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Fabrication of Model Using Pneumatic System for Unloading Wagon

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ABSTRACT

The project being complicated was decide to be developed on a small scale model that should be constructed using light weight material and should be pneumatically operated using pneumatic cylinder arrangement. Also, this pneumatic piston and cylinder arrangement was decided to be motor driven to make the same automatic. These motor run using a battery/ SMPS and are controlled using a remote control that is attached with the base model using wires / FRC cable and these after controlled by operator. A conventional dump truck is mounted on a truck chassis and has an open dump box pneumatically operated and hinged at the rear of the truck usually by one or more pneumatic rams that raise the dump box to unload contents at a delivery site. These pneumatic rams are either front loaded or mounted in the underbody and are driven from a gear box power take- off. pneumatic rams mounted in the underbody provide the capability of the dump body to tip the dump box on a anyway basis, either to the left or right side or to the rear by rotating the dumper in any direction.

Keywords: Pneumatic Cylinder, Air Compressor, Solenoid Valve, Actuator.

INTRODUCTION

The primary alternative to rotary dumping has long been provided by a wide variety of self-unloading cars. Most of these are bottom-dump cars of various sorts, equipped with doors of one sort or another at the bottom to allow bulk cargo to be unloaded by gravity. Drop- bottom gondolas, for example, are low-sided open-topped cars where much of the floor of the car is composed of trapdoors. While drop-bottom cars could usually be used for other purposes, side-dump cars and hopper cars with sloping floors to guide the cargo to unloading doors can only be used for bulk cargo. All of these have the advantage that they can be unloaded anywhere, but the disadvantage that any imperfection in the seals of the doors allows material to spill onto the track. A dumper/ wagon designed for carrying bulk material, often on building sites. Dumpers are distinguished from dump trucks by configuration: a dumper is usually an open 4- wheeled vehicle name "dumper" comes from. They are normally diesel powered. A towing eye is fitted for secondary use as a site tractor. Dumpers with rubber tracks are used in special circumstances and are popular in some countries Early dumpers had a payload of about a ton and were 2-wheel drive, driving on the front axle and steered at the back wheels. The single cylinder diesel engine (sometimes made by Lister) was started by hand cranking. The steering wheel turned the back wheels, not front. Having neither electrics nor hydraulics there was not much to go wrong. The skip was secured by a catch by the driver's feet. When the catch is released, the skip tips under the weight of its contents at pivot points below, and after being emptied is raised by hand.

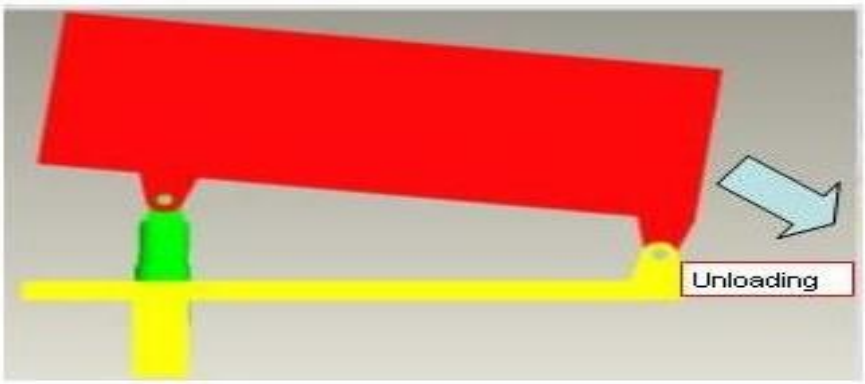
COMPONENTS REQUIRED

1. Pneumatic cylinder

2. Air Compressor

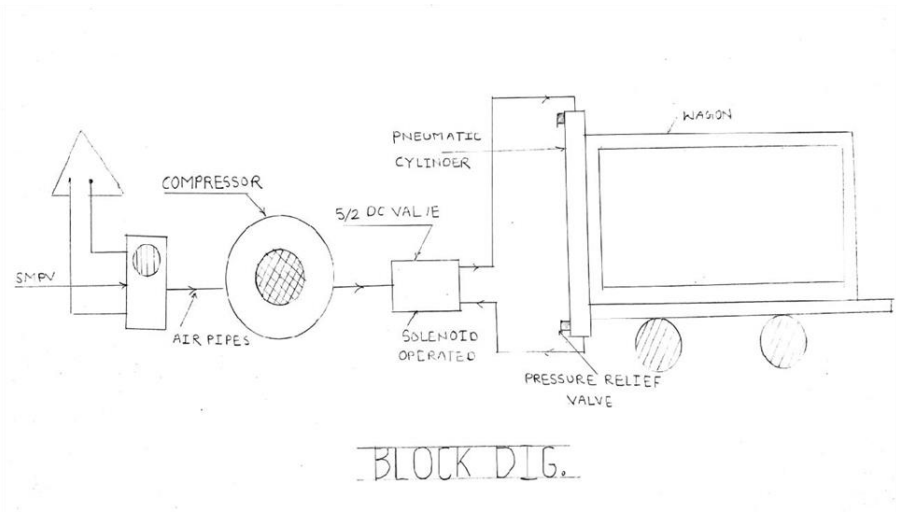
3. Pneumatic pipe

4. Hinge Joint



CONSTRUCTION OF SYSTEM

In the construction of pneumatic system consists of compressor, flow control valve, pressure control valve, and pneumatic cylinder (actuator), and air pipes. The function of all these components are given in above figure. As first the SMPS is the DC convertor are connected to air compressor. The 5/2 solenoid operated DC valve are connected with air compressor. The two ends of pneumatic cylinder are connected to 5/2 DC valve through air pipes. Pipes are well insulated and hoses are provided in pipes. So, air leakage problem is eliminated. This pneumatic cylinder is mounted on a fabricated wagon.



WORKING PRINCIPLE

The working medium adopted is compressed air. The compressed air is transmitted through tubes to pneumatic cylinder where power is converted into reciprocating motion. i.e. actuator motion. The reciprocating motion is obtained by using an electrically controlled solenoid valve or by manually operated direction control valve. The input to the solenoid/direction control valve is given through the control unit. And the pressure valve of the wagon which were inclined that are push in upward direction. The actual working of pneumatic system that lifts the wagon takes place by single press of the button provided on dashboard. When the valve is turned on, the compressed air start flowing through the pneumatic lines. The two-way valve is operated by manually. This pressurized air then directed to the shutoff valve which in turn directs the flow. Distribution of the pressurized air is controlled by a direction control valve on the dashboard. As the air proceeds into the pneumatic cylinder, it exerts a certain amount of pressure on the plunger or the ram inside the cylinder. This exerted pressure of the air is converted into a linear force which in turn causes the plunger in the cylinder to move out of the cylinder. Thus, ultimately the exerted pressure of the air is converted into linear motion of the plunger. And because of this pressure the wagon is left in inclined potion and manually valve is operating in off position so that the pressure actuator is relies.

Advantages

- Infinite availability of the source

Air is the most important thing in the pneumatic system, and as we all know, air is available in the world around us in unlimited quantities at all times and places.

- Easy channeled

Air is a substance that is easily passed or move from one place to another through a small pipe, the long and winding.

- Temperature is flexible

Air can be used flexibly at various temperatures are required, through equipment designed for specific circumstances, even in quite extreme conditions, the air was still able to work.

- Safe

The air can be loaded more safely than it is not flammable and does not short circuit occurs (konsleting) or explode, so protection against both of these things pretty easily, unlike the electrical system that could lead to fires konsleting

- Clean

The air around us are tend to clean without chemicals that are harmful, and also, it can be minimized or cleaned with some processes, so it is safe to use pneumatic systems to the pharmaceutical industry, food and beverages and textiles.

- The transfer of power and the speed is very easy to set up

Air co uld move at speeds that can be adjusted from low to high or vice versa. When using a pneumatic cylinder actuator, the piston speed can reach 3 m / s. For pneumatic motors can spins at 30,000 rpm, while the turbine engine systems can reach 450,000 rpm

- Can be stored

The air can be stored through the seat tube fed excess air pressure. Moreover, it can be installed so that the pressure boundary or the safety of the system to be safe.

FUTURE SCOPE

As the world is progressing at faster rate we meet mover and mover huge construction which head to be dig big and big amount of the earth and thus more efficiently working equipments are to be required and hence the three way dropping dumper may be used more than the two way or one way.

India is progressing at higher rate and hence infrastructural development is on its high that's why efficient and working equipment that are time as well as required at larger scale also we have very low road space in areas like Kashmir working to be efficient, also in dam site these any way dropping dumper is required so the Indian context of view of the project work. Hence the future of this project work seems promising.

CONCLUSION

Wagon damper or tipper is useful for power plant industries for time saving and easy manual free operation .It can take less time for dumping for continuous production of power in plants.

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REFERENCES

[1] Tupkar R. S., Aditya R. Malewar, Rohit A. Ramteke, Harshal S. Lakhade, Shubham R. Navghare, "Design and Fabrication of Unidirectional Dumper" , INTERNATIONAL JOURNAL FOR SCIENTIFIC RESEARCH & DEVELOPMENT, Vol. 3, Issue 02, 2015, ISSN (online): 2321-0613.

[2] Prasath N.E., Shanmugam S., MathalaiSundaram C., VembathuRajesh A., "Development of Three Axes Lifting Modern Trailer", INTERNATIONAL JOURNAL OF EMERGING TECHNOLOGY AND INNOVATIVE ENGINEERING, Vol. I, Issue 5, MAY 2015 (ISSN: 2394 – 6598).

[3] Slivinskii E. V., Korchagin V. A., Radin S. Yu., Rizayeva Yu. N., "Modernization of Bodies Tipper Trailers to Improve the Working Conditions of Maintenance", INTERNATIONAL JOURNAL OF TRAFFIC AND TRANSPORTATION ENGINEERING, Vol. 4, No. 2, 2015.

[4] Ganar S.S., Kakde A.D., Pali R.R., Kolhe S.D.,"Design and Fabrication of Multi-Directional lifting dumper", INTERNATIONAL JOURNAL OF ADVANCED RESEARCH, Vol. 4, Issue 4, 2016, ISSN 2320-5407.

[5] Deshmukh S.A., LonkarPradip P, Bhong Tushar H, Kale Dadaso B,Three Axis Pneumatic Modern Trailer By Using Single Cylinder, INTERNATIONAL JOURNAL OF RECENT RESEARCH IN CIVIL AND MECHANICAL ENGINEERING (IJRRCME), Vol. 2, Issue 2, MARCH 2016, ISSN 2393-8471.