

## Research Article

### Design and Application on Auto-vending Machine for Cupped Beverage

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**Abstract:** The purpose of this study is to design an auto-vending machine for cupped beverage, specifically studying its shape design and color design. The article elaborates that the shape design of this auto-vending machine for cupped beverage should follow the art rule of variation and unity and meanwhile the whole shape still should be simple and direct; the color design of the auto-vending machine for cupped beverage not only should satisfy the request of man-machine coordination and environment and function, but also should value the choice of tone, match the new age request of appreciation beauty and notice novelty. And then the working principle and working process of the auto-vending machine for cupped beverage is introduced, based on which the conclusion has been reached.

**Keywords:** Auto-vending machine, color design, cupped beverage, shape design

#### INTRODUCTION

Take a wide view of the development process of auto-vending machine, it is not difficult to discover that those designed more excellently auto-vending machines 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). Auto-vending machine is a very important partner in contemporary people life. 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 auto-vending machine to deal with (Zhan, 1999).

The auto-vending machine is not restricted within some place, conveniently and quickly. It could sell goods 24 h every day, so it is popular with office workers. Many offices of company are placed auto-vending machines, selling all kinds of goods, from drinks, snacks, cigarettes, candy to the toothbrush and instant noodles. In Japan it even uses the auto-vending machine sell rice, oil and underwear. This way of avant-garde retail has appeared in 65 countries and regions. The auto-vending machine is very popular in developed countries. In Japan, it has 1 million auto-vending machines only in Tokyo and In the whole Japan it has a total of 6 million auto-vending machines of various types, having 1 per 23 people, having 1 per 40 people in the United States and having 1 per 60 people in Europe (Pei, 2003). The development and social ownership of auto-vending machine has become an important symbol

of measuring the degree of city modernization and civilization level (Jiang, 2014).

While at abroad it is the beverage manufacturers that guide, lead to the development of auto-vending machine, in domestic the situation is on the contrary, as beverage manufacturers are not interested in this kind of business operation style, so the machine manufacturers have to seek the middle enterprises, with the machine, seeking exit. Since 1992, the auto-vending machine was put into production in domestic, of which the market growth is very slow.

At present, the domestic auto-vending machines have two major classes, namely the completely independent development class and the agent sales abroad class. Among them, the price of the auto-vending machine made in our country is focused on the 30000 yuan to 40000 yuan and the price of the agent abroad class auto-vending machine is about 50000 yuan (Pei, 2003).

The product type of auto-vending machine includes the auto-vending machine for cold drink, auto-vending machine for hot drink, auto-vending machine for goods, auto-vending machine for cigarette and other types. The mode of payment of auto-vending machine mainly adopts the cash settlement way, namely in cash COINS or paper money (Zhan, 1987).

At present, in domestic there have been many manufacturers having the capacity of developing and producing auto-vending machine. The domestic manufacturers of auto-vending machine are distributed in different areas, some having been in the stage of product promotion and some being in the stage of investment promotion. At present, due to various reasons, the market promotion of auto-vending machine is slow and there is no better business model. The

market of auto-vending machine is in the stage of cultivation (Jiang, 2013). The products produced by the domestic manufacturers of auto-vending machine are mainly the auto-vending machines for cold (hot) drinks, foods, cigarettes and other products (Pei, 2003).

The purpose of this study is to design an auto-vending machine for cupped beverage, specifically studying its shape design and color design, of which the shape design should follow the art rule of variation and unity and meanwhile the whole shape still should be simple and direct; of which the color design not only should satisfy the request of man-machine coordination and environment and function, but also should value the choice of tone, match the new age request of appreciation beauty and notice novelty.

### DESIGN METHODS

**Shape design of the auto-vending machine for cupped beverage:** In the shape design of the auto-vending machine for cupped beverage, above all, the inside quality and the hommization of using of auto-vending machine for cupped beverage must be ensured. Never only pursue the scale and patter beauty of shape design, so as to reduce the quality and other technique function index. The various components of the auto-vending machine for cupped beverage are made up of some geometry bodies which are composed of dot, line and face. The shape design of the auto-vending machine for cupped beverage is combining the material techniques such as structure and function 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 the auto-vending machine for cupped beverage of generous beauty and novel style (Qiu, 2005). The shape design of the auto-vending machine for cupped beverage should be scale coordination, balanced steady and take" unity " as king, "variation" 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 the auto-vending machine for cupped beverage, it has same, similar, logical and harmony nature in the shape, line type, color, part, carriage, quality, amount and other aspects. But the variation 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 the auto-vending machine for cupped beverage different, vivid and attractive, it could add the variety in the same nature of unity, harmony and integrity to strengthen each other contrast, but the variation has to be appropriate, not excessive to avoid huge miscellaneous, chaos and centrifuge, as shown in Fig. 1.



Fig. 1: The shape design of unity



Fig. 2: The shape design of concision

**Concision:** The whole shape design of the auto-vending machine for cupped beverage should be as far as possible simple and direct to acquire a whole, simple and direct style, which could adopt following two kinds of methods. The first, the body design of the auto-vending machine for cupped beverage should apply some basic geometry body or some more simple curves and curved face, of which the shape is rule, simple and explicit, giving person with the deep impression and it is easy to achieve the art effect of simplicity, direct and clear, enrich and 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 the auto-vending machine for cupped beverage, makes its whole good and attains a simple, direct and clear visual effect.

**Color design of the auto-vending machine for cupped beverage:** The color design is an important constituent part of the design of the auto-vending machine for cupped beverage, as color has more ocular, more strong and more attractive magic power than the body. The color could firstly influence the person's sense organs than the body, moreover, that could raise user recognizing and watching degree to some operation controls, show instrument and appearance by making use of vision recognizing effect and psychology of color, sequentially, the function of these device could be well developed and the mental request of user could be satisfied. The color design of the auto-vending machine for cupped beverage should follow the following few important points:

**Satisfy the request of man-machine coordination:** The color design of the auto-vending machine for cupped beverage should well embody the relation of man-machine coordination, so as to make user's mood pleasant, don't easily produce confusion and then attain to the purpose of operating accurately. For example, generally, the base and body of auto-vending machine for cupped beverage properly adopt heavy and solid deep color, not only bearing dirty but also making person have the dependable sense of stability to machine. The other parts are the components that person usually use, which properly adopt bright color, so as to get rid of depressed feeling, satisfying the request of operating accurately and man-machine coordination.

**Satisfy the request of environment and function:** The color should well express the function characteristic of product and mutually coordinate with the use environment. If the greasy dirt of use environment is serious, usually the dark color is proper for bearing greasy dirt. The color of the panel of auto-vending machine for cupped beverage generally properly use the neutral base color of low bright degree and low pure degree, contrasting with component color, so as to enhance the vision recognizing degree. The panel should have no strong reflection and dazzle light. The color of display part should be obvious and refreshing, but not dazzle eye. The color of caution part should be fresh and gorgeous to come into notice and the color of concealment part should be quiet, as shown in Fig. 3.

**Value the choice of tone:** The choice of main tone of auto-vending machine for cupped beverage is a problem



Fig. 3: The color design of auto-vending machine for cupped beverage satisfying the request of environment and function

of very importance, the different tone will form different art effect. In matching color of auto-vending machine for cupped beverage, 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 auto-vending machine for cupped beverage 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 auto-vending machine for cupped beverage, transform the tone of auto-vending machine for cupped beverage 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 auto-vending machine for cupped beverage 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 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



Fig. 4: The color design of auto-vending machine for cupped beverage matching the new age request of appreciation beauty

extensively. The color design of auto-vending machine for cupped beverage also should sufficiently consider using the "popular color" to accord with the age request, as shown in Fig. 4.

**Notice novelty:** The color design of auto-vending machine for cupped beverage should notice novelty and creativity to make it have vitality and more competitiveness. The color of auto-vending machine for cupped beverage not only can satisfy the request for appreciating beauty, under the particular condition, but also has strong influence, which can cause the transfer of people's emotion and interest to attract people's attention. For example, on an international industrial product exhibition, a red auto-vending machine for cupped beverage produced by some country appeared in the exhibition hall. Though the red is not the color that the auto-vending machine for cupped beverage consistently uses, the factory surprisingly adopted red color to decorate the auto-vending machine for cupped beverage, causing the purchaser to crowd in its vicinity and then understood its function characteristics, which produced a surprising sensation effect and made its order enormously exceeded other nation. It is thus clear that the novelty of color design is very important.

**RESULTS AND DISCUSSION**

**Working principle and working process:**

**Working principle:** The work principle of the auto-vending machine for cupped beverage is that customers need to throw coin or banknote of corresponding face value, if having not banknote of corresponding face value, it could throw the banknote of bigger face value and the machine will return change automatically. Of course, it also could brush card (Zhu and Wang, 1995). Then choosing the beverage and pressing the homologous button, the sensing system will deliver the signal to the paper cups detaching mechanism, of which the electromotor begins to work after receiving the signal, thereby separating paper cup and then sending to appointed position by the paper cups slideway mechanism. At the same time, the powder mechanism also receives the signal, provides hot water or cold

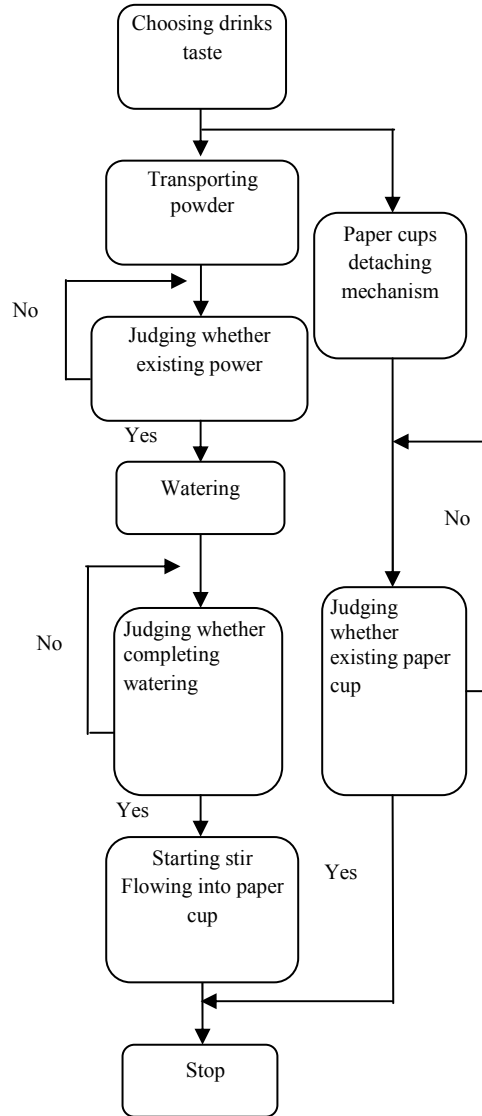


Fig. 5: Workflow chart of the auto-vending machine for cupped beverage

water toward the mixer according to the request of customers, conducts stir, finally flows into the cup and completes the work.

**Working process:** According to the work sequence of the auto-vending machine for cupped beverage drawing up the flow chart as shown in Fig. 5.

It could be seen from the workflow chart that after choosing beverage, the transporting powder mechanism and the paper cups detaching mechanism receive the signal in the meantime and begin to work. After the transporting powder mechanism completes the work, it starts to inject water after judgment and then to stir. At the same time, the transporting cup mechanism sends the paper cup to the appointed position and finally opening the mixer valve, the beverage flows into paper cup. If above judgment is "no", it will make circulating

judgment. If more than three times, it will be invalid. After nullity, it will automatically deliver the signal to the worker, who will make the homologous maintaining.

### CONCLUSION

- The auto-vending machine for cupped beverage is easy to install, repair and replace spare parts. The design is in accordance with principles of ergonomics and it is convenient to operate and safe and reliable to use.
- The overall structure of the auto-vending machine for cupped beverage is concise and reasonable.
- The manufacturing technical requirement and manufacturing cost of the auto-vending machine for cupped beverage is low and the standard parts are plenty, so general machinery factories could make by themselves.
- Having the function of automatically controlling the concentration of beverage and others.

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