

# Development of Manually Operated Air Compressor for Automotive Purpose

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**Abstract-** This paper describes a new approach to design and fabrication of Pedal operated air compressor with the goal of building a working prototype. Here is a try to create a mechanical device that can use the mechanical power operated by pedals as in bicycles to run an air compressor. We used a cycle chain-sprocket system as a basic pedalling power source and connect it to the main shaft joining both the air compressor through several gears. This approach will be helpful for saving a sufficient amount of electricity and get a robust portable air compressor system.

## INTRODUCTION

Air compressors are found in a wide range of environments for an even wider range of uses. You'll see gas stations offering compressed air to inflate your vehicle's tires and your tire shop using compressed air with an air tool to remove your tires. You may have seen small desktop air compressors used with an airbrush or a trailer-style gas-powered air compressor at a construction site powering jackhammers and concrete compactors. Air compressors have a multitude of uses for leisure and maintenance at home or in businesses to get work done efficiently and safely. The pressure that comes from compressed air has so many uses that we're sure to leave out a few applications, but we have compiled a lengthy list that will widen your knowledge about the various ways that air compressors are used in a multitude of environments.

Different applications call for different types of air compressor there are many types of compressor in size and power supply, you will find two main designs for the majority of air compressors reciprocating piston air In these two designs you'll find several models offering a selection ranging from

the low pressure air in a small storage tank sufficient to pump up your bike or car tires to the ultimate power of pressurized air that will supply a heavy manufacturing facility with constant and reliable air for plant operations. compressor and rotary screw air compressors. Compressed Air Power at Home Personal use of compressed air comes in many forms. For fun or profit, having an air compressor at your home will make many maintenance tasks easy do yourself and allow for creative expression with hobbies and professional artistry. Any use at home will be covered with the selection of size and power offered in a reciprocating piston design.

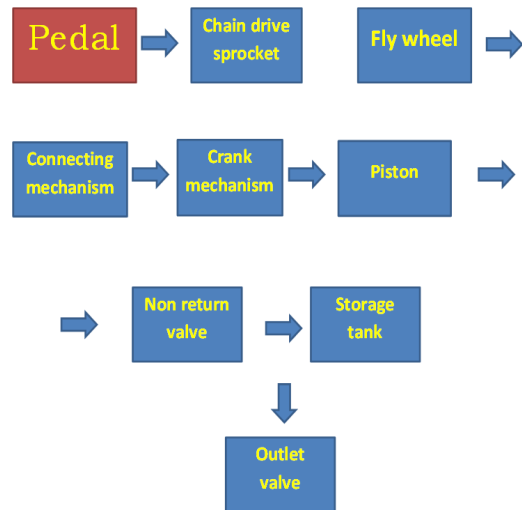
## WORKING OF MANUALLY OPERATED AIR COMPRESSOR

The pedal powered air compressor set up, has a simple mechanism operate with the chain and sprocket arrangement. The chain is place on the teeth of the wheel and pinion. Pedal and connecting rod are interconnected to each other with bolts.

The seat has mounted on a position that can slide along the frame for varying user heights. The most difficult challenge was transferring the manual power to the compressor without exhausting the user too quickly. The gear ratios required for attainable pedalling speeds are determined by the specific well conditions.



BLOCK DIAGRAM



CONCLUSION

The pedal powered machine has been experimentally verified. This pedal operated mechanism can generate enough power to drive the air compressor. The compressor is human powered. This narrows down our powering options significantly to something purely mechanical (probably no electric power of any kind). This system is easy to operate and can be made at a very less expense. The pressurized air generated and be used in various other purposes such as filling air in tires, paint sprayer etc.

REFERENCES

[1] Alex Weir, “The Dynapod: A pedal power unit” Volunteers in Technical Assistance, ISBN-0-86619-072-4 in 1980

[2] S.Chand & Co. Ltd., Machine design, 11th Revised edition (1 July 1996)

[3] S.M. Yahya “Turbines Compressors and Fans” 4th Edition, McGraw Hill Education (India) Pvt. Ltd.

[4] Alex Weir, “The Dynapod: A pedal power unit” Volunteers in Technical Assistance, ISBN-0-86619-072- 4 in 1980. S.Chand & Co. Ltd., Machine design, 11th Revised edition (1 July 1996).

[5] Bicycle power pump, vita technical bulletin27 vita 3706 rhode island avenue mt. rainier, Maryland 20822USA.

[6] S.M. Yahya “Turbines Compressors and Fans” 4th McCullogh, James C, Pedal Power, Rodale press, Emmaus, Pennsylvania, 1977 probably the most completed work on the subject, Has several usefull designs for various pedal operated machines as well as a new dynapod design, also has chapter on the history and future of pedal power.

[7] Weir, alex pedal power thresher and winnower available from alex wier, facility of agriculture , university of dare s sallam, box 643, mörgoro, Tanzania.