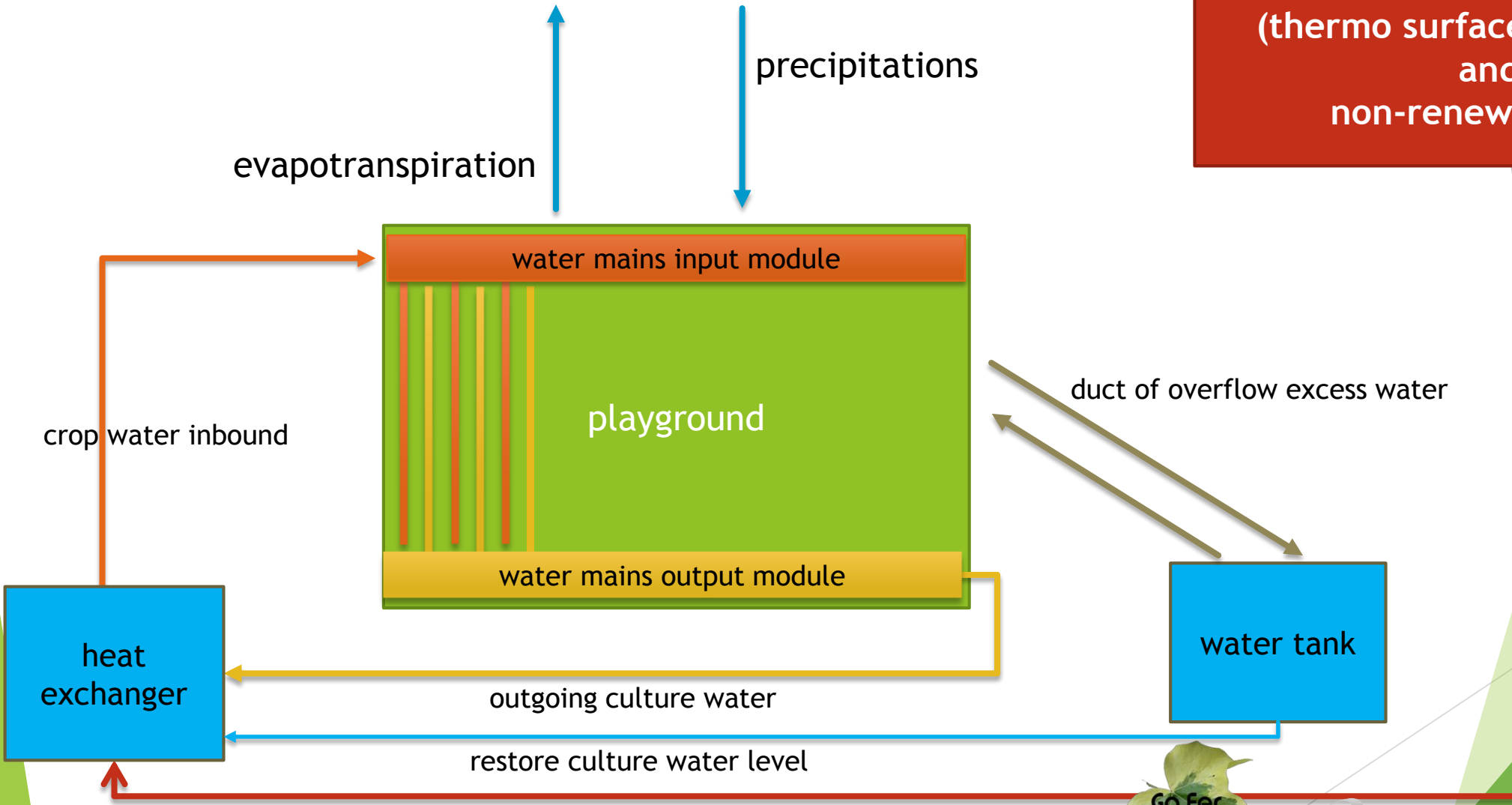
- water properly conditioned by biological products becomes a nutritional and sanitary vehicle, turning the soil into a sort of "biological purifier"
- the system promotes optimum development of the root systems
- it allows a constant and continuous vegetative activity of the turf through the use of organic products activators, regulators and growth promoters with activity:
 - nutritional
 - preventive against the onset of fungal diseases



TECHNICAL DESCRIPTION

- ▶ waterproofed tank with overflow openings
 - ▶ of surface size equal to the area of the surface to be conditioned
 - ▶ and height proportional to the thermal and irrigation regimes required
- ▶ water system positioned inside the tank with input and output modules
- ▶ outer water reservoir for hot / cold storage
- ▶ heat exchanger
- ▶ draining soil to fill the tank
 - ▶ gravel layer immersed in water
 - ▶ dry gravel layer
 - ▶ culture medium and turf
- ▶ external collection of sewer overflow tank

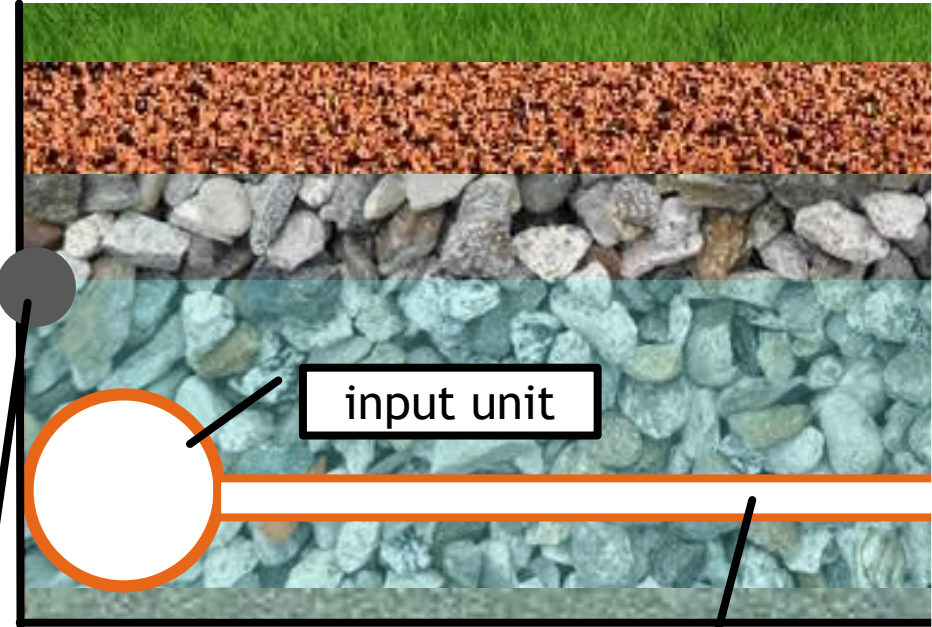
OPERATING DIAGRAM



ENERGY
from renewable energy sources
(thermo surfaces - thermo well)
and / or
non-renewable (boiler)

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cross section



natural turf

growth medium

dry gravel

gravel immersed in water

output unit

sand

duct of overflow

permeable ducts

input unit

input unit



water supply - external water tank - heat exchanger and draining soil realize a practically closed cycle of culture water

the opening to the outside is given by the surface of the tub (evapotranspiration) and the overflow openings (for adjusting water excesses from precipitation)

the outer water reservoir has the function to heat the water of crop by means of technical hot water provided by thermal power plant fueled preferably from renewable sources

the crop water, appropriately flanked by an organic fertigation system , will also be used for irrigation of turfgrass

for this purpose
it will be placed probes for monitoring the chemical / physical characteristics of crop water

it will be added bio-fertilizer according to the needs



**FERTIGATION ORGANIC
TREATMENTS
TO LOW ENVIRONMENTAL IMPACT
FOR THE MANAGEMENT
OF THE NATURAL GRASS TURF**



the organic fertigation technique suitably calibrated according to the soil and climatic conditions:

it allows you to change the methodology of fertilizing, reducing the 80%, and beyond if required, the amount of synthetic fertilizer

it helps the turf to overcome the stress and confers greater resistance to the onset of plant diseases

it reduces the polluting effects caused by the use of fungicides, insecticides and synthetic fertilizers in excessive doses

drastic reduction of plant diseases



- it allows plants to develop a natural survival strategy that helps to overcome the thermal stress (especially those extremes such as excessive heat and cold)
- it makes them more resistant to attacks from parasites
- it promotes regeneration of root development followed by a greening luxuriance of epigeal part which ensures a compact texture of the turf
- it leaves less free space for the development of spontaneous flora
- it eliminates the problems associated with trampling and excess of felt

- it ensures the maintenance of optimal agronomic conditions that allowing the formation of strong and resistant rhizomes that football requires to the grassy surface
- it promotes the growth of the root system than the epigeal part allowing to perform fewer mowings and therefore guarantees also energy and management saving

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tests carried out in Serai Villach (EE) AUSTRIA

altitude: 587.0 m

DD: 46.5981000

13.9053600

DMS: 46° 35' 53.160" N

13° 54' 19.296" E

results on root system obtained by biological fertigation on turf composed of fescues - poa pratensis and perennial ryegrass



turf treated with biological fertigation + Mycorrhizae

in the background: the turf from which the samples were taken, considered the season, and after eight days of snow, for the produced amount of chlorophyll, it seems a meadow in May in central Italy



turf treated with biological fertigation + brown algae PRC





24/03/2008 9:46 a.m.



24/03/2008 6:14 p.m.



29/03/2008 ore 9:29 a.m.

strawberries, tulips and grass under the influence of organic treatments do not suffer the stress of snow and Frost (2/29/2008 of -10 C°)

irrigation, draining and heating system
associated
with biological treatment of Fertigation
represents
an investment in the name of

ENERGY SAVING

ENVIRONMENTAL PROTECTION

**SAFEGUARDING THE HEALTH OF CONSUMERS
OF SPORTS FACILITIES IN NATURAL GRASS**





- ▶ We are a group of experts of different scientific training always been committed to developing original know-how in energy conservation, waste water treatment, biogas production, production of vegetable proteins, biological treatments, which drew up an Energy Process Optimization (EPO) high synergy able to save between 50 and 75% of the costs related to the entire company structure with preference for farms, Manufacturing of agro-food supply and agro-livestock, not excluding sports centers and medium-density urban settlements.
- ▶ EPO is based both on the experience of the professionals involved in the project on registered and active patents.
- ▶ The technical-scientific component is tightly integrated with the financial aspects making this project unique on its kind.
- ▶ EPO is rewarding for operational group because the 50% of the total direct and indirect savings realized by the company (regulated by a special agreement) represents the compensation, in the final balance, for professionals. Likewise it is profitable for the company that in a few years will realize significant savings and redevelopments.
- ▶ The interdisciplinary working group that developed EPO considers that there is sufficient knowledge to implement a real energy revolution worldwide. The synergy between competences, know-how and necessity is the winning combination to get very close to energy self-sufficiency. The process of photosynthesis, which is the basis of our food pyramid, governs and directs the life on Earth. We eliminate the energetic discontinuity (waste and dissipation) along the food chain (which is also energetic), imitating natural processes, applying them to the best, on the basis of our present scientific knowledge.

