

PNEUMATIC KITCHEN KIT

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Abstract

Pneumatics is that branch of technology, which deals with the study and application of use of pressurized gas to affect mechanical motion. **Pneumatic tools** or **air tools** are tools driven by gas, usually compressed air supplied by a gas compressor. Pneumatic tools can also be driven by compressed carbon dioxide (CO₂) stored in small cylinders allowing for portability. Pneumatic tools are commonly cheaper and safer to run and maintain than their electric power tool counterparts, as well as having a higher power to weight ratio, allowing a smaller, lighter tool to accomplish the same task. Pneumatic tools are mainly used when we need fast movement. We can convert the compressed air pressure into rotary motion and reciprocating motion using pneumatic grinders and pneumatic cylinders. In this model we have used pneumatic grinder to rotate the mixer grinder blades. We have also used two pneumatic cylinders to chop the vegetables in the desired shape. The motion of the two cylinders is synchronized by manually operated flow valve such that when one piston moves inwards, the other moves outwards and vice-versa. The speed of grinder can be controlled by flow control valve. Different types of blade grids can be inserted into the slot to chop the vegetable into desired shape and size.

1 Working Principle

The working principle of our mechanism is conversion of air pressure into reciprocating motion of pneumatic cylinders and rotary motion of pneumatic grinders. This motion can be used for food processing as per requirement.

2 Motivation

We heard of Pneumatics the first time we saw the poster of NaCoMM Student Mechanism Competition-09. When we read about pneumatics on the internet we got motivated to participate in this competition. As we know that Pneumatics is not taught in any institute as a part of their engineering curriculum, we thought to develop a mechanism which will take pneumatics to every home in the world. So we decided to make a pneumatic kitchen kit. But gradually when we worked on our project we found that large compressors can't be placed in every home and so we limited

the application of our mechanism to large scale use only. We can use this mechanism in canteens and mess of industries which uses air compressors.

3 Components

3.1 Air cylinder:

(a)

1. Bore diameter – 32mm
2. Stroke length – 80mm
3. Pressure – 0 to 10 kg

(b)

1. Bore diameter – 25mm
2. Stroke length – 200 mm
3. Pressure – 12 bar

3.2 Grinder:

Rpm – 22000

Pressure – 90psig

3.3 Direction Control valve

3.4 Y – connector

3.5 T- connector

3.6 L – connector

3.7 Flow Control Valve

3.8 Blade Grid

3.9 Jar and Body of Mixer Grinder

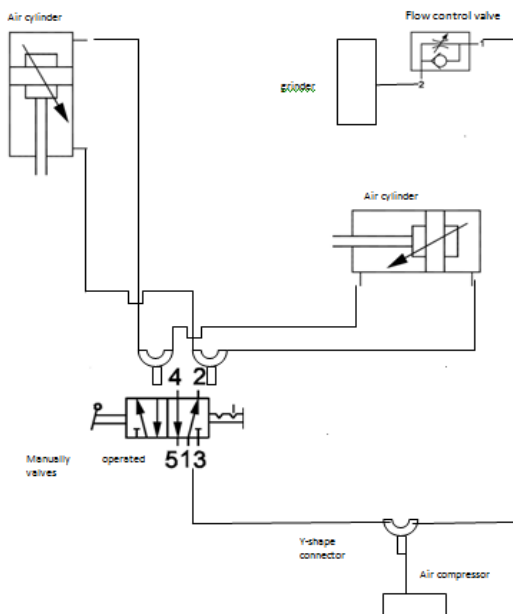
4 Applications

1. Our device can be installed in canteens and mess of industries where compressors are used.
2. It can also be used in hotels and restaurants.
3. It can be used as a full functioning food processor and a lot of applications can be added.

5 Advantages

1. This mechanism can also be used in case of power failure.
2. Pneumatic systems tend to have long operating lives and require very little maintenance.

6 Circuit Diagram



7 Conclusions

With all our efforts and guidance of our professors, we have manufactured a model of our pneumatic kitchen kit which can do cutting and grinding operations.

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