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## THE SMART DESIGN OF AN ELECTRICAL HOUSEHOLD APPLIANCES – IRON

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**Abstract:** Through designing standards and technological development, electrical household appliances are manufactured by respecting well defined and regulated parameters. In order to fit into our current environment these appliances should be manufactured using efficient technologies that imply lower costs and lower amounts of energy. The performance of the appliances is targeted through continuous development and transformation. The quality of all electrical appliances is a decisive factor in creating the features that aim to make our life better. In this article, we present the intelligent appliance named – iron.

**Keywords:** Design, home appliances, iron, innovation, project

### INTRODUCTION

This article aims to present the designing process of an electrical appliance. This project was proposed during the „Electrolux Design Lab” contest for the year 2013. Looking into the recent past, soon after the year 1989 some poor quality appliances were sold on the Romanian market. This situation was caused from carelessness but also because of the manufacturer’s failure to consider highest quality standards.

If we follow the idea of continuous development in the process of designing and building appliances, we have to determine producers to be aware of the necessity for using an adequate quality standard. This way, our environment is also protected.

In order to increase the performance of appliances, producers should use modern and efficient materials and production systems [1], [2]. Nowadays, the market offers a wide range of appliances, for example the modern iron. This machine is a tool used for smoothing out clothing or fabrics by hot pressing. This ironing operation loosens the links between the long molecules of the fabric. Also, taking into account the weight of the machine, the fabric shall be smooth and cooled in the desired shape. Some fabrics like those made of cotton need some added water in the process so that the molecules can be loosened.

In the current business environment, consumers are increasingly fastidious and competitors are fiercely fighting to harness new ideas, innovative products and services [3]-[7]. Hence, this article is presenting a new product design for household iron series.

### HISTORY

In China, starting with the first century, metal pots filled with charcoal were used for ironing. In Europe, triangular cast iron plates were used starting with the seventeenth century. Afterwards, charcoal filled cast iron flatiron appeared. The electrical iron was presumably invented in 1882 by Henry W. Seeley. The first iron with thermoregulator was launched in 1920. Later, Thomas Sears invented the steam iron and these products were continuously developing.

The steam iron also helped for smoothing and finishing rippled fabrics. Although the steam iron was invented somehow early, it only became popular in the 1940’ [8], [9].

### PRODUCT PRESENTATION – CONCEPT

The underlying concept of this iron represents a rechargeable iron that identifies the fabric structure (using a sensor) and automatically sets the ironing temperature for the specific fabric. Aside of these features, this iron has all the functions of a modern one; images 1-a) and 1-b).

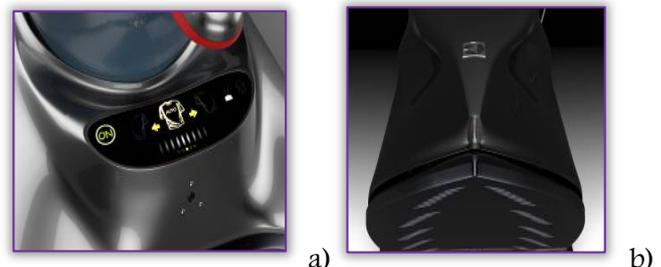


Figure 1 – a) The LCD screen;  
b) The thermoregulatory sensor

## MATERIAL AND METHOD

The 3-D Model was performed using the 3-D Studio Max software; image 2. In the next sequence we present the steps of the modeling process.

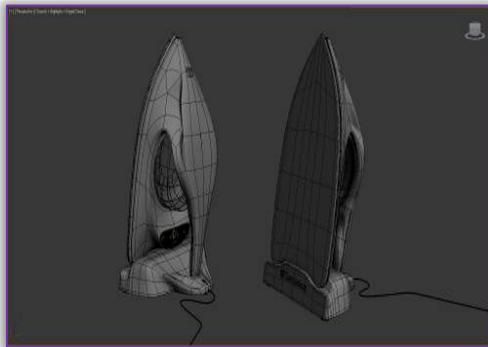
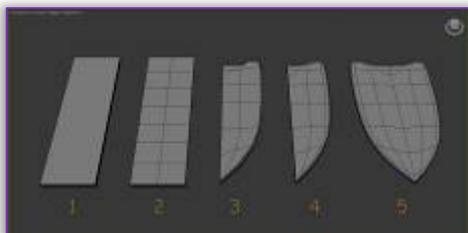


Figure 2 – Product modeling

In order to create the model, basic geometrical forms were shaped in order to accomplish the desired result. In the image of figure 3, we can see how the soleplate was modeled starting from a box (1) and then adding parts using the ‚connect’ function. In the second step, the vertex (3) is modeled alongside with other added parts. In the third step, the ‚turbo smooth’ function was added (4). In the final step the ‚symmetry’ function was used to complete the other half of the model and finish the entire element (5); images 3-a) and 3-b).



a)

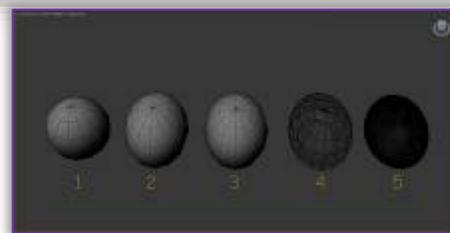


b)

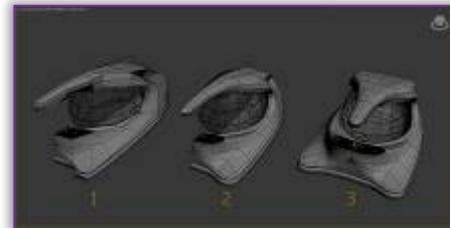
Figure 3 – a/b) Modeling steps - 1

The next image presents the steps of creating the body structure. This element was created starting from the upper part of the soleplate that was shaped on one side of the model. Moving forward, the inner side was erased in order to start the modeling process (3)-(5). Also, turbo smooth and symmetry functions were applied; image 4-a).

The water tank was created starting from the basic geometrical form which is a sphere that was manipulated on the X and Y axes, (3). In the next phase, the inner quarter was cut in order to obtain a flat surface (4). Here, the turbo smooth function was added once more; image 4-b).



a)



b)

Figure 4 – a/b) Modeling steps - 2

As specified earlier, the symmetrical elements have been modeled only on one half. In the image below, the three phase model is presented as following: (1) raw model (unchanged); (2) turbo smooth added; (3) symmetry added (on elements that support the function).

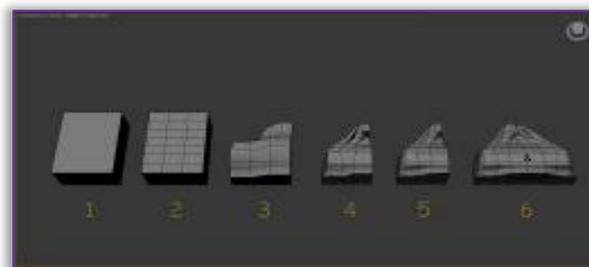


Figure 5 – Modeling steps - 3

In the image above we can see the steps for modeling the iron charging station. This was created starting from a box form that was divided for better modeling purposes. This process is presented in the steps (3),(4). The turbo smooth and symmetry functions are added in steps (5), (6); Image 5.

### TURBO SMOOTH

In this section, the turbo smooth function is explained. In the image below, two perpendicular planes are presented in three phases:

- » In the upper side we have the two perpendicular planes with the turbo smooth function disabled and in the lower side we have the two perpendicular planes with the turbo smooth function enabled. When this function is enabled we can observe how the right angle becomes a curve. This curve is defined by the distance between the edge and the closest line.
- » In order to better demonstrate this effect and obtain a smaller curve, a line on each plane was added between the two planes and close to the edge.
- » In this phase, the lines are very close to the edge and a very small edge was obtained. Here, the

curve is perceived as a sharp edge and the deformation of the two planes is much smaller. To conclude, various phases can be used in modeling in order to obtain the desired shapes, from very sharp edges to very smooth curves, all without the deformation of the initial geometrical form.

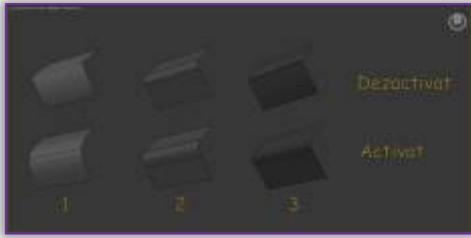


Figure 6 - Modeling – Turbo Smooth

## RESULTS

The chosen iron design is futuristic and has aerodynamic shapes, smooth curves and a quality finish that exposes the structure and features. The ultimate model was obtained by creating elements around the water tank which is the starting point of this design project. The materials used comprise glossy surface plastic and rubber for a better grip on the handle. In the rear side, a touch screen display was added for accessing and utilizing the iron functions. The following images represent 3-D rendering created in 3-D studio Max Software; Image 7.



Figure 7 - Presentation of design product

Launching new products is extremely costly and, for this reason, careful planning is essential. When a new product is released on the market, it already has a history behind it. The process starts from identifying a need or demand which should be analyzed prior to developing the product and creating packaging. Afterwards, the role of marketing and communication strategies sets the future course of development.

Considering that innovation is not an option but a prerequisite, creating new products is a very difficult task and that's why only a few ideas prove to be good enough to attain success in the market. In this case, the proposed item offers remarkable solutions, image 8.

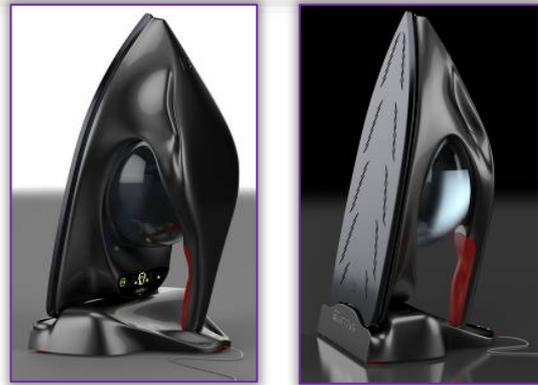


Figure 8 - Presentation of design product – front / back  
In the present time, the customers' demands for increased comfort are manifold so, to offer maximum satisfaction, the new irons are elegant in both design and functional features. The body and structure of the iron emphasizes the differentiation and makes it stand out among similar products, image 9.



Figure 9 - Presentation of design product – front / back

## CONCLUSIONS

The process of designing an iron is a complex activity that comprises multiple steps before accomplishing a state-of-the-art product, like the iron presented above. Knowing that design can be represented at various levels, this iron fits the Product Design category meaning the process was created with regard to both design standards and technical standards. The end product is the result of common efforts from mechanical engineers, designers and marketing specialists.

The product is part of durable goods that are bought infrequently and the buying decision is decisively influenced by the following ratio: price-quality-brand. This specific product is an exceptional electrical appliance that has innovative functional attributes, a state of the art iron in terms of ergonomics, quality and authenticity.

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