VIVA-TECH IJRI
ANNUAL RESEARCH JOURNAL
VIVA-TECH INTERNATIONAL JOURNAL FOR RESEARCH AND INNOVATION
ANNUAL RESEARCH JOURNAL
ISSN(ONLINE): 2581-7280

# Larger Distances Objects Transporting (LDOT) Gun

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***Abstract:*** *It is observed that the task of installing cable or internet wires from one building to another is very tedious, less precise, and also a bit risky. Usually, this task is carried out using a simple rope and ball mechanism i.e at one end of the rope is a ball tied and at the other end is the wire to be transported. Now the ball is thrown to the destination with the rope equal to the distance between two buildings and as the ball reaches the destination the rope is pulled along the wire. Thus we can see this entire process is very long and less precise. To make this task simple and overcome all these problems we have proposed a mechanical device called as 'LDOT Gun' i.e Larger Distances Objects Transporting Gun which simply works on the principle of air pressure i.e pressurized air filled in the gun when released helps the object reach up to its destination with the help of ball and rope attached at the nose of the gun. This gun not only transports wires from one elevation to another but also transports other heavy objects. Also, this device is easy to use and quite affordable making the task precise and eradicating all the risk factors.*

***Keywords -*** *Air pressure, Ball, LDOT( Larger Distances Objects Transporting) Gun, Paintball gun, Rope.*

## I. INTRODUCTION

The present invention generally relates to a Grappling Hook. A Grappling Hook or Grapnel is a device invented by the Romans in approximately 260 BC. The grappling hook was originally used in naval warfare to catch ship rigging so that it could be boarded typically have multiple hooks (known as claws or flukes), attached to a rope; it is thrown, dropped, sunk, projected, or fastened directly by hand to where at least one hook may catch and hold. Generally, grappling hooks are used to temporarily secure one end of a rope. They may also be used to dredge for submerged objects. Grappling hooks are well-known devices, which are used for tethering or securing ropes, cables, to supporting structures and other devices. Grappling hooks are often used in climbing where a cable is secured to one end of the grappling hook. A myriad of other uses of a grappling hook is well known in the art, including pulling, towing, securing, tying, connecting, and anchoring. Most grappling hooks are thrown by hand, but some used in rescue work are propelled by mortar or a rocket. The grappling hook is launched in front of an obstacle and dragged backward to detonate trip-wire-fused land mines, and can be hooked on wire obstacles and pulled to set off booby traps on the wire

## II. LITERATURE REVIEW

Boris B. Tolstykh, Pneumatic Air Gun, 2019 [1] The paper describes the objective, construction, and working of an air distribution device which is used basically for a dual-barrel pneumatic gun for distribution of air and gas used in it. An air distribution device for a dual-barrel air gun is disclosed that routes air or other gases exhausted from an air gun tank to a select one of the air gun barrels which allows the user to fire a follow-up shot with less delay. More specifically, the device of the present invention allows the user to control the routing of air to either barrel of the air gun through the use of a stem selector, a first transfer port, and a second transfer port.

Zuopeng Zhu, Three-stage Air Pump Assembly for Pneumatic Air Gun, 2019 [2] The paper explains the construction and working principle of three staged air guns made for air guns. The three-stage air pump assembly

includes an air compression assembly and an energy storage assembly disposed of on gun support of the pneumatic air gun. The energy storage assembly includes a three-stage air pump and the main check valve disposed of at the end of the air pump. The three-stage air pump includes a front fixed sheath, a rear fixed sheath, a front movable sheath, a rear movable sheath, a first tube, a second tube, a third tube, and a piston rod. The diameters of the first tube, the second tube, and the third tube are successively reduced.

Krzysztof Kraz, David C. Johnson, Automatic Pellet Loader of Pneumatic Air Gun, 2018 [3] The present invention relates to air gun, and more particularly air gun with multiple energy sources for providing compressed air charge for the firing of an air gun in projectile motion. An air gun includes two different types of energy sources that may be used to fire a projectile. The first type of energy source may include an air cylinder having a piston that moves through a cylinder, as urged by a mechanical spring or gas strut, to create a compressed air charge for firing a projectile. The second type of energy source may include a compressed gas storage tank that holds compressed air or another propellant, that is released during firing to urge the piston through the air cylinder to create a compressed air charge for firing a projectile.

Chao-Hsiung Cho, Yau Yu-chan, Air Gun Firing Operating System, 2014 [4] The present invention provides an air gun firing system, which can employ a purely mechanical system to achieve a high-speed continuous firing or single firing operation. The firing system uses a sliding shuttle tube able to move frontward and rearward between a bullet chamber and a cylinder. The speed of the back-and-forth movement is further subjected to an increase in the amount of air pressure in a prepositioned pressure regulating device of the pressure buffer chamber, thus enabling high-speed movement and achieving a high-speed firing operation.

Bryan Litz, Modern Advancements in Long Range Shooting, 2014 [5] Modern Advancements in Long Range Shooting is an ongoing series that deals with the progression of equipment and scientific knowledge used for long-range shooting. In particular, new equipment and ideas are tested to determine if and how they can help shooters be more effective at long-range shooting. Rather than rely on popular opinion or marketing hype, the writers approach the matter with careful experimentation which is then described in a way that's easy to understand and apply. There is a pattern to how the subjects are addressed.

Chih-Chen Juan, Air Gun Firing System, 2002 [6] It is the main objective of the present invention to provide an air gun firing System with a simple Structure and fully automatic repeating operation. Another object of the present invention is to provide an air gun firing System that does not require a bi-directional gas pressure vessel for simpler control. A further object of the present invention is to provide an air gun firing System that has a control valve cast in a mold for better reliability.

Thomas G. Kotsiopoulos, Pressure Regulating System For Compressed Gas Powered Weapons, 2000 [7] This invention generally relates to a Pressure-regulating System, and more particularly, to a regulating System for use in compressed gas-powered weaponry. A compressed gas-powered gun includes a firing system capable of achieving increased firing rates. The firing System includes a regulating System by which an air or firing chamber can be charged with compressed gas from a compressed gas Source to a predetermined pressure very rapidly. The firing System also includes a trigger mechanism that enables rapid actuation of a trigger by a user.

Bruce M. D'Andrade, Safety Nozzle for Projectile Shooting Air Gun, 1996 [8] The present invention toy air gun has been developed to provide high powered, the safe shooting of projectiles, such as foam darts. It may be any known or yet to be developed air gun for shooting projectiles through a nozzle. The safety mechanism is located within the nozzle. The safety mechanism includes a valve connected to the nozzle to prevent the flow of pressurized air into it when closed and to allow the flow of pressurized air when opened; a biasing device for biasing the valve to a closed position; an opening device movably located within the nozzle, e.g. within an annular space between a launch tube and the nozzle.

Alfons Vandoninck, Spray can be Incorporating A Discharge Pressure Regulating System, 1994 [9] A spray can include a reservoir, a riser pipe in the reservoir, and a valve connected to the riser pipe. The spray can is further provided with a pressure regulator in the riser pipe for maintaining a near-constant pressure in the medium being dispensed from the spray can through the riser pipe. The spray can is hereby put under pressure by partly filling the reservoir with a gas under pressure. Since, at the start, the pressure in the reservoir is high, this causes the medium to be atomized with an undesired great force when the spray can is used. To remedy this disadvantage, the researchers have built-in a pressure regulator in the valve of the spray.

Marion L. J. Lambert, Compressed Air Gun, 1934 [10] This invention relates to compressed air guns and has special reference to portable instruments for use in controlling the discharge of compressed air from a container Supported within the body of the instrument. An object of the invention is to provide an improved portable compressed air gun having a body, including two separably connected Sections, one of which is hollow and is designed and adapted to receive and contain a cartridge or shell filled with compressed air and the other of which sections contain a mechanism for opening the cartridge or shell and controlling the discharge of the compressed air, therefore, and sealing devices for preventing loss of the compressed air.

## III. METHODOLOGY

The process began by analyzing and understanding the problem statement. This was followed by studying various existing models related to our problem statement and finalizing the rough design. The next step began by creating the rough estimation of the parts list and making 2D designs on Drawing sheets. After completion of designs, the next step was the selection of materials best suited for each unique component. The next step was design calculations. Once the design calculations were completed, 3D CAD Modelling using CAD software was executed for a better understanding of the design. After completion of the design in CAD software, They were further analyzed by performing various tests in different conditions through simulation software. In the next step after completion of all the design and analysis, the final product is made practically. In the last stage, the final product is tested by performing various tests taking real-life examples.

## IV. CONSTRUCTION

This gun mainly consists of 4 parts:

1. Internal chamber
2. Gun casing or Gun body
3. Ball and rope
4. Handle
5. Air valve

Inside is the internal chamber where the stored air from the air reservoir enters into when the chamber due to the spring's kinetic energy is set into motion. Then upon the internal chamber is the Gun casing or gun body. The main purpose is to store the inlet air into an air reservoir that enters into the casing through a one-side air valve that allows the flow of air only in one direction. This stored air into the air reservoir is measured with the help of a pressure gauge. Then at the back of the gun comes the handle which provides stability to the gun and grip to the user preventing both vibrations and recoil. Here at the disk face of the gun are attached 4 springs that are responsible for initiating forward motion of the internal chamber. This entire process is triggered by a trigger mechanism placed at the handle. then comes the ball at the nose of the gun which is responsible for taking the rope up to the desired destination.

## V. FIGURES AND TABLES

TABLE 5.1: Part list and Material

| **Part Name** | **Material** |
|---|---|
| Gun casing | Fiber |
| Kevlar Rope (200m, 3mm dia) | Kevlar |
| Pulley and spring snap hook | Stainless steel |
| Level Indicator | Mercury |
| Air Valve | Rubber |

| | |
|---|---|
| Air Pump | Plastic |
| Pressure Gauge | Polymer |
| Stand and Collecting net | PVC and Nylon |
| Ball | Rubber |
| Trigger Switch | Stainless steel and Plastic |

## VI. CONCLUSION

In the conclusion, we believe that as per our idea and as per whatever we have designed, the following are the outcomes,

1. Transfer cable wires easily and safely from one building terrace to another
2. Reduce the time required for transferring and installing cable wires.
3. Can easily transport wires up to 150 m distance.
4. High accuracy, lightweight, and easy to carry and use.
5. LDOT Gun Can be used to transfer lightweight objects up to 30kg for a 150m distance.

Thus we conclude that our LDOT (Large Distances Objects Transporting) Gun will resolve all the difficulties faced during transporting objects from one elevation to another making the overall process easy and safe. Also, the product is quite affordable and with a maximum weight carrying capacity of 30kg.

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