DESIGN OF FRAGRANT & HYGIENIC VACUUM CLEANER

Saiful Irwan Bin Sarkawi1, Khalid Hussein Bin Tuah2, Mohd. Shah Bin Yunus3

1 Mechanical Engineering Department
Kuching Polytechnic of Sarawak
2 Training and Continuing Education Unit
Kuching Polytechnic of Sarawak
3 Commerce Department
Kuching Polytechnic of Sarawak

Abstract

Cleaning the floor at home with the existing cleaner vacuum do not solve the problem of odor, and exposure to germs and bacteria in the air escaping from the vacuum cleaner. Fragrance and hygienic vacuum cleaner is a product or device used in conjunction with vacuum cleaner to use to reduce odors and bacteria eliminate contained in the air from vacuum cleaner. This product can be used to vacuum cleaner blower type with funnel or without funnel blower. This product is easy to use, and may take place. Tools and hygienic fragrance is refillable, cleanable and can be replaced. Two parts to facilitate the use of special input on any type of vacuum cleaner. Fragrance and hygienic vacuum cleaner has a small size and easily stored and durable and environmentally friendly.

1. Introduction

1.1 Field of Invention

This invention related to reduce odors and bacteria and germs release in air from vacuum cleaner. This innovative concept is environmentally friendly; overcome the problem of air pollution and free energy sources.

1.2 Statement of Problem

Dirt and small objects will be gathered and eventually will result in odor and it’s also likely to contain germs results of organic materials decompose or react with the bacteria. Air containing these germs in the air spread out around it.

Food debris, mould, dust mites, human skin flakes and bacteria sucked into the dust bag are decaying inside it. Therefore the air blowing out of the filter-based vacuum cleaners usually has a bad smell. [1]

Not only that, the smell of air inside the vacuum cleaner can also be spread on the blower. For example, when the vacuum spilled curry on the kitchen floor, then work vacuum made in the living room or bedroom, the smell of curry will be spread too.

The exhaust air vent of most filter-based vacuum cleaners is pointing downwards and is very close to the floor level. Therefore the air current from the exhaust vent is blowing up dust from the floor well before you manage to suck up the dirt. [1]

Vacuum cleaner is most frequently users such as sneezing allergies, cold and
uncomfortable while at home as small and smell of dust scattered in the air. This will interfere with the comfort and health of residents of the house.

Bad odor in the house may be due to various reasons like seasonal changes, dampness, dust mites etc. To eradicate these causes here are some useful tips to help your home smell good. [2]

Apart from this, very specific pollutants are found inside rural and urban buildings. A Tata Energy Research Centre study observes "Key pollutants in urban buildings include nitrogen dioxide, carbon monoxide, radon (from building materials, water and soil), formaldehyde (from insulation), asbestos, mercury, man-made mineral fibres, volatile organic compounds, allergens and tobacco smoke - as well as health damaging organisms like bacteria." [3]

1.3 Objective

Thus, with the system fragrance and hygienic air suction, the problem of bad air and bacteria from the vacuum cleaner contains can be overcome. This system has two special tools that is perfume and kills germs in the air. Both of these special devices placed on a special space in the production of vacuum cleaner air. When the foul air passing through it, this special fragrance will reduce and even eliminate odor and kill germs from released from the vacuum cleaner.

1.4 Scope of Study

Fragrance Innovation and Hygienic Vacuum Cleaner-scope encompasses the scope of the following:

i. Design and production of the concept of green products and environmentally friendly technology.

ii. Function and product claims in overcoming the problem of odor and bacteria content in the air discharged from the vacuum cleaner blower.

iii. Products suitable for a vacuum cleaner for home uses with and without funnel blower.

2. LITERATURE REVIEW

2.1 Introduction

By definition, "a vacuum cleaner (also called a vacuum or hoover or a sweeper) is a device that uses an air pump to create a partial vacuum to suck up dust and dirt, usually from floors." [4]

The first attempts to provide a mechanical solution to floor cleaning were begun in England in 1599. Before vacuum cleaners, rugs were hung over a wall or line and hit repeatedly with a carpet beater to pound out as much dirt as possible. [4]

You will eat two to three pounds of food and drink one to three quarts of water today. But you will breathe 1500 quarts of air. A little bit of air pollution may have a big effect on health. [5]
The EPA studied life span in a number of cities as related to the amount of fine dirt particles in the air. Results indicated significantly shortened life spans in cities with dirtier air. Surprisingly, EPA studies also show that home air is often 6 to 10 times more polluted than outdoor city air. [e]

Home air is contaminated by organic and inorganic particles and toxic gases. [5]

The products you use to clean your home may actually cause more harm than good. Many general-purpose cleaning products contain ammonia, which can cause burns or rashes when splashed on the skin. Its fumes can cause eye and lung irritation and, if mixed with another product containing chlorine bleach, will create toxic chloramine gas. [6]

In summary, the major problems of filter-based vacuum cleaners include:

i. Leakage of dust
ii. Clogging of pores, leading to reduction in efficiency and energy wastage
iii. Bad odor from decaying materials, mound and bacteria trapped
iv. High Maintenance Costs
v. Generate ozone which is harmful to health and to the environment
vi. The air current from the exhaust vent blows up dust from the floor
vii. Cannot clean the hose, wands, brush heads, or dust chamber easily [1]

Before engaging in design, drawing some sketches done. From the sketches, there are characteristics to be evaluated. Drawing Final selection was based on assessments that have been made.

### 3.2 Design of project

#### 3.2.1 Scratch Drawings

i. Drawing 1

![Figure 1: Drawing Design 1](image-url)
This design shaped cube that have a hollow inlet and a hollow outlet. Airflow are going through transom that consisting of fragrance and hygienic part. That air will mix through one fan in outlet part.

**ii. Drawing 2**

![Figure 2: Drawing Design 2](image)

These design shaped cylinders also have a hollow inlet and a hollow outlet. Fragrance and hygienic part shaped as a curve that rests with body wall product. Airflow from vacuum cleaner blower will mix through fan in outlet part.

**iii. Drawing 3**

![Figure 3: Drawing Design 3](image)

This design shaped cube that have a hollow inlet and 3 pockets outlet. Fragrance and Hygienic part rests with side product. Airflow from vacuum cleaner blower will mix through 3 screws in 3 parts outlet. This product design weakness is fan movement will make sound if fan did not spin steady. Outlet hole which many cause air from vacuum cleaner blower do not mix with perfectly Fragrance and Hygienic solution.

**iv. Drawing 4**

![Figure 4: Drawing Design 4](image)

This design shaped cube that have 2 pockets inlet and a hollow outlet. Fragrance and Hygienic part rests with side product. Airflow from vacuum cleaner blower will mix through fan in outlet part.

**3.2.2 Final Drawing**

![Figure 5: Perspective View](image)
3.3 Brief Description of the Drawings

Here is the brief description of the final drawing of project.

Figure 5 and Figure 6 is full view showing the fragrance and hygienic vacuum cleaner. The view shows the isometric and perspective of the fragrance and hygienic vacuum cleaner look like.

Figure 7 is descriptions of part assemble view. There are 11 products division connected according to order that is correct.

Figure 8 is a description of the fragrance and hygienic devices placed in the product. Tools and hygienic deodorant can be maintained easily refillable and cleanable.

Figure 9: Main Body and Cover
Figure 10: Component of Main Part

Figure 9 and Figure 10 is a description of the main part of Fragrance and Hygienic Vacuum Cleaner. Main body is for placing the fragrance and hygienic tools and Inlet part. Outlet part is at main cover. Close cap is for closing a hole when the product is using. Rubber cap is for funnel blower such as griper.

Figure 11: Assemble to vacuum cleaner without funnel blower.

Figure 12: Assemble to vacuum cleaner with funnel blower

Figure 11 shows assemble of Fragrance and hygienic Vacuum Cleaner to the blower intake cleaner vacuum. FIG 6 is to vacuum cleaner types without the funnel, and the Figure 12 is to vacuum cleaner with funnel. One of a section will be closed with a special closing event of this tool is used.

Figure 13: Binding Tool

Figure 13 is a representation for tools and fasteners for fragrance and hygienic vacuum
cleaner to vacuum cleaner body with its use. Binding tool can be adjusted to suit the shape of vacuum cleaner.

![Fan, Fan Stand and Fan Cover](image)

![Screw and Nat](image)

Figure 14: Component of Outlet Part (With Fan Operation)

Figure 14 is showing component of outlet part with fan operation at outlet section on top of a fragrance and hygienic vacuum cleaner. This fan is moved by the action of the air flow from the blower.

### 3.4 Claims

Claimed for Fragrance and hygienic Vacuum Cleaner is:

Fragrance and hygienic vacuum cleaner has two main actions, the perfuming and disinfecting of air released by vacuum cleaner.

To eliminate as many pollutant sources as possible from your indoor environment consider the following helpful hints; Air filters that remove fine particles and/or gases are available as room filters or as whole house filters. (A whole house filter attaches to the central heating and air conditioning system.) [5]

A fragrance tool is made by special fragrance to perfume the air that smells. This fragrance tool can be refillable and cleaned. This tool can also be replaced easily if damaged.

Hygienic tool is intended to reduce the bacteria or germs in the air at the drop of vacuum cleaner. Hygienic tools such as the fragrance device for this product can be cleaned and refillable and can be replaced if damaged.

Two parts of this product entry comes with the cover attached to the blower is very easy for any type and model vacuum cleaner on the market. There are two types of blower for cleaner vacuum for home use. It is vacuum cleaner with and without funnel blower. The inlet is adjustable to suit the type of blower to vacuum cleaner. One of the entries will be closed in accordance with the installation on the vacuum cleaner. In addition, these section also suitable uses with vacuum cleaner hose.

At the exit of this product, there are fans that are installed for the purpose of mixing the fragrant air and hygienic before released. This fan can be cleaned if dirty and replaced easily if damaged.

Binding tool for fragrance and hygienic vacuum cleaner is made of elastic material. This binder can suitable to vacuum cleaner design to be used with this product. The device also can be replaced if damaged.

Traditionally manufacturers of electronic goods made them cheap and disposable. In the UK it is estimated that we will each
throw away an average of 3.3 tons of electrical goods over our lifetime. Fortunately, most people accept that to help preserve our environment we need to become more sustainable, which means that we have to reduce the impact that our actions have on the environment. [7]

Size Fragrance and Hygienic Vacuum Cleaner is small and is easily stored. Materials are also making use of strong but lightweight materials. Use is also does not require energy sources such as electricity or fuel. Therefore, the fragrance and hygienic vacuum cleaner is environmentally friendly product.

3.5 Material and Cost

The following are recommendations for the use of materials produced Fragrance and Hygienic Vacuum Cleaner:

Table 1: The use of materials produced Fragrance and Hygienic Vacuum Cleaner

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole body, fan</td>
<td>Plastic</td>
</tr>
<tr>
<td>Cover and inlet hole cover</td>
<td>Rubber or elastic plastic</td>
</tr>
<tr>
<td>Fragrance and hygienic tool</td>
<td>Plastic, fabric and special fragrance and hygienic solution</td>
</tr>
<tr>
<td>Binding tool</td>
<td>Rubber-plastic and fabric</td>
</tr>
</tbody>
</table>

The whole construction depends on the suitability of the product design and ease of access to material resources for certain parts of this product.

For this production, the lowest cost to be the major concern. This product can be adapted to the use of recycled materials. It meets the main purpose of this innovation to meet the requirements of the Green Technology and environmentally friendly.

4. FINDING AND ANALYSIS PROJECT

4.1 Introduction

In the production of Fragrance and Hygienic Vacuum Cleaner, there are some findings that are categorized as the advantages and disadvantages. Advantages and disadvantages of this product innovation can be used as a research and reference to the next innovation.

4.2 Excess

There are many advantages Fragrance and Hygienic Vacuum Cleaner.

In terms of unique design facilitates the use and storage. This product is cube-shaped with small size (size 145 cm length x 145 cm height x 145 cm width) and it’s mass about ±500 g.

In terms of energy resources, Fragrance and Hygienic Vacuum Cleaner does not use any energy, such as electrical or fuel. It’s fan also moved by the resulting air flow from blower vacuum cleaner. Therefore, this product truly eco-friendly

In terms of effectiveness, this product has the special fragrance and hygienic solution. The use of solution (liquid) is the most economical compared to the use of volatile materials such as solid or gel type, naphthalene or the like. Fragrance and Hygienic solution easily maintained such as adding or cleaning that is a savings on the product. Solution or liquid materials can be
evaporated by air flow. As a result, the particles of the fragrance and hygienic solution will evaporate and mix with the air particles flowing from the blower. This is the key to the creation of the Fragrance and Hygienic Vacuum Cleaner.

4.3 Weakness

The weakness of the Fragrance and Hygienic Vacuum Cleaner is depending on the material selection and type of vacuum cleaner used.

The choice of material depends on the design and manufacturing process for this product. If materials selection does not accurate to the product design, the production of Fragrance and Hygienic Vacuum Cleaner will be problematic.

In the market, there are various types of vacuum cleaner according to the use of these products. There is vacuum cleaner for common duty such as in homes and offices uses. In addition, the vacuum cleaner type of hyper-duty used for factories or industries. Therefore, Fragrance and Hygienic Vacuum Cleaner limited to the use of vacuum cleaner mild.

5. DISCUSSION

5.1 Introduction

When you plug the vacuum cleaner in and turn it on, this is what happens:

1. The electric current operates the motor. The motor is attached to the fan, which has angled blades.
2. As the fan blades turn, they force air forward, toward the exhaust port.

3. When air particles are driven forward, the density of particles (and therefore the air pressure) increases in front of the fan and decreases behind the fan.

This pressure drop behind the fan is just like the pressure drop in the straw when you sip from your drink. The pressure level in the area behind the fan drops below the pressure level outside the vacuum cleaner (the ambient air pressure). This creates suction, a partial vacuum, inside the vacuum cleaner. The ambient air pushes itself into the vacuum cleaner through the intake port because the air pressure inside the vacuum cleaner is lower than the pressure outside. [8]

Figure 15 below show how the vacuum cleaner works. Airflow from blower or exhaust direct on due to pressure action like that was discussed just now. Due to this, vacuum cleaner that is good point air product from blower is towards on. Fragrance and Hygienic Vacuum Cleaner operate such.

Figure 15: How the vacuum Cleaner Works
Each product has its own advantages and disadvantages pliers. Thus, there are a few highlights to note include the production of Fragrance and Hygienic Vacuum Cleaner. Firstly, the weakness of the project should be identified through the weakness of this product. Next steps for problem solving is done to produce a good product and as a reference the next revolution.

5.2 Problem Project

By finding and analysis project, there are two major weaknesses that can be listed. Of these drawbacks, the problem discussed.

In terms of material selection, design and producing process will also be affected if things go wrong. Selection of material is most frequently a problem after the design is produced. When the material is required is difficult to be obtained, the use of other materials and affect the physical characteristics and functions of the product. Different materials also have different manufacturing processes. More likely, the manufacturing costs are also affected.

In terms of consumption of various types of vacuum cleaner, Fragrance and Hygienic Vacuum Cleaner limited to vacuum cleaner with and without funnel blower. However, there are various types and design of the vacuum cleaner on the market. This leads to the possibility of vacuum cleaner cannot be used with Fragrance and hygienic Vacuum Cleaner.

5.3 Problems solving Project

Design of an engineering component involves three interrelated problems:

i. Selecting a material,

ii. Specifying a shape, and

iii. Choosing a manufacturing process.

Getting this selection right the first time by selecting the optimal combination your design has enormous benefits to any engineering-based business. It leads to lower product costs, faster time-to-market, a reduction in the number of in-service failures and, sometimes, significant advantages relative to your competition. [9]

To overcome these problems, several steps must be taken. It is intended to ensure Fragrance and Hygienic Vacuum Cleaner truly capable. Selection of materials should be doing systematically. Prior to design, make sure materials are easily available to use. In addition, materials selection has to suitable to the features and functions for the products made. Next, materials selection should also be safe to use either during the manufacturing process carried out and the use of the product. Material costs are also perils to be considered. Cost depends on the selection of materials on the market price of the materials and manufacturing cost of the materials.

There are many types and models of vacuum cleaner in the market. Therefore, Fragrance and Hygienic Vacuum Cleaner require the method or methods of use of a variety. 2 parts cause of this problem, namely the input and the method of holding a vacuum cleaner product to use. The inlet side of this product requires a tool that can be modified according to design of vacuum cleaner blower. Special retainers as adhesive or gripping a method suitable for a variety of vacuum cleaner design. The use of additional tools also serves as alternative solutions to this problem.
6. CONCLUSION AND SUGGESTION

6.1 Conclusion

Many housewives feel safe and comfortable after work to clean the floor using a vacuum cleaner. However, in not knowing the air in the house has been contaminated by the smell and the contents spread of germs by vacuum cleaner. Fragrance and Hygienic Vacuum Cleaner is a product that can solve the problem. The smell of the air from the vacuum cleaner can be reduced even fragrances by the special fragrance of this product. While this product special hygienic hand can reduce the bacteria or germs from the air cleaner vacuum. As a result, the air is fragrant and free of germs can be seen in the Fragrance and hygienic Vacuum Cleaner.

6.2 Suggestion

To improve this product, an additional function for the Fragrance and Hygienic Vacuum Cleaner is best done. Among the proposals is improved as reducing the amount of fine dust from vacuum cleaner and ionizes the air from the vacuum cleaner to neutrals ions and safe.

To reduce the fine dust in the air from the vacuum cleaner, water use can be made. The flow of air from the blower will go into the water storage and produce bubbles and clean air can be produced.

In the journal of “The Basics of Air Ionization for High-Technology Manufacturing Applications” by Arnold Steinman, creating air ions artificially requires adding electrons to or removing them from the gas molecules in the air. Two basic methods are used to achieve this: alpha ionization and corona ionization. [10]

7. REFERENCE


[8] Tom Harris, HowStuffWorks – How Vacuum Cleaners Work
(http://home.howstuffworks.com/vacuum-cleaner.htm, accesses in 19 September 2011)

[9] ME349 - Engineering Design Projects
(http://homepages.cae.wisc.edu/~me349/lecture_notes/material_selection.pdf, accesses in 20 September 2011)

(http://www.ce-mag.com/archive/06(ARG/steinman.htm, accesses in 20 September 2011)