

Testing and Fabrication of Bladeless Table Fan

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Abstract-In this paper we designed a bladeless Fan to overcome the safety considerations and noise problem in a normal table fan. This fan has blades which are not visible and is relatively better in all relative aspects such as wind speed, distribution of air, safety. The whole fan was prepared by us in our college workshop by the use of normal daily purpose stuffs like bathroom bucket (plastic bucket), water pipe (PVC pipe). This fan stagnate the noise generated with other various items used such as applying wood support across the motor, no toppling as proper base is provided. The product appears to be a circular tube mounted on a pedestal. We had started with the base of the fan i.e. pedestal and mounted a D.C. motor within it and attached the motor with the help of small wooden block. Then we prepared the upper part of the fan with the help of bucket by cutting it into the required size. Thereafter both the parts are assembled together. After constructing the bladeless fan, we compared it with the normal table fan. We conclude that this type of fan can be used in future efficiently with less sound and more safety as compared to normal table fan.

1 INTRODUCTION

IN this paper we have modified the general structure of a table fan to overcome various problems associated with it such as noise, more space requirement, efficiency, non-uniform flow of air etc. The result came out to be the transformation of blade consisting fan to bladeless fan i.e. the fan doesn't have any visible blades.

PRINCIPLE

The fan consists of mainly three parts-

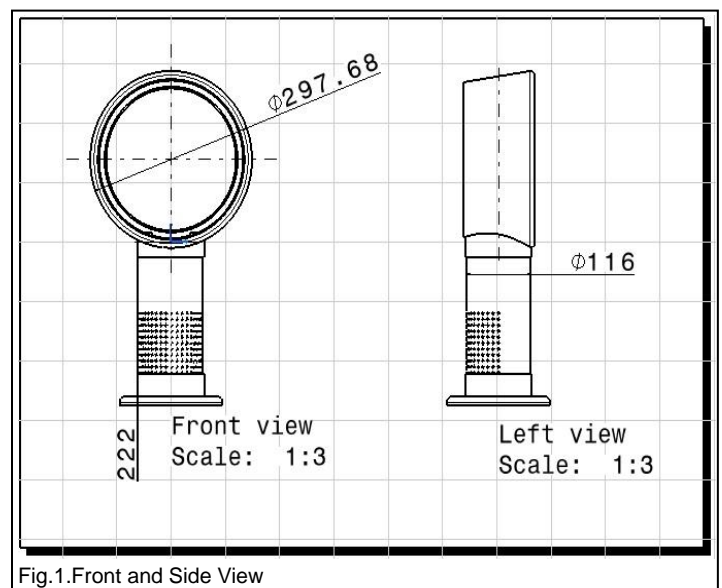
- Pedestal
- Circular Tube
- DC motor with attached fan.

The pedestal have a number of minute holes from where the suction of air (from the surrounding) takes place and the air thereafter is circulated in the circular tube, inside which it is deflected by the water pipe provided at the back peripheral side of the circular tube, which thereafter emerges out from the slits present at the inner peripheral side of the tube. This fan acts as an air multiplier as the speed of air is increased manifold as compared to table fan.

2 METHODOLOGY

We had constructed the bladeless fan by using simple things which we can find in anyone's home. We had used plastic bucket to make the circular tube, PVC Sanitary pipe for pedestal, metal plate from which the fan is cut, a DC motor and a DC driving source.

The fan rotates inside the pedestal and sucks air from the surroundings through minute holes provided on the pedestal surface. This air is circulated to the circular tube from the pedestal. Air circulated in the circular tube then gets deflected by the water pipe provided on the back peripheral side of the circular tube. The deflected air emerges out from the slits provided at the inner peripheral sides.



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3 EXPERIMENTATION

APPARATUS REQUIRED:

- Plastic Bucket
- Water Drainage PVC Pipe(sanitary pipe)
- Water pipe(PVC soft garden pipe)
- Adhesive
- DC motor(12 V)
- Tin plate
- Cutter



Fig.2.Isometric View designed in Catia

First of all we had started with the base of the fan. We took a sanitary pipe of 2mm thickness and 110mm diameter. The length is according to the height required (here we have taken it as 250mm).



Fig.3. Motor with Mounted Vanes

The lower half of the pipe was drilled with a number of minute holes for the purpose of suction of air. The upper half of the pipe was mounted with a DC motor with the help of wooden blocks, which were attached with the help of screws to the body of pipe. Then we cut a tin plate of 95mm into eight equal parts and each part was turned into the shape of the blades.

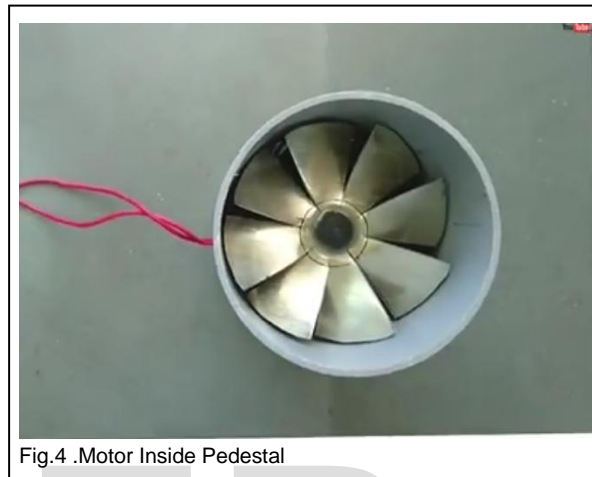


Fig.4 .Motor Inside Pedestal

For the upper part, the bucket was cut into two circular parts of 95mm and 100mm width. The two parts were mounted one on top of the other with a strip in between to maintain the gap through which air is circulated in upper portion.

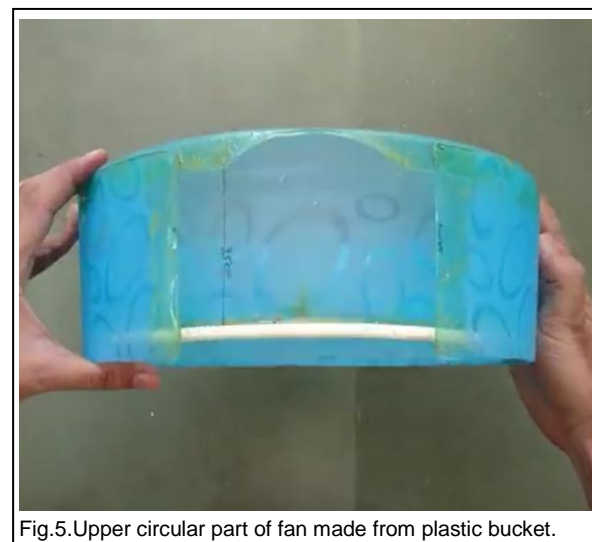


Fig.5.Upper circular part of fan made from plastic bucket.

The back peripheral side of the portion is covered with water pipe (garden pipe) from which air is reflected and expelled out. The inner peripheral side was attached with a

small circular part of 30mm width with spacers provided in between from where air is expelled out.



Fig.6.Fan blowing out air.

The velocities of air at different distance from the fan have been tabulated as shown below and the speeds have been compared with a table fan and variation is shown in the following graph. The readings were taken with the help of anemometer.

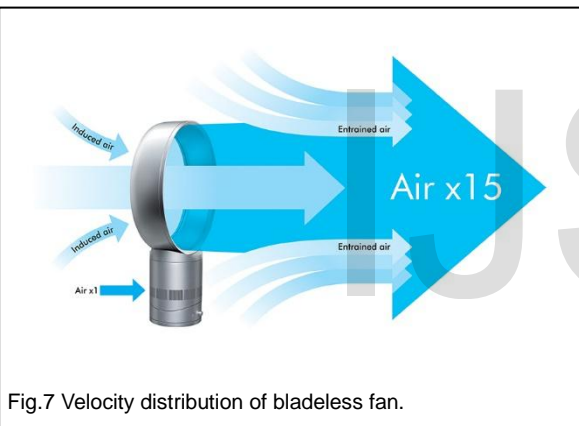


Fig.7 Velocity distribution of bladeless fan.

Table. 1
Velocity Distribution

S No	Distance (m)	Bladeless Fan (m/s)	Table Fan (m/s)
1.	0.5	4.01	4.94
2.	1.0	3.23	3.26
3.	1.5	2.50	2.28
4.	2.0	2.05	1.54
5.	2.5	1.82	1.15

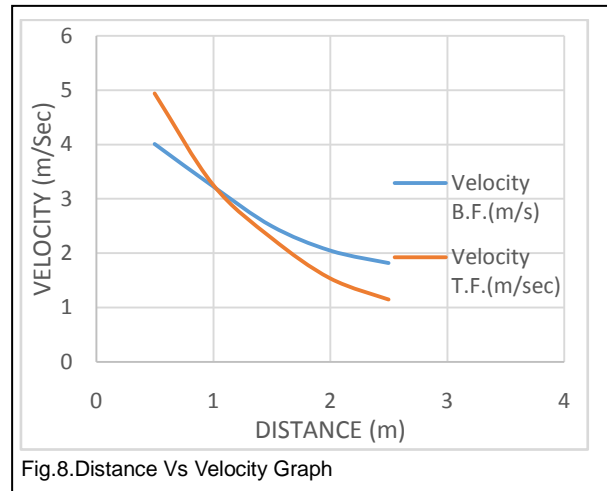


Fig.8.Distance Vs Velocity Graph

4 DISCUSSION

From graph it is clear that for short distance we get more air from a table fan but in case of long distance, bladeless fan gives more air.

- The distribution of air is more uniform in case of Bladeless Fan.
- Noise intensity is low in Bladeless Fan as compared to Table Fan.
- Bladeless Fan occupies less space than a Table Fan.
- From safety considerations table fan is less safe as it requires more covering to avoid contact with blades. Where as in bladeless fan this is overcome by the fact that blades are hidden in the base.
- These are comparatively easy to clean as most of the area is exposed.
- No grills are required in case of bladeless fan.

5 CONCLUSION

This idea of making Bladeless Fan is effective in almost every aspect mainly the safety considerations and noise intensity as compared to a normal table.

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