

FORM 1

(FOR OFFICE USE ONLY)

THE PATENT ACT 1970
(39 OF 1970)And
The patent rules, 2003Application number:
Filing date:
amount of fee paid:
CBR NO:**APPLICATION FOR GRANT OF PATENT**

[See sec 7, 54,135 and rule20 (1)]

1 APPLICANT(S)

Name	Nationality	Address
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Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

2 Inventor(s)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

3. TITLE OF INVENTION

A device for passively cooling a thermal mass

4. ADDRESS FOR CORRESPONDANCE OF AUTHORISED PATENT AGENT IN INDIA :-R 9 harshnil, Eknath puram
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5. DECLARATION:

(i) Declaration by the inventors

We the above named inventors are the true and first inventors for this invention

Date 8th day of December 2009

Signature of the inventors.

Name: (1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay

(ii) Declaration by the applicants

We the applicants hereby declare that:-

We are in possession of above mentioned invention.

The complete specification relating to the invention is filed with the application

There is no lawful ground of objection to the grant of patent to us.

Signature of the applicants.

Name: (1) Ingole Vijay Tulshiram

(2) Ingole Ashutosh Vijay

(3) Ingole Paritosh Vijay

6. FOLLOWING ARE THE ATTACHMENTS WITH THE APPLICATION

- (a) Complete specification in duplicate
- (b) Drawings in duplicate
- (c) Statement and undertaking on form 3 in duplicate
- (d) Abstract in duplicate
- (e) Form number 26 Power of authorization to patent agent.
- (f) Form number 9.
- (g) Form number 18.

Fee Rs in Cash/Cheque/bank draft bearing no

Date on Bank.

We hereby declare that to the best our knowledge, information and belief the facts and the matter stated herein are correct and we request that the patent may be granted to us for the said invention.

Dated this 8th day of December 2009

Signature:

Name : (1) Ingole Vijay Tulshiram
(2) Ingole Ashutosh Vijay
(3) Ingole Paritosh Vijay

FORM 2

THE PATENT ACT 1970
(39 OF 1970)
AND
The patent rules, 2003

COMPLETE SPECIFICATION
(See section 10: rule 13)

1. TITLE OF INVENTION

A device for passively cooling a thermal mass

2 APPLICANTS(S)

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout, camp, Amravati-444602

3. PREAMBLE TO THE DESCRIPTION

COMPLETE

Following specification particularly describes the invention and the manner in which it is to be performed.

4. DESCRIPTION.

Technical field of invention

The invention relates to thermal cooling particularly to passive thermal cooling of any mass by means optical property of optical drive wherein when a ray from rare medium falls on it, it gets refracted and when the refracted ray falls on the inner surface and if has an angle more than the critical angle of the medium of the optical device it undergoes total internal reflection. Any other ray falling on the inner surface of the optical device having angle less than critical angle gets refracted to rare medium.

For example:-a right angle symmetrical prism is considered for further explanation wherein the larger surface is exposed to perpendicular light it will get totally reflected however the light falling on the smaller side will get refracted through it. This phenomenon however depends on the refractive index of the prism. In order to eliminate other rays which would have lesser angle than the critical are prevented from falling on the larger surface of prism by fins. In order to minimize conduction and convection the prism are mounted on double walled vacuumed sheet. It will be clear from the above explanation that there lies an unbalance of radiation from either side of the prism that is there is one way energy flow and that property is utilized for the present invention of the device.

5. Use

The present invention concerns a device for passively cooling a thermal mass comprising a novel arrangement of a transparent insulated sheet, plurality of prism and plurality of fins, which is non polluting, passive, reliable, of simple design, simple to use, economical, compact, noiseless and can be used for both industrial installations, cold storages and also for domestic application including homes, houses and rooms.

Additional advantages and modification will readily occur to those skilled in art. Therefore, the invention in its broader aspect is not limited to specific details and representative embodiments shown and described hereafter.

6. Prior art

It is known that refrigeration and air-conditioning are very important process widely used for human comforts, medical application storage of goods, cooling of electronics, home and many other industrial installations. The

conventional refrigeration systems incorporate heat pump using compressor, absorption system, semiconductor peltier effect etc. all the known processes require external energy to remove heat and further use suitable medium for their functioning. In present invention Boltzman-stefens law is applied which states that thermal equilibrium in term of temperature of any black body is attained when the thermal energy is absorbed by the mass is equivalent to thermal energy radiated by it. The radiation of absorption is a function of fourth power of its absolute temperature in degree Kelvin of black body. Any deviation in term of energy radiation or absorption will either increase or decrease or maintain the black body temperature.

For example in case of well known thermos the fluid inside the thermos device neither absorbs nor radiates thermal energy due to the peculiar arrangement of the device. Thereby the temperature of the thermal fluid within the thermos device remains unchanged. Total internal reflection is a well known phenomenon encountered in the optical devices. When radiation encounters the change of medium it either refracts or reflects depending on the ratio of refractive indices of the medium as well as the angle of the indices of radiation. In case of prism such phenomena is generally observed where the radiation from one side encounters total internal reflection when the incident angle of radiation is more that critical angle whereas the same prism refracts radiation from remaining sides. This will become further apparent in further description. it is uniquely suitable for many applications due to absence of external energy source means passive operation, no pollution, no moving part, no noise.

Problem to be solved:

The conventional refrigeration systems incorporate heat pump using compressor, absorption system, semiconductor peltier effect etc. all the known processes require external energy to remove heat and further use suitable medium for their functioning. There is a need of device for cooling thermal mass in absence of external energy source means passive operation.

Object:

The primary object of this invention is to provide a system for cooling of thermal mass which is non-polluting, passive, reliable, of simple design, simple to use, economical, compact, noiseless and can be used for both large scale industrial installations and for domestic application including homes, houses and rooms. Other objects, features and advantages will become apparent from detail description and appended claims.

STATEMENT:-

Following invention provides a device for passively cooling a thermal mass comprising a novel arrangement of a transparent insulated sheet, plurality of prism and plurality of fins of simple design and simple to use as well as provides process of passively cooling a thermal mass which is non polluting, passive, reliable, economical, compact, noiseless and can be used for both industrial installations, cold storages and also for domestic application including homes, houses and rooms.

BRIEF DESCRIPTION OF DRAWING

The invention is described by way of example with reference to the following drawings

Sheet 1 of 4 shows the detail of first embodiment of the invention where-

Figure 1G, figure 1H show an elevation and side elevation of insulator sheet.

Figure 1E; figure 1F show an elevation and side elevation of plurality of prism.

Figure 1C, figure 1D show an elevation and side elevation of plurality of fin.

Figure 1A; figure 1B show an elevation and side elevation of composite sheet or device.

Sheet 2 of 4 show detail of another embodiment of invention where

Figure 2G; figure 2H show an elevation and side elevation of insulator sheet.

Figure 2E; figure 2F show an elevation and side elevation of plurality of prism

Figure 2C, figure 2D show an elevation and side elevation of plurality of fin.

Figure 2A, figure 2B show an elevation and side elevation of composite sheet or device

Sheet 3 of 4 show detail of another embodiment of invention where

Figure 3A show an elevation

Figure 3B shows a plan

Sheet 4 of 4 show detail of another embodiment of invention where

Figure 4A shows an elevation

Figure 4B shows a plan.

Detailed description:

Referring to sheet 1 of 4 shows the detail of first embodiment of the invention where the figure 1G and figure 1H show the double walled insulated sheet 15 and vacuumed space 10. Referring to fig 1E and 1F show the plurality of linear prism 14. Referring to figure 1C and figure 1D show the plurality of square matrix of fin 13. Referring to fig 1A and fig 1B show the assembly of insulated sheet 15 over which plurality of linear prism 14 is mounted and covered. Further plurality of fin 13 in form of square matrix is mounted and covers plurality of prism 14 thereby forming a composite sheet or device which has two sides namely 19 which is towards insulated sheet 15 whereas another side 17 which is towards plurality of said square matrix of fin 13.

Referring to sheet 2 of 4 shows detail of another embodiment of the invention where fig 2 G and figure 2H show the double walled insulated sheet 25 and vacuumed space 20. Referring to figure 2E and fig 2F shows the plurality of circular prism 24 preferably in form of concentric circles. Referring to fig 2C and 2D show a sheet in which holes are formed thereby forming plurality of fin 23. Referring to figure 2a and 2B show an assembly of insulated sheet 25 over which plurality of circle prism 24 is mounted and over which plurality of fin preferably in form holes 23 is mounted thereby forming a composite sheet or device which has two sides namely 29 which is towards insulated sheet 25 whereas another side 27 which is towards plurality of fin 23.

Referring to sheet 3 of 4 where another embodiment implementing the present invention is shown in figure 3A and figure 3B as an elevation and plan respectively where the device preferably form a six sided container 39 also includes any conventionally shape fabricated by using the device. The said container contains mass 37 which is enclosed by said embodiment. The plurality of prism 34 is mounted and covers insulated sheet 35 having vacuumed space 30 and plurality of fin 33 is mounted and covers plurality of prism 33. The double walled vacuumed 30 insulated sheet 35 is placed towards the mass 37 whereas plurality of fin 33 is facing the ambience 38. The mass 37 in container 39 is subject to passive cooling phenomenon and the fluid 37 thus gets cooled. The container may be provided with an inlet 32 and outlet 31 for circulation of fluid mass.

Referring to sheet 4 of 4 where another embodiment implementing the present invention is shown in figure 4A and figure 4B as an elevation and plan respectively where the device preferably forms a cylindrical container 49 also includes any conventionally shape fabricated by using the device. The said container contains mass 47 which is enclosed by said embodiment. The plurality of prism 44 is mounted and covers insulated sheet 45 having

vacuumed space 40 and plurality of fin 43 is mounted and covers plurality of prism 43. the double walled vacuumed 40 insulated sheet 45 is placed towards the mass 47 whereas the plurality of fin 43 is facing the ambience 48. the mass 47 in the container 49 is subject to passive cooling phenomenon and fluid 47 in the container 49 is subject to passive cooling phenomenon and the fluid 47 thus gets cooled.

According to the embodiment the device for passively cooling a thermal mass can be provided in different size which is non polluting, passive, reliable, of simple design, simple to use, economical, compact, noiseless and can be used for both large scale industrial installations and for domestic application including homes, houses and rooms.

Additional advantages and modification will readily occur to those skilled in art. Therefore, the invention in its broader aspect is not limited to specific details and representative embodiments shown and described herein. Accordingly various modifications may be made without departing from the spirit or scope of the general invention concept as defined by the appended claims and their equivalents.

BEST MODE OF WORKING

The invention is a novel means construction of insulated sheet means the air within the double walled insulated sheet is evacuated to prevent conduction and convection and is covered by a novel arrangement of plurality of prism and further covered by plurality of fins. The device encloses the mass to be cooled. the mass is subject to cooling by its own radiation but cannot be subject to heating due to external radiation means the prism is arranged in such a novel manner that it allows the heat from mass to escape outside but the outside heat is not allowed to reach the mass due to total internal reflection by the prism. Means the energy radiated by the mass is more than the energy absorbed by the mass thereby the temperature of the mass keeps on decreasing till a new equilibrium is attained. The novel arrangement of plurality of fin allows only that radiation which makes an angle of incidence more than critical angle on the plurality of prism such that all such radiation is subject to total internal reflection and all other radiation is obstructed by plurality of fin.

We claim:-

1. a device and process for passively cooling thermal mass comprising; construction of double walled insulated sheet in which the air within the space of double walled insulated sheet is evacuated to minimize conduction and convection and is mounted on and covered by a novel arrangement of plurality of prism where plurality of prism are arranged in linear or circular or any geometrical pattern and further mounted on and covered by plurality of fins where the fins are arranged in linear, circular or any other geometrical pattern in the form of projected fins or perforated holes in the sheet so as to expose the plurality of prism and such composite sheet formed by the said arrangement means the device and the said device fully or partially encloses the mass in the container to be cooled means mass is subject to cooling by its own radiation but is not be subject to radiation due to external source and the said arrangement of device is arranged in such a novel manner that it allows radiation from said insulated side means angle side to escape towards the plurality of the fin side means hypotenuse side but does not allow the radiation from plurality of fin side means hypotenuse side to reach insulated sheet side means angle side due to total internal reflection by the plurality of prism means the energy radiated from the insulated sheet side means the angle side is more than the energy transmitted from the plurality of fin side means hypotenuse side energy radiation absorbed by any mass on the insulated side means angle side is less thereby the temperature of the said mass keeps on decreasing till a new equilibrium is attained and further the novel arrangement of the plurality of fin allows only that radiation which makes an angle of incidence more than critical angle on the plurality of prism such that all such radiation is subject to total internal reflection and all other radiation is obstructed by the plurality of fin and furthermore the when the device orientation is reversed means plurality of fin means hypotenuse side is facing the said mass and insulated sheet means angle side is facing outside source the said mass receives more energy radiation thereby increasing the temperature of the said mass means the energy radiation from the said mass means radiation is reflected back to the said mass itself and further the radiation from outside source is also absorbed by the said mass means mass receives more energy radiation than energy radiation lost means mass temperature increases.

2. The device for passive cooling of the mass according to claim 1 comprising a transparent vacuumed doubled walled insulated sheet forming container includes any conventional shape.
3. The device for passive cooling of the mass according to claim 1 comprising a transparent double walled vacuumed insulated sheet having space and includes the said space being filled up by suitable gas which minimizes conduction and convection.
4. The device for passive cooling of the mass according to claim 1 comprising a transparent double walled insulated sheet includes a single wall suitably thick thermally insulated transparent sheet.
5. The device for passive cooling of the mass according to claim 1 comprising plurality of prism wherein the prism includes linear, circular or any other geometrical pattern depending upon manufacturing process.
6. The device for passive cooling of the mass according to claim 1 comprising plurality of prism wherein the size of the prism includes all possible sizes depending upon the manufacturing process.
7. The device for passive cooling of the mass according to claim 1 comprising plurality of prism wherein the material of prism includes any transparent material depending upon manufacturing process.
8. The device for passive cooling of the mass according to claim 1 comprising plurality of prism wherein the refractive index of prism includes any value depending upon the material and design.
9. The device for passive cooling of the mass according to claim 1 comprising plurality of fin includes a perforated sheet of suitable geometry and thickness as per claim 2 to 8.
10. The device for passive cooling of the mass according to claim 1 comprising plurality of fin wherein the number of fin of perforated holes is related to number of prism as per claim 2 to 9.
11. The device for passive cooling of the mass according to claim 1 comprising plurality of fin wherein the dimension of fin includes any possible value depending upon refractive index of plurality of prism as per claim 2 to 10.

12. The device for passive cooling of the mass according to claim 1 comprising plurality of fin wherein the material of the fin includes of any suitable material depending upon the manufacturing process.
13. The embodiment formed by material means device as per claim 1 to 12 means a suitable composite sheet comprising insulated sheet, plurality of prism and plurality of fin.
14. The embodiment as per claim 1 to 13 includes plain bent sheet or pane to cover a window, door or any opening of houses, room, industrial establishments as well as residential buildings.
15. The device formed as per claim 1 to 13 includes totally or partially covering the enclosure as per claim 14.
16. The device for passive cooling of the mass according to claim 1 to 15 comprising plurality of fin wherein the cooling of fin includes natural, forced cooling.
17. The device for passive cooling of the mass according to claim 1 and recited in claim 2 to 16 and as described and illustrated in preferred embodiment includes covering the said device by suitable transparent material sheet to protect the embodiments.
18. The device for passive cooling of the mass according to claim 1 and recited in claim 1 to 17 and as described includes the reversing of device to reverse the process of cooling to heating of the mass.
19. the device for passive cooling of the mass according to claim 1 and described in claim 2 to 18 includes the coating of device surface with suitable reflecting or absorbing coating to improve its efficiency.
20. The device for passive cooling of the mass according to claim 1 and recited in claim 2 to 19 and as described and illustrated in preferred embodiment and ascertained the nature of this invention and the manner in which it is to be performed and revealed in diagram of figure 1A, figure 1B, figure 1C, figure 1D, figure 1E, figure 1F, figure 1G figure 1H figure 2A, figure 2B, , figure 2C, figure 2D, figure 2E, figure 2F, figure 2G figure 2H figure 3A, figure 3B, figure 4A figure 4B.

Date:-8th day of December
S/d

3mgala Vises Tullhrom

Sheet 4/1.

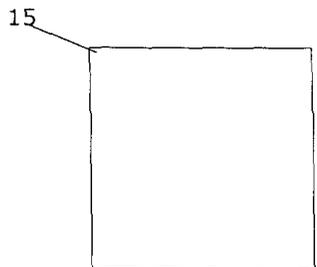


Figure 1G

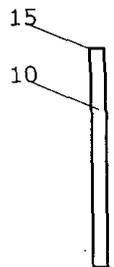


Figure 1H

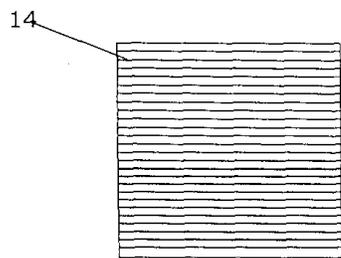


Figure 1E

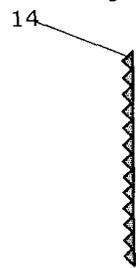


Figure 1F

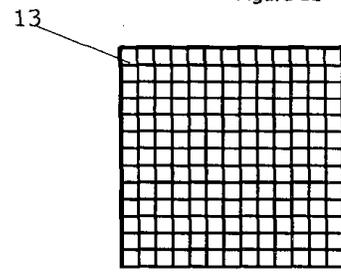


Figure 1C

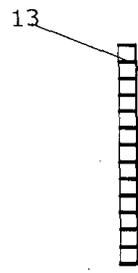


Figure 1D

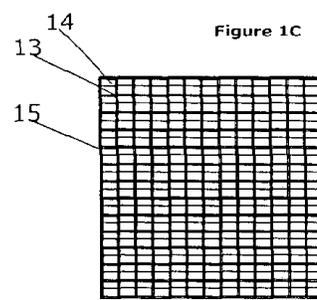


Figure 1A

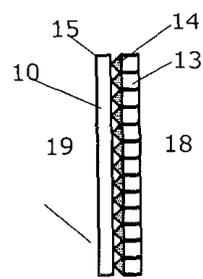


Figure 1B

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21 DEC 2009

Singale Vijay Tulshiram

Sheet 4/2

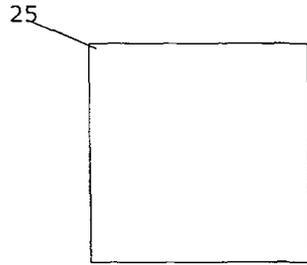


Figure 2G



Figure 2H

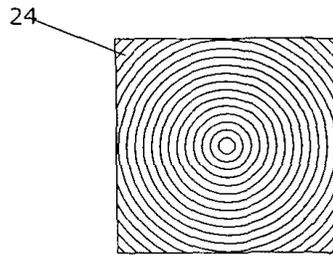


Figure 2E



Figure 2F

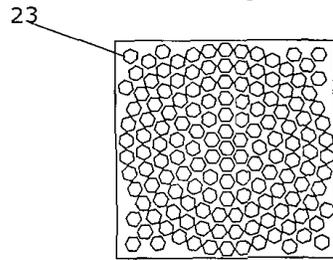


Figure 2C



Figure 2D

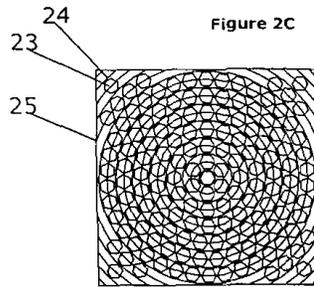


Figure 2A

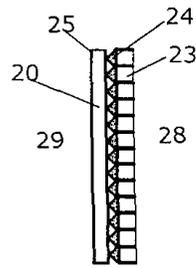


Figure 2B

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21 DEC 2009

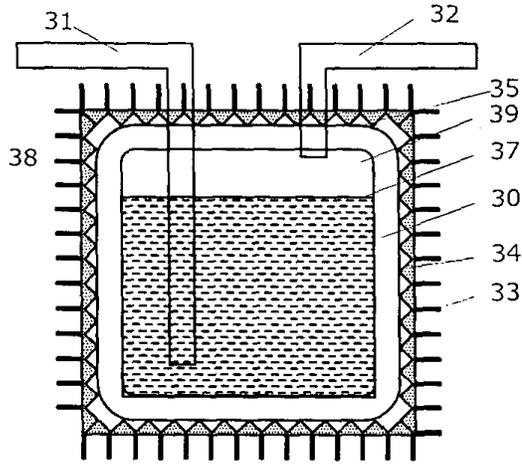


Figure 3A

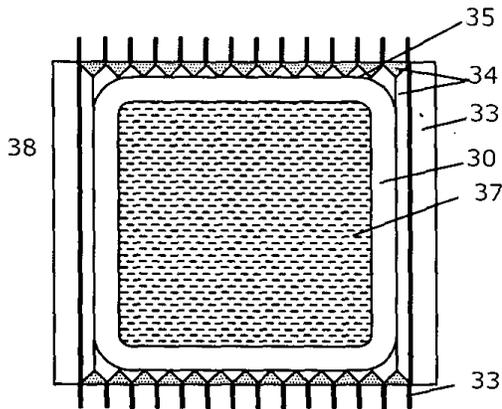


Figure 3B

21 DEC 2009

Engal

Angelo V. Jay, Full Invention.

Sheet 9/9.

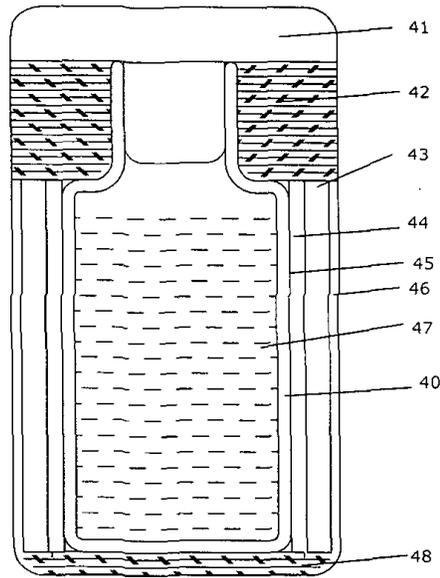


Figure 4A

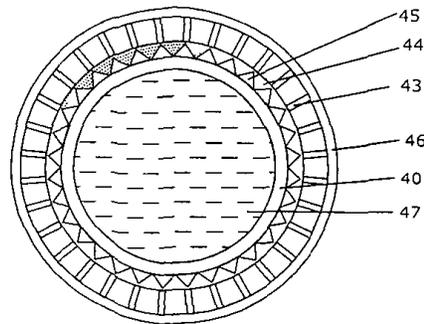


Figure 4B

Angelo V. Jay

'21 DEC 2009

FORM 3
THE PATENT ACT 1970
(39 OF 1970)
AND
The patent rules, 2003
STATEMENT AND UNDERTAKING UNDER SECTION 8
(See section 8; rule 12)

We

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout, camp, Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout,camp,Amravati- 444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout,camp,Amravati- 444602

Hereby declare:-

(i) That we have not made any this application for the same /substantially the same invention outside India.

Dated this 8th day of December 2009

Signature

To
The controller of patents,
The patent office,
At Mumbai.

FORM 9

THE PATENT ACT 1970
(39 OF 1970)
AND
The patent rules, 2003

REQUEST FOR PUBLICATION
(See section 11-A (2); rule24-A)

We

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602

Hereby request for early publication of our application titled "A device for passively cooling a thermal mass" attached herewith the application under section 11(a) 2 of the act.

Dated this 8th day of December 2009

Signature

To
The controller of patents,
The patent office,
At Mumbai.

FORM 18
THE PATENT ACT 1970
(39 OF 1970)
And
The patent rules, 2003

(FOR OFFICE USE ONLY)

Application number:
filing date:
amount of fee paid:
CBR NO:

REQUEST FOR EXAMINATION OF APPLICATION OF PATENT

[See section 11-B and rules 20(4)(ii),24-B(1)(i)]

1. APPLICANT

Name	Nationality	Address
Ingole Vijay Tulshiram	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Ashutosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602
Ingole Paritosh Vijay	Indian	104 Ganediwal layout,camp,Amravati-444602

We hereby request that our application for patent titled "A device for passively cooling a thermal mass" attached herewith the application shall be examined under section 12 and 13 of the act.

Address for service: - 104 Ganediwal layout, camp, Amravati-444602.

Dated this 8th day of December 2009

Signature

To
The controller of patents,
The patent office,
At Mumbai

ABSTRACT

The present invention concerns a device for passively cooling a thermal mass comprising a novel arrangement of a transparent insulated sheet, plurality of prism and plurality of fins, which is non-polluting, passive, reliable, of simple design, simple to use, economical, compact, noiseless and can be used for both large scale industrial installations and for domestic application including homes, houses and rooms. It comprises a double walled vacuum transparent sheet on which plurality of sheet prism are fixed over which a plurality of fins are mounted. The said arrangement by the combination of insulated sheet, plurality of prism and plurality of fins is hitherto called 'device'. The said device is in the form of a plane sheet and can be bent to enclose any volume. The said device works in such a manner that any radiation from one side refracts through it to other side whereas the radiation from other side refracts back to the same side due to the total internal reflection. Thus if a thermal mass is kept on one side shall cool itself as it will be shielded from external radiation from other side. The said device is further revealed in diagram of FIG 1A, FIG 1B, FIG 1C, FIG 1D, FIG 2A, FIG 2B, FIG 3A and FIG 3B which is provided along with the application.