Goal: create the energy
How: find a theoretical counter example where the energy in a closed device is not constant.
Device: theoretical with some characteristics to limit the calculations

Cycle: it is not a cycle, I study just the deformation of the device, the energy must be conserved all the time, so even in a deformation the energy must be conserved. I took an example for the deformation, from 45° to 90° in reference to the ground.

Composition:

- one container, example of dimension: side of 1 meter, the container is closed (6 faces)
- one big disk (white color), example of dimension: radius of 10 cm
- N spheres (blue color), example of dimension (radius) 1e-6 m (very small so N is very high)
- N springs, force doesn't depend of the length, the springs attract. The force of the spring is a force for a surface, the surface of the sphere.
- One layer of blue spheres to keep constant the volume when the white disk rotates

Characteristics:

- No gravity
- Isolated device (closed)
- No mass
- No friction
- All volumes are constant
- Three dimensions device but only one layer of blue spheres (the blue sphere has a radius not null)
- The springs can be outside the container or imagine them without a volume

The main idea of the device:

NB: I speak about top, bottom, ground, it is only to explain the drawings, there is no gravity.

I use small theoretical spheres and springs to create a theoretical fluid and pressure like gravity can do with water. The blue color is like water, except there is no mass and no friction. And the springs attract the blue spheres like gravity can do, but with the springs I change the orientation of the attraction to be like the Wall1. I count all the energies, the sum of all energies must be constant. There is one spring for each blue sphere. Each spring is attached between a fixed point on the green line and a blue sphere.

It is possible to think with pressure, exactly like pressure in water with gravity.
Example at start:
- at top, at right the pressure is zero
- at bottom, at left, the pressure is maximal

The device DON'T DEFORM ITSELF alone, I imagine I control all the walls, all the springs, all the blue spheres, the white disk, etc. with a theoretical external device, this device count the energies needed to move something or the energy it can recover. This external device which control all the device is there only because the closed device is unstable. So, in theory I don't need this device IF I imagine the deformation like I want.

The small spheres are like the molecules of water and the springs are like the gravity. With gravity of

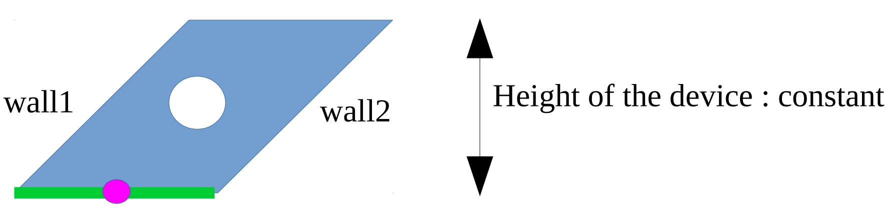
Earth for example, I cannot change the orientation, but I need to do it, so for that I imagined the springs, ideal springs to attract the spheres like gravity can do. When an object is put in water under gravity (on Earth for example) the object has the principle's Archimedes on it (buoyancy force), here it is the same principle but with the spheres and the springs. Note, I need to keep constant the orientation of the springs if I want to use the simple laws of pressure of a fluid under gravity.

<u>Movements</u>:

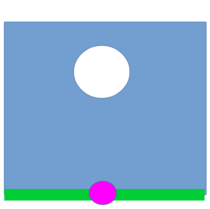
- the container is deformed, but the height is kept constant, the container has 4 sides (side view), one is fixed: the bottom (green color). The green side is fixed to the ground. Don't forget, the container is closed, it has 6 faces.
- the white disk rotates around the magenta point
- the springs follow the slope of the wall 1 (the wall 2 has always the same slope as the wall1), at start the springs have a slope of 45° from the ground and at final the slope of the springs is 90°. Again, the force of the springs is constant, don't depend of the length.
- to rotate the white disk, I need to move out the container a layer of blue spheres: the layer at left of the white disk (between the wall 1 and the white disk), and I need to move in a layer of blue spheres at right (between the wall2 and the white disk), and it must be very precise, because at each time, the volumes are constant, all the volumes. Sure, for that I need an extra layer of blue spheres, it is not drawn. Note, I need to have an extra layer of spheres, because when I move out the spheres, I need to move in the same quantity of spheres inside the container, but it is not possible without an extra layer because I move in elsewhere I move out.

NB: all the views (drawings) are front, except when I indicated.

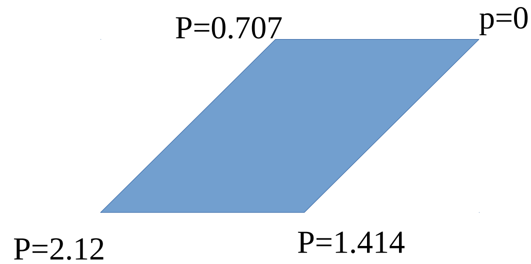
<u>At start the device is like that:</u>



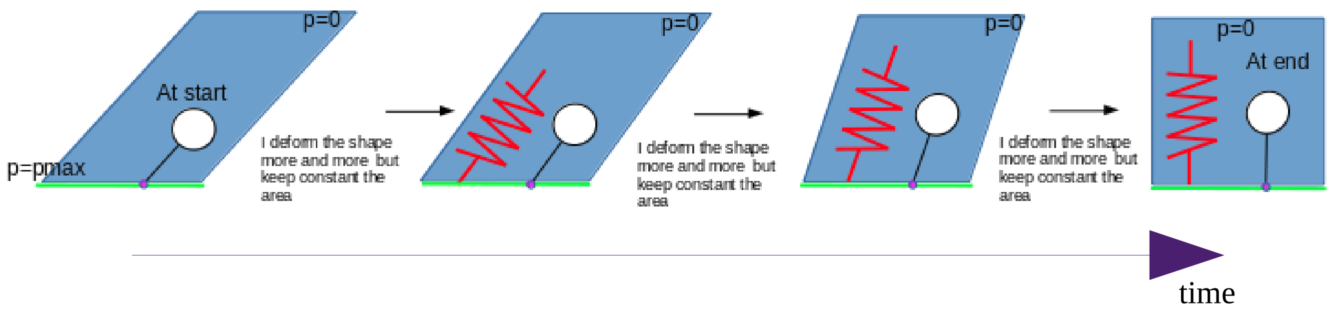
<u>At final the device is like that:</u>



At start, an example, with the pressure at for points (corners), a pressure different of zero exist all around the container, except at top right corner:

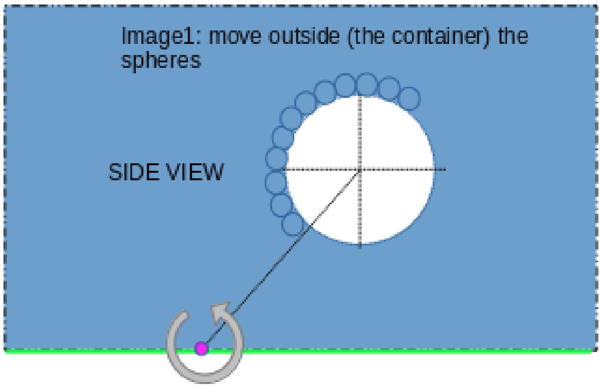


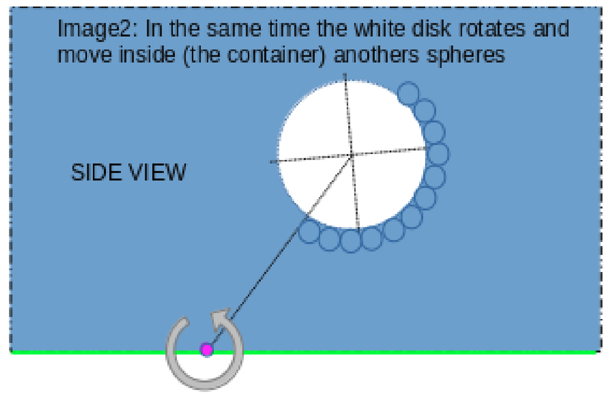
The deformation of the device is like that:



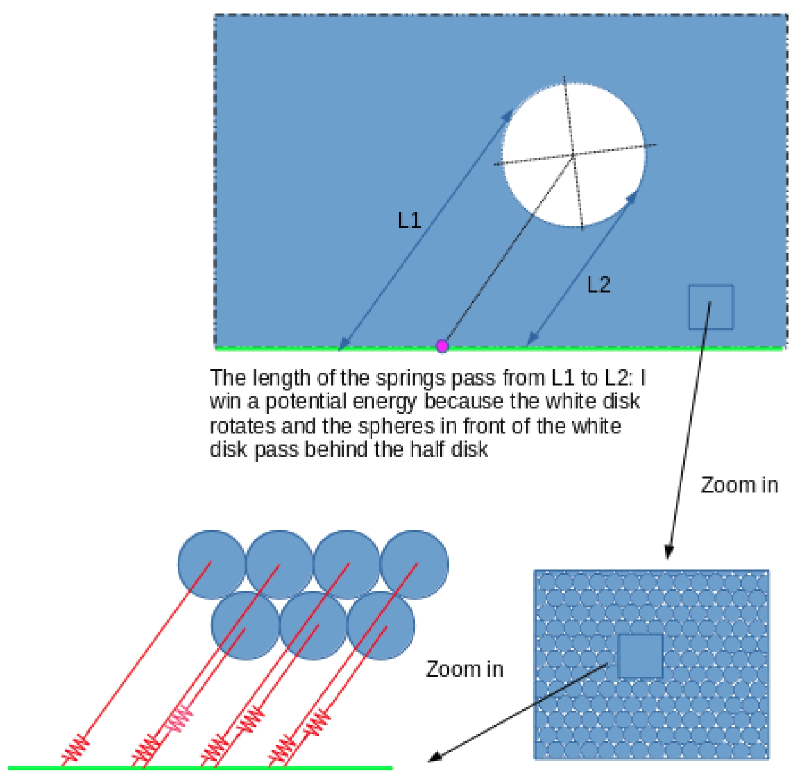
I drew a big spring, to show how the orientation of the springs change when the device is deformed. All the springs have the same angle from the ground. At final (right), the angle with the ground is 90° for the springs. I drew the device in time, the device doesn’t move in translation !

I didn't draw all the device: the white disk rotates, so I need to move outside the container one layer of blue spheres (the layer between the wall1 and the white disk) and in the same time, to keep constant, I need to move inside the container the same quantity of the blue spheres. Note, it is possible to keep constant all the volumes, because I use spheres:



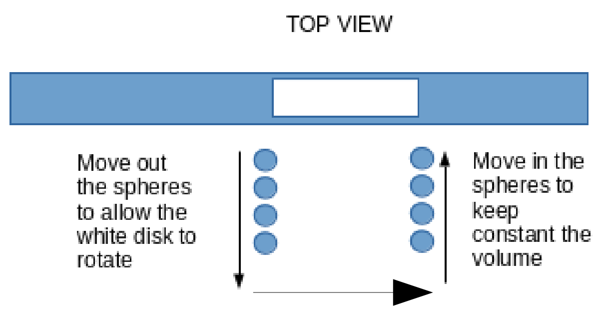


<u>The following drawing shows details inside the container, some zoom in, to show details:</u>



Note, the lengths L1 and L2, L1 > L2.

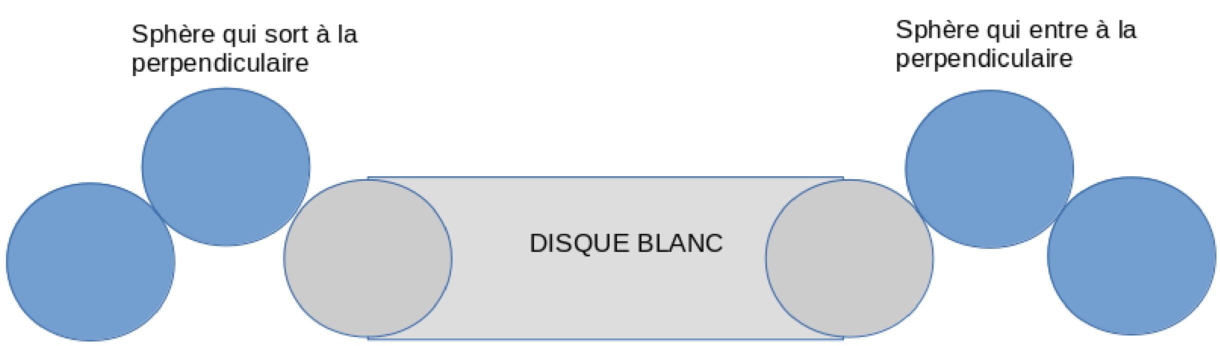
The following drawing shows how I move outside and inside the container the blue spheres to keep constant the volumes and to allowing the rotation of the white disk. There is one extra layer of blue spheres because the spheres I move out the container, I move them inside just the next step:



Movement of the spheres:

The spheres move out at the perpendicularly of the device. Note:

- the walls rotate in the same time I move in / out the spheres
- there is always a layer of the spheres outside, from each layer I recover an extra energy
- I need to control the speed of move in/out the spheres
- to have a force always perpendicularly of the container I need to have two ends of the white disk like that:



The sum of forces on the container without the white disk:

With the axis ‘x’ the abscisse and ‘y’ the ordinate.

The sum of forces is well at zero. Example with a force constant equal at 1/length N/m².

The springs give on the green line a force Fx=√2/2 N and a force Fy=√2/2 N
The wall up gives a force Fy=integrate x/√2 dx from 0 to 1 = 0.35355 N
The wall down gives a force Fy=- integrate √2+x/√2 dx from 0 to 1 = - 1.7678 N
The left wall gives a force Fx=integrate x/√2 dx from 0 to √2 = √2/2 N and a force Fy=- integrate x/√2 dx from 0 to √2 = -√2/2 N
The rigth wall gives a force Fx=-integrate (1/√2+x)/√2 dx = - √2 N and a force Fy= integrate (1/√2+x)/√2 dx = √2 N

The sum is 0 N in axis x and y.

<u>The sum of forces on the all device, with the white disk:</u>

The white disk adds a buoyancy force like Archimede's force and this force is canceled by the force from the springs on the green line because there are less springs because there is no blue spheres where there is the white disk.

<u>The sum of energies:</u>

1/ I need to demonstrate the energy is only in the potential energy from springs and in the work of the work WHEN there is no white disk. So iImagine the device without the white disk, and without move in/out the container the blue spheres, the sum of energies is well constant, I calculated with an example. I have :

the sum of energies is S = X-W-Y but X=W+Y, so the sum of energies is zero

X is the potential energy at start, from the springs
Y is the potential energy at final, from the springs
W is the energy from the walls 1 and 2

With a length of one meter for the base of the device and with a force constant equal to 1/length N/m, it is easy to have the potential energy at start it is sqrt(2)/2 J and at final it is ½ J. The wall at right need an energy equal to:

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \int_{0}^{\frac{1}{\sin(x)}} y\,(-y + \csc(x))\, dy\, dx = 0.191299$$

The wall at left gives the energy of:

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \int_{0}^{\frac{1}{\sin(x)}} y\,(-y + \cos(x) + \csc(x))\, dy\, dx = 0.398406$$

The sum of the energy gives by the walls is the same the energy lost in the potential energy in the springs.

The springs change their length inside the container, but it is like move up or down a molecule of water inside a container full of water under gravity: it costs nothing (or give nothing). Because, the buoyance force from Archimede is the same than the force from the spring.

2/ Now, I have the white disk. The white disk rotates, so it doesn't need an energy and it don't give any energy. To move in/out the blue spheres I don't need an energy or it doesn't give any energy: I count here the energy needed or given from the pressure not from the springs (potential energy). In the contrary, there is a lower potential energy at start X-d and at final the potential energy is also reduced Y-d because there is less blue spheres where there is the white disk, so less blue spheres mean less springs, so less potential energy, the equation becomes:

X-d=W+Y-d

Note, the values of X, Y and W are the same as in the case 1/

The sum seems to be constant like that, but when I move in/out the blue spheres to let the white disk rotate, I win a potential energy from the springs. Look at the drawing where I noted the length L1 and L2, the springs passed from L2 to L1 with L2>L1. There is an extra energy, I called 'e'.

The equation is :

X-d < W+Y-d+e

The sum of energies is:

S = X-d-W-Y+d-e = X-W-Y-e or X=W+Y so the sum of energies is 'e' it is a creation of energy.

<u>Estimation of the energy ‘e’:</u>

I took the side of the container of 1 m, so I can take a radius for the white disk at 0.1 m.

The mean of the difference of the length of springs is 2*R*tan(x), so I need to integrate from π/4 to 0, the result is 0.069 but I need to multiply by the surface to have the force. The surface is 2R*π/4=0.0157. So the potential energy is 0.346*0.0157=0.001 J.

So the potential energy lost by the springs (final state less initial state) is 0.207 J
The energy won by the walls is 0.207 J
The energy win by the springs of the spheres that move out/in is 0.001 J