

A review on Design and Fabrication of Frumentum Maskin

Shailesh Dharpure¹, Tushar Kumbhalkar², Yadnesh Dhabre³, Mahesh Kanojiya⁴

¹ Student, Mechanical Engineering Department, Nagpur Institute of Technology, Nagpur, Maharashtra, India.

² Student, Mechanical Engineering Department, Nagpur Institute of Technology, Nagpur, Maharashtra, India.

³ Student, Mechanical Engineering Department, Nagpur Institute of Technology, Nagpur, Maharashtra, India.

⁴ Professor, Mechanical Engineering Department, Nagpur Institute of Technology, Nagpur, Maharashtra, India.

Abstract - This paper describes about the new idea that deals with the grain shops, ration shops, etc. This helps in reduction of wastage of grains by supplying grains to customers. This project consists following components they are hopper, lead screw and sliding mechanism. This assembly is connected with automated mechanism with solenoid valve as a sliding mechanism which control flow of grains.

Key Words: microcontroller, solenoid valve, pneumatic cylinder.

1. INTRODUCTION

A Frumentum Maskin is a machine which is used to provide frumentum (grain) to the customers without wastage of frumentum (grain) on ground or floor. The name "Frumentum" is a Latin word means grain; and "maskin" is a Swedish word means machine. In grain shops and government controls, it seen that most of the grains get wasted by falling on A Frumentum Maskin is a machine which is used to provide frumentum (grain) to the customers without wastage of frumentum (grain) on ground or floor. The name "Frumentum" is a Latin word means grain; and "maskin" is a Swedish word means machine

In grain shops and government controls, it seen that most of the grains get wasted by falling on ground or floors during providing frumentum to the consumers and these are of no use. By seeing that, the concept of the frumentum maskin is introduced

Frumentum will place in hopper and extracted out with the help of hose pipe as the sliding plate moves. The time is set for the sliding plate to move the plate with the help of sliding mechanism which is controlled by controller.

2. PARTS

Frumentum Maskin consists of following components,

2.1 Base

2.2 Lead screw

2.3 Hopper

2.4 Electronic Devices

2.5 Mechanism

2.1 Base

Base is the most important part of the machine and it placed at the bottom of the machine. All the load of maskin acts on the base. Load cell is attached to the base so as to measure the weight of the grains.

2.2 Lead Screw

Lead Screw is used to provide to perform linear motion to the hopper to slide it up and down. The functions of the lead screw are to support the hopper and to provide motion to it and also to adjust the height of hopper. The hopper comes down and gets filled by frumentum and then moves up with the help of lead screw which is connected to motor via. Chain and sprocket. Lead screws used are two in numbers.

2.3 Hopper

Hopper is a hollow transition piece going from larger to smaller size, also known as a reducer. The grains are stored in hopper with hopper the frumentum flows in a proper way as from hopper to the bags or containers

2.4 Electronic devices

Electronic Devices are those which actuate the electric energy into mechanical energy. It also has a control on the quantity to be supplied as well as to actuate the mechanism.

2.5 Mechanism

Mechanism is used to engage and disengage dispense of frumentum from the hopper in a quantity required to the consumers.

3. AUTOMATION

The process of flowing frumentum (grains) into container is done with the help of automation.

This can be done by the following electronic devices;

3.1 Microcontroller

3.2 Load cell

3.3 Solenoid valve

3.4 Pneumatic cylinder

3.5 Relay

3.1 Microcontroller

It is an AT89S2 type of a microcontroller. It is a low power, high performance CMOS 8Bit microcontroller with 8K bytes of in-system programmable Flash memory. The AT89S52 provides the features of 8K bytes of flash, 256 bytes of RAM, 32 I/O lines, watchdog timers, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes.

3.2 Load cell

A load cell is typically an electronic device (transducer) that is used to convert a force into an electrical signal. . This conversion is indirect and happens in two stages. Through a mechanical arrangement, the force to be sensed is deforming a strain gauge. The strain gauge converts the deformation (strain) to electrical signals. The electrical signal output is normally in the order of a few millivolts and requires amplification by an instrumentation amplifier before it can be used. The output of the transducer is plugged into an algorithm to calculate the force applied to the transducer.

3.3 Solenoid Valve

The whole 'four port', 'five ports', 'two way', 'three way', naming came from the action of the air as it moves through the solenoid. Again, the names aren't as important as what it does. The best combination of flexibility and use for double acting cylinders is what's called a "five port, four ways" solenoid (they're also called 'valves'). In this, five port, four way solenoid is used. In this, full pressure air is always being sent out of one of the two air cylinder ports. There isn't a position where the air cylinder does not have air going to it. It has a DC voltage of 24 volts.

3.4 Pneumatic cylinders

(sometimes known as air cylinders) are mechanical devices which use the power of compressed gas to produce a force in a reciprocating motion.

Like hydraulic cylinders, something forces a piston to move in the desired direction. The piston is a disc or cylinder, and the piston rod transfers the force it develops to the objective to be moved. Engineers sometime prefer to use pneumatic because they are quieter, cleaner, and do not require large amount for fluid storage.

3.5 Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

4. SKETCH

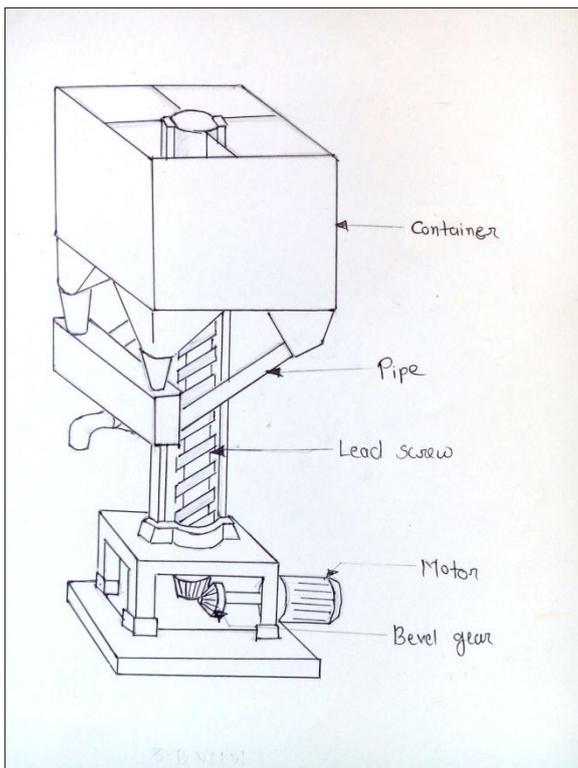


Fig-1: Review of Frumentum Maskin.

5. CONCLUSION

The review of frumentum maskin will be useful for grain shops, government controls. This will be helpful for the reduction in wastage of grains and provides in proper

quantity to the customers. It has higher degree of automation on the basis of sensors and will bring great benefit for reduction in wastage of grains.

REFERENCES

- [1] Oko C.O.C., Diemuodeke E.O., Akilande I.S., 2010. Design of hoppers using spreadsheet. Res. Agr. Eng., 56: 53-58.
- [2] Eric Maynard Jenike and Johanson, INC, Ten Steps to an Effective Bin Design.
- [3] Tim Freeman, Freeman Technology, Modern tools for hopper design.
- [4] Catalin-Iulian CHIVU, Transilvania University of Brasov, Romania, Simulation of Double Acting Pneumatic Cylinder Control.
- [5] Diptarup Paul, Sukalyam Som, Microcontroller Based Intelligent Digital Volume Controller with Timer, International Journal of Computer Applications (0975-8887). Vol. 38- No.1
- [6] T. Nguyen, J. Leavitt, F. Jabbari, J. E. Bobrow , Accurate Sliding Mode Control of Pneumatic Systems Using Low Cost Solenoid Valves, IEEE/ASME TRANSACTION ON MECHATRONICS , VOL. 12, NO. 2.
- [7] Z. Wang, H. HU, " Analysis and Optimization of a Compliant Mechanism-Based Digital Force/ Weight Sensors," IREE Sensors J., vol. 5, no. 6, pp1243-1249, Dec 2005.