

PNEUMATIC CUP SEALER

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Abstract - Known for energy efficiency and robust construction, we are offering our clients a wide range of Semiautomatic Packing Machine. Our range is highly customized and can be availed in various designs and sizes. Our project is a simple pneumatic cup sealer machine which seal plastic cup with help of heating disc which apply heat and pressure on cup to be sealed.

Key Words: Pneumatic, Cup, Seal, Production, Manufacturing, Market, Efficiency.

1.INTRODUCTION

The science of pneumatics deals with the study and function of compressed air. Pneumatics is used in particularly every industry for a wide variety of manufacturing processes. Pneumatic equipment's are used for multiple reasons. The main reason for using pneumatic systems is that it employs air as the working fluid or in other words it is air- powered. Air is a source that is free and is widely available everywhere. It is a limitless natural resource available for even the most rudimentary collection system. Besides being widely available the properties of air add to the advantages of using air in a system.

Air is easily compressible, elastic, and has low inertia. Compressibility and elasticity mean that air can absorb large amounts of energy, which can be distributed rather easily. The compressibility, coupled with the low inertia means that the pneumatic system can offer smooth acceleration, deceleration and reversal of mechanical motions with minimal shock. The low density of air makes it suitable to long-distances, high-speed control. Pressure pulses can be transmitted at velocities up to the speed of sound. The inertia aspects of air enable valve cycle rates substantially higher than what is practical in hydraulic systems.

Market survey:

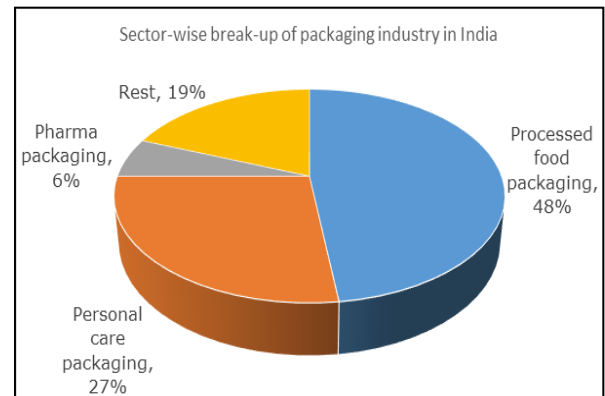


Fig.1

Why Use Pneumatics?

- 1. Weight:** Much lighter than motors (as long as several used)
- 2. Simple:** Much easier to mount than motors
Much simpler and more durable than rack and pinion
- 3. More rugged:** Cylinders can be stalled indefinitely without damage Resistant to impacts.

Description:

It is a foot operated pneumatic cylinder. After applying the force on foot pedal compressed air from compressor will apply force to the piston. This will cause heating disc move down and apply heat and pressure on lid of plastic cover. Due to heat and pressure the plastic and aluminium foil lid will get stuck together and cup will get sealed.

Our unit contains: 1) Pneumatic cylinder

2) FRL unit

3) Foot pedal (3/2) valve

4) FCV & NRV

5) Heating disc & Heating coil

6) Frame

7) Control panel

8) Pipes and connectors

Pneumatic Cup Sealer:

These tools are durable and available in various specifications to meet the diverse requirements of these our clients.

Product features:

- Economical
- Robust
- Flexible
- Portable
- Low maintenance
- Easy to operate
- Easy to clean
- Quick installation
- Easy to assemble and disassemble

Part List:

1. Pneumatic cylinder DA
2. FRL unit
3. Foot pedal (3/2)
4. Aluminium heating disc
5. Heating coil
6. Control panel
7. Hoses
8. Connectors
9. Flow Control Valve
10. Check valve
11. Frame
12. Compressor
13. Cup and lid

Part Details:

PNEUMATIC CYLINDER DOUBLE ACTING: -

Pneumatic cylinders are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion.

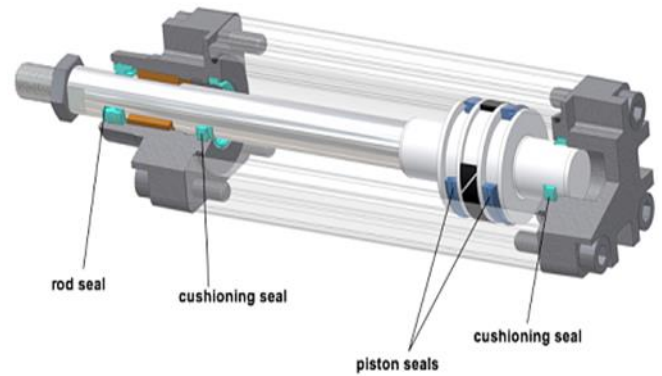


Fig.2

FRL UNIT:

Air leaving a compressor is hot, dirty, and wet—which can damage and shorten the life of downstream equipment, such as valves and cylinders. Before air can be used it needs to be filtered, regulated and lubricated.

An air line filter cleans compressed air. It strains the air and traps solid particles (dust, dirt, rust) and separates liquids (water, oil) entrained in the compressed air. Filters are installed in the air line upstream of regulators, lubricators, directional control valves, and air driven devices such as cylinders and air motors.



Fig.3

FOOT PEDAL (5/2):

They are used to regulate air flow, where necessary.

Foot pedal is nothing but 5/2 directional control valve operated mechanically by pressing it by foot.

Heating disc:

Heating disc is made of aluminium cast. First, we made a wooden pattern with 5mm extra for tolerance. The finished disc was of size as following

Diameter: 130mm

Height: 20 mm

Boss dia: 30mm

Boss height: 35mm



Fig.4

This aluminium disc contains slots for wire, deep hole for heating coil, Allen keys to hold tight, thread in boss for attaching cylinder rod end.

Heating disc:

Control panel consist of thermostat. A compatible rheostat is fitted in box with indicating LED and calibrated scale for adjusting temperature.

Hoses:

Hoses are nothing but pipe made of high strength and flexible rubber mixed plastic i.e., polyurethane.

Hose are carrier for air toward all pneumatics the components.

Diameter of hose is 8mm.

Connectors:

Connectors are small components which are used to connect pneumatic components and hoses to each other.

We used 8mm pneumatic connectors for all joints

Flow Control Valve:

Flow control valves are used to control flow of air entering or exiting the pneumatic cylinder.

- Regulate flow of air into and out of a cylinder
- Used to control speed of a pneumatic cylinder
- If used, attach directly to cylinder (only one end needed)
- seems to regulate air flowing in both directions, but one direction is restricted a little more.

Frame:

Frame is used to support all components and equipments used in total unit the frame supports cylinder, FRL unit, foot pedal and sliding disc in which cup is to be holded.

Total frame is made of M.S.



Fig.5

Compressor:

Compressor is main powerhouse of total pneumatic system



Fig.6

Cup and Lid:

Cup is made of food grade plastic and lid is made of food grade aluminium foil.



Fig.7

Construction:

1. The total frame is erected by using angle, square pipes, strips of M.S. and welding process.
2. Kept the pneumatic cylinder at the top position. And tightened it to supporting angles by its own end threading at required position.
3. The circular heating plate is attached to piston end of the pneumatic cylinder by means of threads on piston rod and internal threads on boss of disc by fastening and provided a lock nut.
4. Before attaching heating disc to cylinder we placed heating coil in to the disc and tightened it with Allen key. Both connecting wires of heating coil are connected to control panel. Also taken earthing out of heating disc.

5. Then we connected Pneumatic cylinder, FRL unit, 5/2 DC valve, FCV, NRV, in form of meter out circuit with the help of hose and connectors and finally connected it to compressor

Then arranged control panel and placed sliding disc into frame and took trial.

Fittings:

- Put Teflon tape on all threads to ensure a good seal do not put tape on first two threads, as it may come loose and clog up a valve
- Tubing attached simply by pushing it into connector If you have a leak, try cutting off the last couple centimeters of tubing; if it is damaged, it will not seal properly To detect leaks, put soapy water on suspect connections and watch for bubbling.

Working:

1. First start the compressor.
2. The rectangular plate is pulled by using hand.
3. After that the glass which we want to pack is inserted in the rectangular plate.
4. After that the glass cover is placed at top of the glass.
5. Then the rectangular plate is push to the assembly.
6. Then press the foot operated valve by using foot.
7. The circular disc is applying the sufficient pressure on the glass cover.
8. At the same time by using the heating coil the temperature of the disc is increased.
9. That means by using the pressure and temperature the glass cover is fitted on the glass.
10. Then the rectangular plate is pull.
11. Remove glass from plate.

ADVANTAGES:

1. Minimum time required
2. It's a semiautomatic process.
3. Economical.

4. Not required technical labor.
5. Size of machine is small.
6. Not higher electricity required.
7. Small to medium sized cup or glass can be packed.
8. Various shaped cups can be packed
9. Robust
10. Flexible

DISADVANTAGES

1. Requires compressor.
2. Labor required.
3. New plate is required for new shape of cup.

properties of air add to the advantages of using air in a system.

Easy and more Efficient.

BIOGRAPHIES:



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Fig.8: Final Product

CONCLUSION:

The science of pneumatics deals with the study and function of compressed air. Pneumatics is used in particularly every industry for a wide variety of manufacturing processes. Pneumatic equipment's are used for multiple reasons. The main reason for using pneumatic systems is that it employs air as the working fluid or in other words it is air- powered. Air is a source that is free and is widely available everywhere. It is a limitless natural resource available for even the most rudimentary collection system. Besides being widely available the