

CORE CUTTING MACHINE

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ABSTRACT

This Improved machine for cutting an elongated paper tube or core mounted on a mandrel into a plurality of identical length core segments has a single control lever which when pivotally moved, actuates a cam and through a linkage system expands a portion of the mandrel against the core which actuated by pneumatic cylinder control by DCV. A push button on the control lever electrically controls the rotation of the mandrel while continued pivotal movement of the lever moves a circular cutter into the tube to be cut. An adjustable stop member which is articulated to permit the loading of new cores pivots with the control lever to permit core segments to fall away from the mandrel as they are severed from the tube. A polyurethane ring on the mandrel provides a long lasting anvil surface for the cutter.

Keywords: Core, Cutter, Polyurethane ring.

1. Introduction

This project is based on the paper core cutting. In industries pipe is made up by extrusion process which is of high length and need to be cut into parts of small length according to customer's requirement or job requirement in paper or printing industries. pipe is one of the most versatile and useful structural building materials available, but you still need a method to reduce it down to the right size. We've provided a few methods and tools, shown below, to cut core easily and safely.

The improved core cutter of the invention consists basically of a selectively rotatable mandrel having locking means for engaging and anchoring a core for rotation with it and a pivoted arm carrying freely rotatable cutter disc. A manually operable handle extending from the pivoted arm includes a push button in its outer end which permits the operator to actuate an electric clutch for causing the mandrel to rotate. A cam and a linkage assembly actuated by the initial movement of the pivoted cutter carrying arm toward the mandrel compresses a rubber ring near the tip of the mandrel in an axial direction and causes the rubber to expand radially into locking contact with a core member positioned on the mandrel. As the cutter disc contacts the rotating core it is rotated by frictional contact with the core.

2. Literature survey

A horizontal log splitter works well if you are splitting hundreds of logs each year. If you have heavier logs that you are not able to lift on your own, vertical log splitters can assist you best. Many models have the option to switch back and forth between vertical and horizontal.

You no longer need to do the backbreaking work of log splitting with an ax. Using a wood splitter will save you tons of time and pain, so you can get back inside and relax by the fire. And speaking of a fire - splitters make splitting firewood quite easy

3. working

This project relates to improvements in core cutting machines, principally cutters providing means to slice or cut a paper core into a number of predetermined Sections. The new machine is especially adaptable for cutting heavy wall paper cores, leaving clean, dustless beveled edges so vitally necessary when the cores are used on slitting machine rewind arbors. The new and useful core cutting machine according to my project is comparatively simple in design and very simple to operate; its frames are all metal and rugged in construction while all rotating parts are dynamically balanced. Another object of my project is the provision Of a Core Cutting machine equipped. With a gripper device to prevent the core tube from slipping around its mandrel and make it positively rotate with the drive

shaft during the slicing Operation. Other objects and advantages of my project will become more fully known as the description thereof proceeds and will then be more specifically defined in the appended.

We have improved the machine by adding many features in the new design.

- 1) T-slot arrangement for moving the cutter blade(with cutter holder) in the longitudinal direction, to adjust the spacing between the cutter blades to cut the total length paper tube into desired pieces of different lengths as desired.
- 2) Provided nylon sleeve to prevent touching of the cutter blade to the mandrel surface which grips the paper tube and rotates along with it. PVC pipe can also be used instead of the nylon sleeve.
- 3) This is a semiautomatic machine, cutter blade fed by pneumatic means; only loading and unloading of the paper tube is done manually.
- 4) Provision is also made for moving the cutter blade individually independent of each other. This allows for longer usage of the same cutter blade until it wears to such an extent that, regrinding is not possible. This is to compensate for different rate of wear of different cutter blades (if they are mounted on the same member)
- 5) This is completely a new design and all the parts are fabricated as per the design.

4. CONSTRUCTION

The manufacturing & designing of suitable machinery for rural industrialization will help in better production improve productivity more employment. The designing & manufacturing of viable, economic machinery is the necessary of the have in rural economy.

Our project should be such that its operation should be simple, its running & maintenance expenses should be law. It should work with minimum economic input & its depreciation cost is low.

It should provide better technique of breaking system with minimum cost by giving a better result.

There are different parts used in machine / system.

- 1) Motor drive
- 2) Pulley driven
- 3) One shaft
- 4) Metal frame.
- 5) Cutter
- 6) Pneumatic Cylinder
- 7) DCV

4.1 FRAME:



Fig 4.1 Frame

In our project firstly we make square tube frame on which owe other parts are assemble. On the frame there is a longer shaft is mounted horizontally. & it is mounted in plumber block at the base motor is mounted horizontally & drive is passed through pulleys.

4.2 TRANSMISSION SYSTEM:

The mechanical power produced by prime mover we used to drive various machines in the workshop & factories. A transmission system is the mechanism which deals with transmission of power & motion from prime move to shaft or from one shaft to the other.



Fig 4.2 Shaft

4.3 PULLEY:

The rotary motion of the one pulley is transmitted to the operative element to provide on operative working or auxiliary motion. When the required motion is rotary; the transmission takes place through mechanisms transfer rotary motion from one shaft to another. Transmission of the motion from the external source i.e. electrical energy to the operative element can take place trough mechanical elements such as belts, chain etc.

The belt drive is one of the most common effective devices transmission motion & power from one from one shaft to the other by means of then inextensible belt over running over pulleys.



Fig 4.3 Driven Pulley

When the center distance between the two shafts is large than the tight side of the belt should be the lower one the pulley called driver is mounted on the driving shaft while the shaft while the other which is mounted on the shaft to which power is to be transmitted is called the driven pulley.

When the belt moves over the pulley there is always the possibility of slipping between the belt & pulley & hence the character of the motion transmitted is not positive when positive action is required.

4.4 PNEUMATIC CYLINDER:

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

Like hydraulic cylinders, pneumatic cylinders use the stored potential energy of a fluid, in this case compressed air, and convert it into kinetic energy as the air expands in an attempt to reach atmospheric pressure. This air expansion 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 object to be moved. Engineers prefer to use pneumatics sometime because they are quieter, cleaner, and do not require large amounts or space for fluid storage.

Because the operating fluid is a gas, leakage from a pneumatic cylinder will not drip out and contaminate the surroundings, making pneumatics more desirable where cleanliness is a requirement. For example, in the mechanical puppets of the DisneyTiki Room, pneumatics is used to prevent fluid from dripping onto people below the puppet.

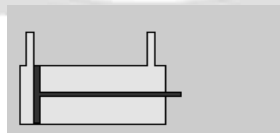


Fig 4.4 Pneumatic Cylinder

4.5. DOUBLE-ACTING CYLINDER

Double-acting cylinders (DAC) use the force of air to move in both extends and retract strokes. They have two ports to allow air in, one for out-stroke and one for in-stroke. Stroke length for this design is not limited; however, the piston rod is more relations between cylinder and pressure we can accurately find out bending and buckling of tie rod. Vulnerable to buckling and bending. Addition calculations should be performed as well by using design data hand book using some

4.6 2D VIEW:



4.7 TWO WAY DIRECTIONAL VALVE

A two-way directional valve consists of two ports connected to each other with passages, which are connected and disconnected. In one extreme spool position, port is open to port B; the flow path through the valve is open. In the other extreme, the large diameter of the spool closes the path between A and B; the flow path is blocked. A two-way directional valve gives an on-off function.

(Flow path open and Flow path closed).



4.8 HIGH SPEED STEEL BLADE:

A blade is used to cut the sheet metal in a desired dimension. Here we are using high speed steel blades to cut the paper core.

(3) Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state.

5.OBJECTIVES:

1. To split paper core at different sizes.
2. To split core in such a way that it is with smooth edges.
3. To reduce the effort required to split paper core.
4. To replace the use of manual cutter.
5. To split core faster
7. To avoid the use of skilled labor.
8. To split paper core of varying sizes
9. To make the process simple

6. ADVANTAGES

1. Inexpensive
2. Unskilled person can operate it.
3. Simple in construction.

7. APPLICATION

1. In printing industries.
2. Home use.

8. REFERENCES

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