تمت الترجمة بمعرفتي وعلى مسؤوليتي

# EXPANSION MOTOR

**Paragraph 1. :** **Title of invention: EXPANSION MOTOR**

**Paragraph 2.:** **Technical description of the invention:**

## A. Technical condition:

Several methods and machines were developed to meet man's needs and save his efforts. These were called engines or motors; of these we mention:

1. The Rotary water mill: rely on the water energy.
2. Wind mill : rely on the wind energy
3. The steam engine for **James Watt**
4. The Electric Motor for **Michael Faraday**
5. The gasoline engine for **Nicholas OgestOtto**
6. The diesel engine for **Rudolf Diesel**
7. The thermal engine for **Robert Sterling**
8. The Jet engines
9. The waves and tidal scraper motors ... Etc.

Today we present a new type of motorsthat we name:

**The expansion motor ofTarek Soukar**

**Preface**: The discovery of fossil fuels (cool oil and gas) leaded for all kinds of combustion engines.However, after more than 100 years of use they startedconsuming the sources of this fuel which had harmful effects to the environment like pollution and global warming.This created the necessityfor an engineof a clean and renewable energysources and motors that can make good use of these resources, save the fossil fuels and keep it long for future generations.

- **The situation before access to the invention:**

All thermal engines burn oil and converts some of its power into mechanical energy but loses the remaining into heat , and what we 've been working on for years is ( getting the benefit of already existing heat to convert it into mechanical power whether this heat was from the sun orfrom machines ).

**Important note: The ExpansionMotoris not limited to solar power , but this power is the first candidate to run this motor in the future.**

This is not a new application of already existing idea, nor it is an improvement for a technical method. This is an absolutely new idea for something that did not exist before.

The transaction resulting from thermal expansion has already been used in manufacturing thermal cutouts , electric types , and thermostat installed in the cooling circuits in order to stifling or opening, but no one thought of making this movement **continuous** for what was believed to be small or slow.

In mechanical studies on heating or cooling , we used to concentrate on the importance of thermal expansion and contraction, and absorbing or compensating it in tanks due to its being**a huge mechanical energy**that may crash the whole system.

On the other hand, structural thermal studies for buildings and bridges also concentrated on the importance of thermal expansion and contraction because it might cause a collapse due to its**enormous kinetic energy**.

- **The problem that existed:**

  All combustion engines and even electrical motors are heat diffusers, expensive, limited in power, weak returns, they need high precision in manufacturing, and bear great heat and pressure, which areexclusive for advanced industrial countries.While we seek to get motors which converts existing heat into continuous motion.

- **How to solve these problems by this invention ?**

This expansion engine is an industrial scientific environmentalbreakthrough in generating power, it will operate under normal temperatures, low pressure, and even poor industrial technology

I clearly say:

As gasoline engine consumes fuel in rotation
As diesel engine consumes diesel fuel in circulation
As sterling engine consumes heat in circulation
As electric motor consumeselectricity in rotation
Our invention consumes expansion and contraction - caused by temperature changes - in rotation Providing a kinetic power in a unique case that was not previously applied.

The expansion or contractionwhich represents a kinetic mechanical power converted from a thermal energy is just what we need.

- **The new in this invention:**

1. The Idea: to make use of the thermal expansion in creating motion.
2. Design a mechanism which will make this motion continuous ( our engine).

Next is : the detailed explanation of the inventionthen a miniature application of this principle which proves it, and demonstrates the idea and the efficiencyof the invention.

## B- Detailed explanation of the invention:

This new invention is an expansion engine not explosion or combustion, it converts heat (or coldness) into work (motion) ,the following is a detailed explanation:

Let's say we have a group of cylinders (C1, C2, C3, ..., ...) withgood absorption of heat, cylinderscontain inside an element (L) with a large volumetric dilation coefficient , the cylinders are connected to pistons (P1, P2, P3, ..., ..., ...). , and totransmissionbeams i.e. plungers ( B1 ,B2 , B3 , …… ) , and they are allfixed on arotatable block. ( Fig 1)

Cylinders at the top are exposed to solar heat .While, Cylinders down are drowned in a cooling pool.If we call The cylinder existedin the area exposed to heat**the active cylinder**C1, the expansion will push the related**active piston**P1and the **plunger** B1.

If we appropriately locate a slantedwall (A) fixed on the axis of the rotatable block, the plunger B1 will strike theslanted wall( A ), which will lead to a reaction force that pushes the plunger,cylinder, piston, and the whole rotatable blockto round them all about the axis.The rotation will start and will place a new group of **(cylinder C2 , piston P2, and plunger B2)** in the area exposed to heat. the action will happen again and again.

To reduce the friction with the slanted wall , a cylinder bearing can be added on top of each transmission beam sliding on the slanted wall .

A cooling stage is needed to return the piston to its principle position , Here we can improve the design of the slanted wall to a helical wall to give another reaction force during the contraction phase which is another rotating force in the same direction .

The fact that the collection of these cylinders plungers and Pistons fixed on rotatable blockwill give usa continuous rotation which Is simply : (The expansion Motor).

For solar power driven motor we can add a parabolic reflector mirrors to concentrate the solar heat on the position of the active cylinder. ( Fig 2)

- **application areas:**

Generators,Vehicles , Cooling circuits, Pumps , Blenders.... Etc.

- **Economic feasibility:**

The low cost of manufacturing and maintenance of this invention, and not spending any consuming cost makes this invention economically privileged.and easily spread to every consumer of energy which will bring countless benefits. Most importantly ; the estimated cost of the expansion Motor will not exceed the overall cost of any generator fixed to it.

## Paragraph 3. Drawings and diagrams:

( Fig 1) The Expansion Motor of Tarek Soukar

( Fig 2) The Motor with parabolic reflectors

( Fig 3) The miniature application ( plan )

( Fig 4)The miniature application ( parts )

( Fig 5)The miniature application ( The action )

( Fig 6)The miniature application ( photo )

## **paragraph 4. Claims (claims) to be protected**:

1. Main claim : The invention is a method or device converts the expansion ( or contraction) of objects or liquids into rotational movement ( motor), it consists of one group or more of (a cylinder and a piston) , these arerotatableand driven by the kinetic energy caused by **thermal expansion or contraction** not explosion or combustion.
2. Dependent claims: the invention mentioned in the main claim contains a mechanism features a movement restores itself each time .
   The mechanism contains aslanted wall, the slanted wallcausea reaction forcepushes the active parts from the active position to place another parts in their position this restores itself each time.
3. Independent claims: the possibility of utilizing existing heat whether natural or artificial and interoperability with renewable energies such as solar and ice cooler .

## Paragraph 5. Summary of the invention:

The invention is a method or a device that converts thermal expansion or contraction of objects or liquids into action.

It consists of a set of cylinders containing the active ingredient (substance orexpansion liquid) each of the cylinders is connected to an arm and a motionelement (or a piston lever). All are assembled on a rotatable block .

When one of the cylinders is exposed to a change in temperature, thekinetic power-caused by liquid's stretching or shrinking-pushes the connected arm to collide with a slanted wall. This slanted wallis designed to provide a reaction moving the arm with its cylinder and piston to place a new group of (piston-cylinder- arm ) in the place of the previous. So the motion is recreating itself again and again.

## Paragraph 6. References used:

Damascus University publications: (1975-2015)

- Hydraulics (1-2): Dr. M-Akkel
- Theory of machines: Dr. S-Obeid, Dr. Alex-Amghe
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- Introduction to Renewable Energies: Dr. E-Hamzeh-Dr. K-Naji-Dr. S-Al-jabi
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- Hydraulic Controls Regulations: Dr. Gh-Haddad-Dr. m. A-Gh-Khadur
- Engineering Economy: Dr. N-Abu-Saleh-Dr. M- A-F-Abu-Bakar,
- Production engineering: Dr. M-E-Salame

Al Baeth University publications: (2008-2009)

- Principles and Applications of Thermal Solar Energy:
  Dr. R-Georges Dr. W-Naeme
  Dr. T-Kasem Dr. M-Saegh
  Dr. R-Almasri Dr. S-Ajeeb**.**

## paragraph 7. Documents deposited:


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2. Technical description of invention----------page 1

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