

Research Article

Development Design of New Age Food Machinery

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Abstract: Through the analysis of present development condition of our food machinery, the author states her own personal idea about development design of new age food machinery. And then the author makes an exploration on the man-machine factors, the shape design and the color design of food machinery. At last, the emphasis that the modeling design of food machinery should be given has been pointed out and a related development work also should be energetically carried out.

Keywords: Development design, food machinery, man-machine factors

INTRODUCTION

Take a wide view of the development process of food machinery, it is not difficult to discover that those designed more excellently food machineries have already got away from icy cold, boring mechanical face and also got away from the characteristic of disobeying human's nature, but become full of affinity, match appreciation of the beauty and the interest of modern people and occupy more outstanding position in the competition (Jiang, 2011). Food machinery is very important equipment in contemporary food industry. Therefore, at the premise of satisfying the function, carrying on a research, development and design to it, continuously raising its outside quality and satisfying the demand of the market competition, have become an impending problem for the industry of food machinery to deal with Zhan (1999).

In our country, the food machinery is given a high value as well and after the effort of several decades, our food machinery gradually approaches advanced level in the world in the aspect of function design, but in the aspect of modeling design, it still doesn't cause enough value of the insider. In the modeling design, the food machinery exists many problems, such as dull color, improper collocation; huge body, crude lines, inconvenient operation; inappropriate show device to observe etc., (Jiang and Cheng, 2012), which makes some food machineries originally have the same market competition ability as the foreign products, but because of neglecting modeling design, resulting in low outside quality, it makes the whole quality greatly discount (Jiang, 2013). The development design of new age food machinery aims at investigate an effective method of the modeling design of food machinery, thereby raising the external appearance quality and pleasant of food machinery product, strengthening additional value and whole shape effect of product, satisfying the demand of

market competition and creating higher economic efficiency (West and Deng, 2010).

The main purpose of the study is to investigate an effective method of the shape design and color design for food machinery, thereby raising the external appearance quality and pleasant of food machinery, strengthening additional value and whole shape effect of product, satisfying the demand of market competition and creating higher economic efficiency.

MATERIALS AND METHODS

After looking up abundant data about food machinery and arriving at some big factories to carry on on-the-spot investigation, the author sums up some practical methods about the development design of food machinery. Next, the shape design and the color design of food machinery will be analyzed one by one.

The shape design of food machinery: In the shape design of food machinery, above all, the inside quality of food machinery and operator's safety must be ensured. Never only pursue the scale and patten beauty of shape design, so as to reduce the processing accuracy and other technique function index. The various components of food machinery compose of some geometry bodies composed of dot, line, face. The shape design of food machinery is combining the material techniques such as structure and function of food machinery and art contents together, forming a 3D space stereoscopic shape, which has to correspond to art rule, masterly makes use of shape composing principle and masters shape appearance characteristic and forming psychology and vision error of related shape, that is important means to acquire food machinery of generous beauty and novel style (Qiu, 2005). The shape design of food machinery should be scale coordination, balanced steady and take "unity" as



Fig. 1: Food machinery



Fig. 2: Walnut cake biscuit forming machine

king, "change" as assist and the line type has to be simple and generous, giving person with comfort, coordination and felling of dynamic in quiet.

Unity: The unity means that among each component of food machinery, it has same, similar, logical and harmony nature in the shape, line type, color, part, carriage, quality, amount and other aspects. But the change refers to the difference and the contrast of above-mentioned various aspects. The perfect shape has to emphasize unity. But in order to making the image of food machinery different, vivid, attractive, can be entered the variety in the same nature of unity, harmony and integrity to strengthen each other contrast, but the change has to be appropriate, not excessive to avoid huge miscellaneous, chaos and centrifuge, as shown in Fig. 1.

Simplicity: The whole shape design of food machinery should be as far as possible simple and direct to acquire a whole, simple and direct style, which can adopt following two kinds of methods. The first, the body design of numerical control machine tool should apply some basic geometry body, or some more simple curves, curved face, of which shape is rule, simple and explicit, giving person with the deep impression and easy achieving art effect i of simplicity, direct and clear, enrich, abstract, as shown in Fig. 2. Meanwhile,

the manufacturing craft of rule shape is simple and easy to have extensive, high quality and low costly production. The second, adopting the shape design of close type, which not only reduces dust invading, but also covers up main body of food machinery, makes its whole good and attains a simple, direct and clear visual effect.

The color design of food machinery: The color design of food machinery is a comprehensive discipline. Correctly making use of a color will ease the worker's fatigue, raising the rate of production. So in color design, the problems such as vision physiology function and the influence of the color upon the human feelings have to be solved well.

The color is the first vision impression that an object gives person. At the moment of looking, the present thing before person is the effect of color match, that is to say, on the visual effect, the color precedes the shape and is even more attractive than the shape. The color has very strong magic power in modeling art. The different color can produce different mental state and physiology function to person and with the dissimilarity of the person's age, sex, career, race and environment, it has difference. Color not only is indispensable in the art, but also has some bizarre effects, for example the feelings and symbol function that color gives person. To carry well on the color design of food machinery the follow aspects should be considered.

Value the choice of tone: The choice of main tone of food machinery is a problem of very importance, the different tone will form different art effect. In matching color of food machinery, having main tone can seem to be to unify. The color is more little, the main body characteristic is more strong, the decorate characteristic is more good and the external form relation of food machinery is more unify. Contrary, the color matches more much, causing the color more disorderly, so that it is difficult to adjust generally, the main body characteristic is unclear and the harmonious effect is broken.

The choice of tone still needs to notice whether unique beauty. It needs to hold tight people's mental request for the color of food machinery, transform the tone of food machinery to make it produce an unusual attraction, in the meantime, increase the category of tone to satisfy people's fondness for different colors.

Moreover, the base, the body and other big pieces of food machinery are suitable to use a low pure degree color as the main body color and use clear, elegant and clean color to unify overall situation to make the main tone definite. Using little area of high purity color to embellish to make the whole seem to be abundant, change and organic. The whole color generally uses monochrome or two sets of colors, not more than three sets of colors (Fu, 2002).

Match the national characteristic of color: National characteristics of color seems to have formed a kind of international norms, namely, when choosing color, it should avoid using the colors forbidden by countries of sale or consumers. For example, in China, people advocate red and red represents auspiciousness, optimistic and happy (Zhang, 2010). But in some countries, such as Benin, red is regarded as a negative color; In the desert region of Middle East, the nations regard green as an auspicious color, while in France, people avoid using dark green; In Egypt, people often think of the blue as a demon, while in Iraq, Turkey, blue is regarded as the color of mourning and in Syria people like blue. In terms of nation, the Mongolian love yellow, but the Miao and the Uygur avoid using yellow. Therefore, the color design of food machinery could not be separated from the objective reality and the geographical and environmental requirements. It should study the regional difference of color, fully respecting the features of love and taboo for color in different regions and different nationalities. It should use the color loved by people and avoid the color forbidden by people, so that the color design of modern food machinery conforms to the people's aesthetic taste, thereby loved by people and expanding market.

Match the new age request of appreciation beauty: With the progress of the age, the improvement of people's living standard and the increase of cultural art accomplishment, the appreciating beauty standards also change. In a certain period or a certain region or world scope, some colors are popular of people and are extensively popular, becoming the "popular color". The "popular color" has a strong age characteristic, as a result, in a period, it become the color which is used extensively. The color design of food machinery also should sufficiently consider using the "popular color" to accord with the age request.

RESULTS AND DISCUSSION

The profession of food machinery is similar to other professions, requesting people fully consider various factors including physiological and mental factors in development design of food machinery, making the operation simple, labor-saving and accurate and making the work environment comfortable and safe and making work efficiency and work quality of the man-machine system attain superior (Ding, 2005).

The food machinery is a high-tech product, of which the structure is very complicated and usually has a lot of buttons and control plank. People usually think that mastering its operation is very difficult and needing very high technique level and thereby influencing its usage. In consideration of the man-machine factors in design, the humanize control panel should be adopted, which can draw near the distance of person and

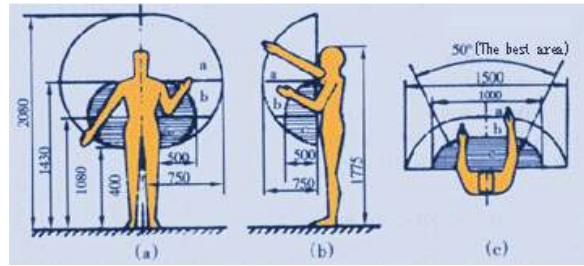


Fig. 3: Range of activity of human arm and hand

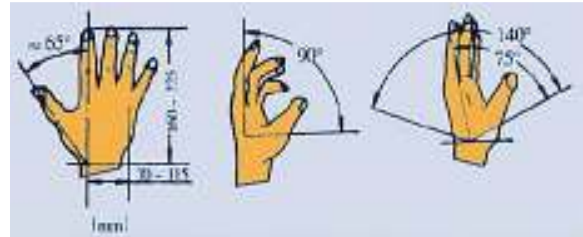


Fig. 4: Structure and range of activity of hand

machine, if considering the design of operation panel from the point of view of person's cognition, it is easy for operator to learn, understand and do a reaction. As a machinery of processing food, in addition to having a high technique, it should infuse deep sensitive cognition into the product. Do not forget giving more concerns and more popular and convenient operation method to operator in design, which makes the product hommization and gives operator with affinity. For example, in the noisy environment, the distinguishing ability of eye to the warm color descends, but the distinguishing ability to the cold color (particularly green) raises on the contrary, which should cause a value in the design of indicating and control device of food machinery. Only hard study in the cognition design of a man-machine interface, endowing thoughtfulness and affection in design process, can raise the friendliness of the product interface and the market competition ability of the product.

The workbench and the operation panel of food machinery are to be provided for person to operate, so their size, position and high should all accord with the size of "average person". For example, the size, position and shape of hand handle in the door of Japanese product all consider the man-machine factors and the diameter much took to be suitable for the size (4~5 cm) that the Asian hand holds and the position of hand handle is in the center partial to the next position in the door, which is as far as possible to make the wrist keep natural state and keep the hand and the small arm in a line. The operation panel is a main interface for man-machine interaction, where person conducts the careful operation of information-based control type, so its position, tilt angle, upper show, the size and position of control device all should make the person observe and operate in a comfortable, accurate and efficient working condition, as shown in Fig. 3 and 4.

CONCLUSION

The above is the idea about development design of food machinery which is presented by the author, aiming at our country current development condition of food machinery, combining the industrial design principle and esthetics rule which should be followed by the modeling design of food machinery. The author makes an exploration on the man-machine factors, the shape design and the color design of food machinery, hoping that the exploration would have a help towards accelerating the development of development design of our food machinery product and hoping that the modeling design of food machinery should cause an extensive value and a related development work also should be energetically carried out.

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