Multifunctional environmental friendly dog walking artifact

WANG U FEI,NG SI IENG,LU CHON IP,CHANG KIN MAN,ZOU I LAM

2023-1-1

HOU KONG MIDDLE SCHOOL

Contents

I. Background of the Study

1.1 Background of the Study

You will surely find that more and more people have pets nowadays. In the neighbourhoods and parks, there are many people walking their dogs on leashes. Some are elderly people in their 60s and 70s who walk slowly behind their fur children; others are teenage children jumping and running with their own dogs - a beautiful sight to behold. Many people find pleasure in playing with their pets. Researchers at Azabu University in Japan have proved this experimentally: oxytocin production is easily stimulated when playing with pets. Oxytocin is a mammalian hormone, a peptide hormone that is secreted by the posterior pituitary gland and synthesised by the paraventricular and supraoptic nuclei of the hypothalamus. In addition to these familiar functions, oxytocin also reduces the levels of stress hormones such as adrenaline in the body to lower blood pressure or to regulate one's body in the face of stress. Therefore, the oxytocin secreted by interaction with pets can help owners feel relaxed and happy, reduce stress and create a sense of belonging.

However, as more and more people have pets, the environmental problems caused by pets have become more and more pronounced. There is often pet excrement in various types of green belts in the streets and alleys, which greatly affects the cityscape and brings a bad living experience to the residents.

Although there are products available in the market to deal with pet excrement, they are not widely available due to inconvenience, high price, poor pet comfort and environmentally unfriendly products, and still need to be improved.

1.2 Motivation for research

As society develops and people's economic level continues to rise, people's lives become more and more comfortable. The rise in economic power has led many people to keep dogs, which not only reduce people's loneliness, but also serve the purpose of physical exercise when they go out to walk their dogs. According to Macau's General Regulations of Public Places, pet owners should keep their dogs on a leash and wear safety equipment when they go out with them, and dispose of their pets' excrement properly. However, for personal hygiene reasons, some people feel nauseous and uncomfortable when confronted with their pets' excrement, so there are some people who do not do anything to dispose of their pets' excrement when confronted with it, which seriously affects the cityscape. For this reason, we plan to make a tool that is environmentally friendly, easy to use, hygienic and can handle dog

excrement well.

1.3 Research significance

1. Market:

Compared to common works on the market, this work is more convenient, cheap, easy to operate, environmentally friendly materials used, no discomfort for pets, has a multi-functional hook, can be used to hang dog leashes, handbags, shopping bags, etc., easy to "free your hands" when walking your dog

This product is suitable for most people with pets, compared to the dog walker on the market, our product is more environmentally friendly, convenient, multi-functional operation, so it is loved by consumers.

2. Environment:

With people's awareness of environmental protection gradually increasing, "low-carbon environmental protection" and "green office" have become widely discussed topics in modern times. Among them, paper waste and other related issues have caused a lot of discussion. Some data shows that the raw materials for paper production are mainly wood, coal and water. It takes 0.875 tonnes of wood, 0.5 tonnes of coal and 375 tonnes of water to produce 1 tonne of paper, resulting in 35% of water pollution. Wasted paper means wasted resources. At present, China's forest resources are in short supply and water resources are in short supply. Soil erosion is difficult to curb and the habitat of endangered species is shrinking, among the top ten environmental problems in China today. As a paper newspaper that we all have in our homes, and because of the special timeliness of news, the proportion of waste has always been high. The risk of fire is also increased as the paper becomes brittle and more flammable in nature. Unused newspapers at home are unintentionally a waste of resources and are not easy to store, nor are they environmentally friendly.

Therefore, we choose to use newspaper as our want to use discarded newspapers for secondary use instead of plastic bags to reduce plastic pollution and waste of paper.

II. Design Objectives

2.1 Creative vision

We have a pet dog at home and sometimes we go out to walk the dog, but we need to keep it on a leash to prevent it from getting lost, sometimes the pet urinates and defecates and we don't know how to clean it up, or even carry a lot of things with us when we go out, and we need to carry heavy things while walking the dog. Most people use plastic bags to dispose of their excrement, but direct contact between your hands and the newspaper or plastic bags used to dispose of excrement is still a hygiene and environmental problem, as well as an inconvenience to others. Plastic bags are not environmentally friendly, so some people are reluctant to dispose of them. Therefore, in order to solve this situation, we plan to create a dog walking tool that is not in direct contact with newspaper, but can handle dog excrement well and is also multifunctional.

2.2 Design objectives

The upper part of this work has a handle of our own design, as well as a small hook on top to hang the dog leash, immediately followed by a solar panel to provide light energy for the lighting of the lower dun light. The middle is a plastic conduit and the bottom is a 3D printed box shape. The middle of the conduit pulls a rope to pull a gear linkage to control the bottom device to form a dog walking device. A dog walker that allows you to dispose of your pet's urine and faeces in a timely manner. It has wheels and a water spray to clean up pet excrement, and can be thrown into the bin without touching the faeces.

III. Description

3.1 Materials

1. Newspaper

Newspapers, which we all have in our homes, sit unused at home after a while because of the special timeliness of the news. Newspapers are not only a waste of resources, but they are also not easy to store and are not environmentally friendly.

We use the unused newspapers at home as our expendable bags, fold them in a specific way to form 15*15*7 fixed size paper bags, which can be placed in a specific position when in use, instead of plastic bags, we turn newspapers into treasure, secondary use of newspapers, newspapers are directly discarded after use, no need to wash, and no dirty hands.

2. Trolley device

Using the gear linkage principle, the printed board is linked to a thin rope. Pulling the right-hand drawstring gear linkage mechanism will glue the newspaper with the pet's excrement. Pulling on the left cord will open the mechanism and the newspaper will fall out.

3.3D printing material (PLA)

The base unit, handle and other related parts are made from 3D printed PLA, which is a biodegradable material that can be completely degraded by microorganisms in the soil within 180 days of disposal, generating CO2 and water without polluting the environment. Using 3d printing technology saves us time and costs, increases design freedom and precision, including internal cavities, different shapes and delicate details.

4. Wheels

Two wheels are mounted to the lower end of the tool to support and slide it, making it easier for us to walk around with the product to reduce the burden, while at the same time it can be placed on the ground to support the whole tool when not needed.

5. Solar panel

The solar panel absorbs light energy, which not only generates electricity when the sun is shining, but also has an insulating effect. The battery stored inside the plastic tube allows for lighting when we walk the dog at night, which is much more efficient than ordinary battery devices. There is a switch on the top of the plastic tube, which is turned on when the light energy is absorbed, and the light underneath the device lights up.

6. Plastic tube

As the main body of our entire tool.

7. LED light

For easier lighting when we walk the dog at night.

3.2 Design principles

1. Handle design:

There are two hooks in our handle design, one of which resembles an umbrella handle to hold it and use it to push the wheel as well as to hang it. The other small hook is extended on the original hook it can hang the dog's leash, also can be used to hang the heavy things when we go out, so that we do not need to pull the leash by hand while walking the dog, can tie the leash on it, already use it to push the bottom two wheels.

2. Mechanism design:

The bottom of our dog walker is a square shape, we use the gear linkage to design two pull cords to control the bottom device, pull the right pull cord, drive the pull gate will be newspaper and dog excrement bonded together. It is convenient to hold the newspaper with excrement without getting our hands dirty. By pulling the left-hand drawstring, the newspaper on the bottom and the dog's excrement will fall to the ground.

3.3 Innovations

1. Environmentally friendly
2. Clean and hygienic
3. Easy to operate
4. Portable to go out
5. Friendly interaction with the dog

3.4 Production method

1. first design the shape of the materials needed for each part of our device on the computer

2. Using 3d printing, print out our designed bottom device and the pull rod device

3. Firstly, put together the bottom 3d panels using hot melt glue to make a box-shaped bottom device

4. Install the thin cord inside the plastic tube, the thin cord of the left handle links the plate under the bottom device and the thin cord of the right handle links the two 3d printed hanging blocks to make the newspaper placed above it airtight.

5. A solar panel is installed above the device, as well as a switch and a light at the bottom

6. We install our own design of handle at the top

6. At the bottom of the device, we install two small wheels

8. Finally, the paper bag prepared in advance (the method of making it is mentioned below) is fitted into the space formed by the cardboard and you are done

IV. The research process

4.1 Analysis of the materials chosen

4.1.1 Plastic tubes

1. Light weight: the relative density of plastic pipes is only 1/7 of that of cast iron, so it is lighter when we take it.

2. Good corrosion resistance: plastic pipe with corrosive liquids and gases, no rust, reduce maintenance costs and long life.

3. Smooth wall: small resistance to body flow, under the same conditions, the flow of plastic is 30% higher than cast iron pipe.

4. Energy saving: compared with steel pipe, the processing and forming temperature of plastic is lower, so the processing energy consumption is low. So we use it as our subject material is more energy saving.

5. Low price: lower material costs and better to find.

4.1.2 Solar panels

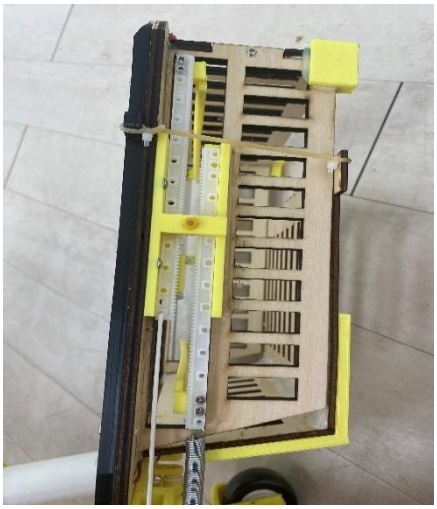
1. Solar energy is a completely clean source of energy that does not emit any polluting gases or harmful energy.

2. It can store a large amount of energy and stores a lot of energy.

4.1.3 Newspaper

Plastic bags bring convenience to people's lives, but they have a very stable structure and cannot be degraded by microorganisms, which will persist in the environment and destroy nature. Newspaper is another common item in our daily life. Considering the environmental protection factor, we use newspaper to replace the plastic bags which are not easily degradable, reducing the harm to the environment while achieving the purpose.

4.2 Product display



4.3 Product use

The newspaper is folded into a box shape and stuffed into a square container underneath the device. The newspaper is glued in place by pulling the right hand gear to link the right hand drawstring of the device. We will secure the folded newspaper using the clips on the back of the device.

Tutorial 1: Origami video tutorial: https://b23.tv/9whiFgy

Pull the left-hand drawstring to close the newspaper to form a box, then pull the right-hand drawstring to pull the wooden board below, so that the box falls into the bin below.

V. Functions

Function 1: Toilet seat

1. Place the folded box of newspaper into the bottom unit
2. When you notice that the dog needs to defecate, place the bottom unit in a suitable position under the dog
3. When the dog has finished defecating, pull the lever on the right to drop the bag into the bin
4. Pull the lever on the left to drop the box containing the excrement into the bin.

Function 2: Lighting device

1. Turn on the solar panel during the day to absorb light energy, which will be stored in the battery
2. Press the switch button under the handle and the LED light on the bottom unit lights up to illuminate.

Function 3: Wheels and support bar

The bottom of the unit is equipped with wheels, so that the pole can be dragged around at will, making it easy to carry out and not weighing much, and if it needs to be placed, there is a support underneath that will not cause it to fall over.

VI. Comparison of similar items

6.1 Telescopic toilet seat

Price: Telescopic pole from 248-328CNY, special bag from 1.2-2CNY

How to use: Attach the special bag to the telescopic pole, wait for the dog to defecate and then press the button to drop the bag. (The opening of the bag has a circular magnetic clasp, which can be used and dropped)

Analysis: Also as a potty picker, it is expensive. Most people would not choose to spend nearly R400 on one. The main components of the bag are the magnetic top and the plastic bag. The magnetic clasp cannot be reused because it is used and thrown away, and the plastic bag is difficult to decompose and pollutes badly. Not environmentally friendly enough

6.2 Poo picker

Price: 32CNY for a set (main body + part of the waste bag)

How to use: After the dog has defecated, use the clip to pick up the poo on the floor and then clip it into the rubbish bag.

Analysis: Inexpensive, but more complicated to use. It requires bending down to pick up the dog's poo and is not suitable for elderly people or those who are not comfortable bending down. Unsanitary, poo tends to rub off on the tool and is unhygienic when cleaning it. Rubbish bags (poop bags) are not environmentally friendly.

VII. Market prospects

7.1 Analysis of survey results

After our survey of the students and teachers around us, most families with pets will choose to take their pets out, they are worried about the problem of pet urine and faeces, if the pet urinates and defecates many people will choose to clean up in time, but may not want to clean up, so they will choose disposable. If there was a magic tool that could clean up pet poo, everyone would want it.

VIII. Summary

8.1 Summary

This product is a device that can help pet owners to clean up their pets' faeces and stools in a timely manner.

1. The device contains a water jet to clean up any residue on the floor.
2. We use newspaper as a recycling material for pets' faeces and urine.
3. The device is equipped with wheels for easy carrying out, no need to carry it.
4. Our materials are cheap and environmentally friendly, and the main body is made of plastic.
5. The hooks provide convenience. When you take your dog out, you will definitely need to take other things with you, so we have designed the hooks to make it easier to carry if you are out shopping, etc.

Conclusion: This product is a great improvement over the dog walkers on the market, we have added many functions, not only can we clean up while walking the dog, it is also easy to carry out and make use of many environmentally friendly materials.

8.2 Future research directions

Humans like convenience and speed. The rapid development of technology has brought us a lot of convenience. High-speed trains and aeroplanes make it easier for people to travel, mobile phones and computers bring convenience in communication, as well as couriers, takeaways, unmanned restaurants, unmanned vehicles and so on. The importance of convenience to human beings can be seen in the ubiquity of design for convenience in everyday life. In the future, we will be looking into the

convenience of our products to make them lighter and more portable in addition to their original functions.

IX. Reference Sources

[1] Origami video tutorial: https://b23.tv/9whiFgy