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DESIGN OF A BACKPACK DRY LEAVES VACUUM

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ABSTRACT

A backpack dry leaves vacuum is proposed to suck the dry leaves for outside cleaning services. It is functioned to reduce manpower, less noise and time saving instead of spending hours on end picking leaves for large areas. The backpack dry leaf vacuum consists of an aluminum funnel attached inside with garbage plastic, connected to a suction hose, filter, a pair of shoulder harness and battery pack. This backpack vacuum is very efficient and ergonomic in a matter of waste management because of the leaves and dirt will be collected directly into the garbage plastic.

Keywords: backpack, vacuum, hose, funnel, cleaning

1. INTRODUCTION AND OBJECTIVES

Before Industrial Revolution starts around 18th century, most houses had wooden (or stone) floors that could be cleaned with hand brooms. After few seasons, people can afford to have carpets and rugs to decorate and make their homes looks nicely. To maintain the carpets when the time comes for cleaning, people would hang the carpets outside and beat them with beaters. This was not very practical and indoor vacuum comes in place to reduce the human loads. Until some extend this indoor vacuum idea improve the outdoor cleaning activities where people invented street sweeper. Street sweeper is a machine for cleaning streets in urban areas. First one appeared early in the 19th century. Nowadays, many big cities use them while other still use human street sweepers by blowing the dirt or dry leaves to one spot. But this kind of idea still need the user to collect back the accumulated dry leaves before throwing it into the garbage bin. Backpack dry leaves vacuum prevent this repeating or twice load into single load which sucks the dry leaves directly into garbage plastic attached to the machine.



2. METHOD

Backpack Dry Leaves Vacuum is designed to position comfortably on the back of a user. Aluminum sheet metal was folded carefully to make sure it can contain the vacuum motor fan and DC motor. Flexible hose was fitted at the side of the backpack and shoulder harness stitched to the backpack. Backpack vacuums are typically fitted with shoulder and waist straps to hold the vacuum securely in place enabling maximum mobility and ease of use. The motor is at the bottom of the unit for a low center of gravity ensuring proper balance and stability for the operator. As these vacuums are fitted tightly to the body, the unit are equipped with sound dampening and cooling components to ensure comfort and safety. This fabrication activity was then undergone proper testing to check the suction power achieve the required level of collecting the dry leaves.

3. FINDINGS AND ARGUMENT

During the project fabrication and testing, several findings was found that the user (mostly cleaner vendor) can do their work more organize with no repeating load (collect back the dry leaves). But the user body tend to stress out easily if backpack used for long time in 2 hours. Moreover, the flexible hose easy to clog because bigger dry leaves stuck in the hose since the filter located at the end of backpack. To avoid this, the nozzle needs to be resized. General comparison between backpack blower and backpack vacuum is stated in the Table 1.

Table 1. Comparison between backpack blower and backpack vacuum

Backpack blower	Backpack vacuum
	
Powered by gasoline motor	Powered by electric motor
Blow dry leaves	Sucks dry leaves
Produce loud noise	Medium noise
Heavy	Lighter
User needs to collect back dry leaves	Dry leaves already collected

4. CONCLUSION AND SUGGESTIONS

Equipment For general summary, it can conclude that backpack vacuum can reduce user load by accumulate the dry leaves at the earlier stage of work. No repeating work needed to complete the outdoor cleaning process. But better design can be a better solution to reduce the stress incur to the back of the user.

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