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DRONE CATCHER GUN

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Abstract: The last, few years, air drones have been widely known as they are remote-controlled, flying devices that are capable of filming and photographing while being on the air. These pose a threat to our personal privacy, national security and also to our various activities. Drone catcher gun is a scalable system, which provides the maximum protection of areas and facilities of sizes, forms and functions [1]. It comprises of different sets of equipment depending on the application (private houses, prisons, commercial venues, government buildings, industrial installations, airports, border security, critical infrastructure, military facilities). We chose these particular bottles as even after our processing on them, they are still safe to tolerate high pressures. One of the most important factors for the right performance of the gun is how fast the valve will open and release the air. Basically, we making and using this gun for the security purposes and to secure from drone [2].

Keywords: Drone Catcher, Gun, Military facilities, Industrial installation, Border securities

1. INTRODUCTION

1.1 Drone catcher gun

(Net Gun) Drone catcher gun is a scalable system, which provides the maximum protection of areas and facilities of sizes, forms and functions. It comprises of different sets of equipment depending on the application (private houses, prisons, commercial venues, government buildings, industrial installations, airports, border security, critical infrastructure, military facilities). We chose these particular bottles as even after our processing on them, they are still safe to tolerate high pressures. One of the most important factors for the right performance of the gun is how fast the valve will open and release the air. Basically we making and using this gun for the security purposes and to secure from drone[3].

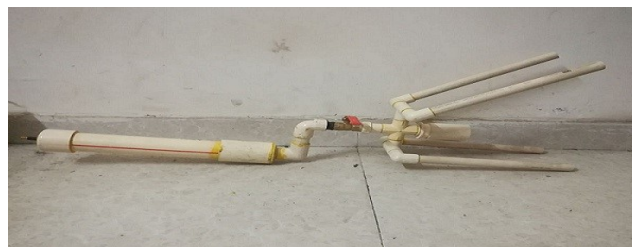


Fig.1.1. Drone catcher gun

2. WORKING

A Drone catcher is a very simple in construction consisting of mainly three sections given as respectively: -

2.1 Pressure chamber

Pressure chamber is used to store the compressed air in it at around 80-150 psi which is used to generate force for pushing the net from the launching section to catch the Drone. In our project it is made from a CPVC (Chlorinated polyvinyl carbon) pipe which is lighter in weight and can sustain a pressure of about 200 psi and a temperature of 93.2 °C.

2.2 Trigger valve

It serves as a switch to rescue the pressure in the pressure chamber to the launching section. It should be quick because its response should be very fast so that it can quickly catch the Drone. Trigger is the intermediate section of our Drone catcher gun which connects the pressure chamber and the launching section. It is the valve through which the compressed air flows. Its material should be highly heat resistant and also capable of handling pressure of around 200 psi therefore, we connected the valve with a strong spring that as soon as the trigger is pulled, the trigger also pulls with pressure and speed the valve to open. Next, we bifurcated the air with four barrels. Also, we bifurcated the air with the same accessories in order to achieve exactly the same distribution of air in each barrel of our gun.

2.3 Launching section

It is the last part of our Drone catcher gun which has four CPVC tubes in which the net is connected. As the trigger of our net gun is opened suddenly the compressed air flows into the launching section from the pressure chamber. Now this net flies to a suitable height and catches the drone flying over.

3. MATERIALS USED FOR CONSTRUCTION

3.1 CPVC Tubes –

Following is the chart of the dimensional details of the CPVC tube used for the construction of DRONE CATCHER GUN.

Dimensional Details

Dimensional details and Pressure Ratings of SDR 11 (Class 1) CPVC Pipes as per IS 15778

Nominal Size (inch)	Nominal Size (mm)	Outside Diameter (mm)		Wall Thickness (mm)		Pressure Rating at 27°C		Pressure Rating at 82°C	
		Average	Tolerance	(mm)	Tolerance	(kg/cm ²)	(MPa)	(kg/cm ²)	(MPa)
1/2	15	15.90	±0.1	1.95	±0.25	28.14	2.76	6.93	0.68
3/4	20	22.20	±0.1	2.25	±0.25	28.14	2.76	6.93	0.68
1	25	28.60	±0.1	2.85	±0.25	28.14	2.76	6.93	0.68
1 1/4	32	34.90	±0.1	3.45	±0.25	28.14	2.76	6.93	0.68
1 1/2	40	41.30	±0.1	4.05	±0.25	28.14	2.76	6.93	0.68
2	50	54.00	±0.1	5.20	±0.30	28.14	2.76	6.93	0.68

Dimensional details and Pressure Ratings of SDR 13.5 (Class 2) CPVC Pipes as per IS 15778

Nominal Size (inch)	Nominal Size (mm)	Mean Outside Diameter (mm)		Wall Thickness (mm)		Pressure Rating at 27°C		Pressure Rating at 82°C	
		Average	Tolerance	(mm)	Tolerance	(kg/cm ²)	(MPa)	(kg/cm ²)	(MPa)

Fig.3.1 Dimensional details of CPVC tube

Chlorinated polyvinyl chloride (CPVC) is a thermoplastic produced by chlorination of polyvinyl chloride (PVC) resin which is significantly more flexible and can withstand higher temperatures than standard PVC.

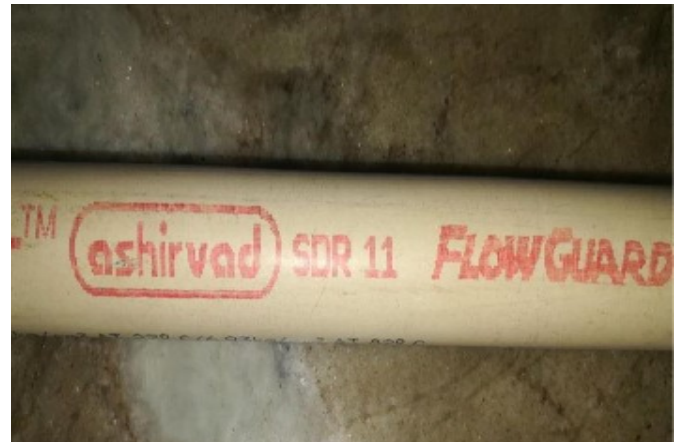
3.2 Properties of the CPVC tubes are:

3.2.1 Physical properties

CPVC shares most of the features and properties of PVC, but also has some key differences. CPVC is readily workable, including machining, welding, and forming. Because of its excellent corrosion resistance at elevated temperatures, CPVC is ideally suited for self-supporting constructions where temperatures up to 200°F (93.3°C) are present. The ability to bend, shapes, and weld CPVC enables its use in a wide variety of processes and applications.

3.2.2 Mechanical properties-

The principal mechanical difference between CPVC and PVC is that CPVC is significantly more ductile, allowing greater flexure and crush resistance. Additionally, the mechanical strength of CPVC makes it a viable candidate to replace many types of metal pipe in conditions where metal's susceptibility to corrosion limits its use.



3.2.3 Heat resistant-

CPVC can withstand corrosive water at temperatures greater than PVC, typically 40°C to 50°C (104°F to 122°F) or higher, contributing to its popularity as a material for water piping systems in residential as well as commercial construction. CPVC's max operating temperature peaks at 200°F (93.3°C) Fig.3.2.3 A CPVC (Chlorinated PVC) pipe used in construction[4]

3.2.4 CPVC CEMENT



CPVC piping systems can be joined using flanging , threading or mechanical joining. But in many cases, the recommended method is solvent cement. Solvent cement is a fast, easy and highly reliable process that produces a joint stronger than either the pipe or fitting alone[5].

Chlorinated polyvinyl chloride (CPVC) pipe and fittings are rapidly growing in popularity in both corrosive and high-temperature applications. ... Solvent cement is a fast, easy and highly reliable process that produces a joint stronger than either the pipe or fitting alone.

The most important thing to know about solvent cement is that it's not glue. Solvent cement is made up of CPVC resin, stabilizers and fillers dissolved in a cocktail of solvents. These solvents serve two purposes:

1. Dissolve the CPVC resin.
2. Prepare the surface of the pipe and fitting.

When applied, the solvents soften and dissolve the top layer of the pipe and fitting material, loosening its molecular

structure. A taper in the fitting socket creates an interference fit that ensures contact between the pipe and fitting. This allows the material to fuse to itself when the two pieces are connected. The CPVC resin is present to fill in any gaps that may exist. Because this fusion happens at the molecular level, when the solvent evaporates, the joint actually becomes one uniform piece. Solvent cement also contains stabilizers that maintain solvent properties and extend its shelf life. Specifically, these stabilizers help protect the solvent cement against heat and oxidation, which can degrade the solution.

4. APPLICATIONS

- a. It can catch a drone who is spying on you.
- b. Design is simple.
- c. Less maintenance cost.
- d. No harm for the human and animals.
- e. Use for security purpose.

5. CONCLUSION

This Drone Catcher Gun is capable of firing a net from 15 to 25 feet using 80-100 psi of compressed air which is stored in a pressure chamber. The net is reusable, assuming your prey doesn't destroy or run off with it. The launcher section is modular and can be removed in case we want to use a different design or add attachments [6].

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