

Outdoor Grill is a product development project, developed with 2 peers from scratch as part of our CAD exam. It was designed and validated using CATIA v5.

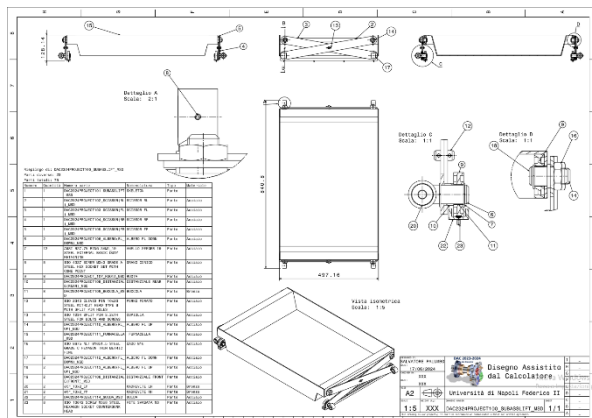
The main idea of the project came out from a very simple (personal) requirement, the need for a barbecue which allows to change the distance between the grill and the fire.

Hierarchically, the project is structured in 3 main assembly:

- The roller chain assembly
- The scissor lift assembly
- The supporting frame assembly

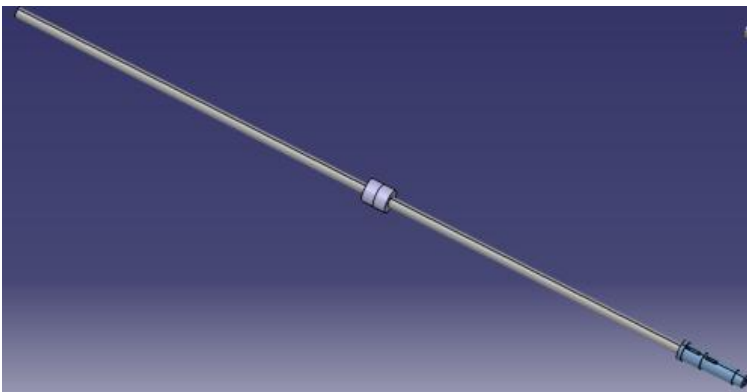
The 3D model was designed using a Top-Down approach, so for each of the assembly has been created a skeleton containing all the geometrical references, controlled by a certain number of parameters. This approach gave us much control over the project, giving us a great percentage of degree of freedoms in the changing of the parameters (without further adjustments from our side).

I personally designed the scissor lift assembly:

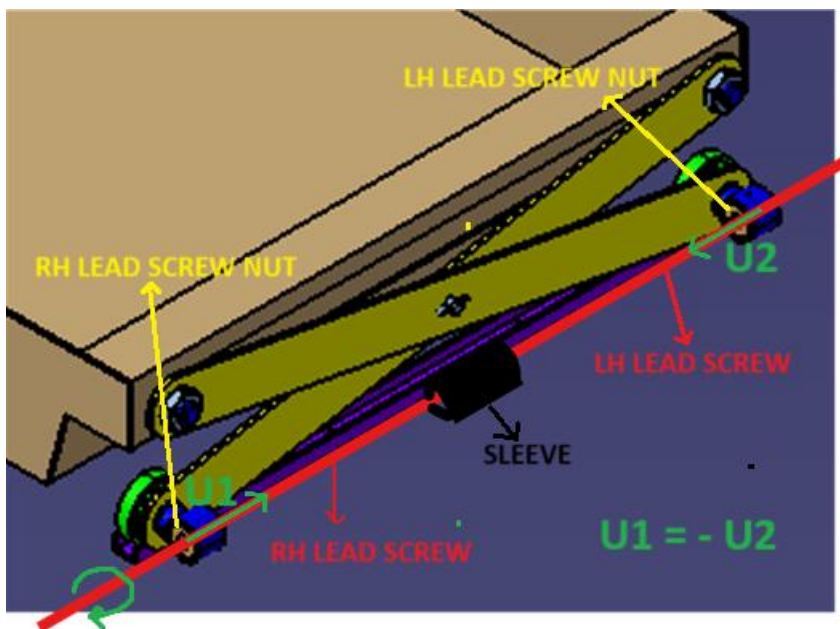


Compared with standard scissor lift, where due to the two shaft rotations we have that one side of the scissor lift remains fixed while the other one move, ad done in this first hand made prototype (with the help of my father):

In our case, due to space limitations, was important that the center of gravity of the basket where is place the charcoal remains always in the same position. For this reason, I implemented a double trapezoidal lead screw, one righthand screw and the other lefthand (of the same pitch ), joint by a mechanical sleeve.



Of course for any of the two lead screw, there is a lead screw nut (one righthand screw and the other left) connected to the two blade of the scissor:



With this system for every rotation of the lead screws we have two displacements in the lead screw nut of the same magnitude but in opposite direction.

As shown in the figure the mechanism of translation has been designed to make it smooth with a wheel which slips on guide connected to the frame of the barbecue.

The system has been simulated kinematically only in the chain as ca be observed in this video.

While structurally was simulated on the frame:

Unfortunately, due to the fact that it was not required, and due to time limitations we have not been able to have a physical prototype of the entire system.