Design and Fabrication of Paper Bag Making Machine

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ABSTRACT

For a daily requirement of carrying goods is carried out by the plastic bags. But plastic bags are hazardous for our environment so we replace it with a paper bag from brown paper which is pollution free and easily degradable or recycle. The machine that already exist is used for making bags from other material such as drawing sheets, brown paper and paper rolls are very expensive. Ultimately it can be improve by some other investigator and overcome this problem. This bag has comparatively large in size and for making these bags uses a complex machine. We have proposed a cheap, portable paper bag making machine, fabricated to produce paper bag and reduce the usage of plastic bags for a clean, safe and green society. The system is semi-automatic which is capable of producing a paper bag from any waste paper. The system can be implemented in a small scale industry for producing paper bag and it will automatically minimize the trend of plastic bags. The main components of this machine include pedestal bearing, pneumatic cylinder, folding SS arms, compressor, cutter, puncher, speed reduction mechanism. The shaft that turns a machine does not always match the speed available from the motor. For our operation we required low speed with high torque but the speed of the motor is too high. Hence, to reduce the speed we use speed reduction mechanism.

Keyword: - *Pedestal Bearing, Pneumatic Cylinder, Folding SS arm's, Compressor, Cutter, Puncher, speed reduction mechanism.*

1. 1 NTRODUCTION

We need small size bags every day for various purposes like grocery, fruits, vegetables, etc. We use plastic bags for such purposes plastic shopping bags have a surprisingly significant environmental impact for something so seemingly innocuous. Plastic shopping bags kill large number of wild life each year. So to avoid harmful effects of plastic bags, viable alternative is required which is Paper bags, Paper bag making machines that are currently available in India remain unaffordable to many poor worker who continue to make them manually paper bag by collecting various papers from localities.

These entire problems are eliminated in the presented machine. A machine whose initial cost is less, which does not require any special paper, which can be use for small scale production is developed. This machine will help a poor family to earn money through small scale production of paper bags. The paper bag will be produce from the regular size brown paper to reduce the cost of bag. Once the bag is used it still can be sold to scrap vendor earning bags small amount of the cost for the paper bag. This not only reduces waste but also promotes the recycling. Even government is trying to reduce the impact of plastic bags. This news definitely proves to be our strong hold as we are also the one who are trying to oust the plastic bags.

1.1 EVOLUTION OF INCENSE STICK & CONES MAKING MACHINE

In 1852, Francis Wolle, a school teacher, invented the first machine to mass- produce paper bags. Wolle and his brother patented the machine and founded the Union Paper Bag Company.

In 1871, inventor Margaret E. Knight designed a machine that could create flat- bottomed paper bags, which could carry more than the previous envelop- style design.

In 1883, Charles Stilwell patented a machine that made square-bottom paper bags with pleated sides, making them easier to fold and store. This style of bag comes to be known as the S.O.S., "Self-Opening Sack".

In 1912, Walter Deubener, a grocer in St.Paul, Minnesota, used cord to reinforce paper bags and add carrying handles. These "Deubener shopping bags" could carry up to 75 pounds at a time, and become quite popular, selling over a million bags a year by 1950. Paper bags with handles latter become the standard for department stores, and were often printed with the store's logo or brand colors.

Plastic bags were introduced in the 1970s, and thanks to their lower cost, eventually replaced paper bags as the bag of choice for grocery stores. With the trend towards phasing out lightweight plastic bags though, some grocers and shoppers have switched bag to paper bags.

In 2015, the world's largest paper shopping bag was made in the UK and recorded by Guinness World Records.

2. AIM AND OBJECTIVES

2.1 AIM:-To design a low cost semi-automatic paper bag making machine for micro enterprises.

2.2 OBJECTIVE:-

1. To minimize the human effort.
2. To develop simple mechanism to perform the operation.
3. To increase the efficiency and quality of the products.
4. To analyze the demand of paper bag.
5. To develop a machine which can be used mostly where there is shortage of electricity.
6. To increase the production rate with the less cost.

3. PROBLEM IDENTIFICATION

Following are the problems identified while studying about the Paper Bag making machine:-

- Plastic bags are one of the worst and most unnecessary plastic polluters of the earth so we avoid to the use of plastic bags we made paper bags.
- Other paper bags to increase the strengthened by adding chemical creates a lot of pollution which in turns harms the environment.
- A small percentage of these end of being recycled, and some people try to reuse old plastic bags for other purposes, but the vast majority of plastic bags are used a single time.
- The major drawbacks of the existing machines are too large a occupy huge area.
- In existing machine the operation gluing folding and punching are not perform on a single unit.
- In fig (3.1) shows, in ancient days the paper bag is made by hand it take more time so that we develop paper bag making machine.

Fig. 3.1:- Paper Bag Making by Hand

4. DEVELOPMENT

4.1 MARKET SURVEY

The table 4.1 shows the type of Paper bag making machine available in India. From this table we can come to know that the availability of machine at high cost around our country. The power consumed can also add to the monthly expenditure on the machines. The capacities of machines are also shown in table. The requirement of floral space is also more for the cheapest machine available which increases the weight of machine.

SR.NO	COMPANY NAME	CAPACITY (PER MINUTE)	COST
1.	Mahindra engineering company	80-100	Rs 3.9 lakh
.2.	Green –tech	100-120	Rs 5 lakh
3.	Elite Pro	100-120	Rs 2.5 lakh

Fig 4.1:- Paper bag making Machines

(a)Mahindra Engg. Company (b) Green- Tech (c) Elite Pro

4.2 MECHANISM

The Paper pulling mechanism is use to pull the paper from the paper roll and by pulling it through the rollers it passes to the folding mechanism where the paper is fold from one side and further passes to gluing mechanism where the one sided open fold is pasted with the help of glue. After gluing the cutting operation is carried out and punching on the top side of the bag.

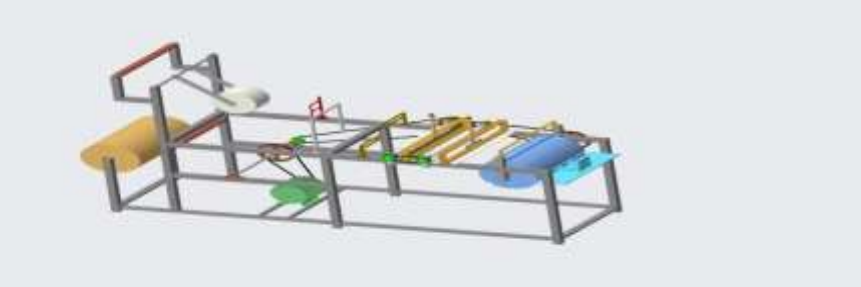

Fig .4.2:- Project Model

4.3 COMPONENTS

The project model is designed to low cost semi-automatic paper bag making machine. The major components of the machine are as follows:-

1. AC motor
2. Pedestal bearing
3. Pulley
4. Gear
5. Folding SS arm's
6. Glue solenoidsor roller
7. Pneumatic cylinder
8. Body frame
9. Conveyor belt
10. Controller circuit

4.4 FABRICATION

The following table shows the list of operation performed for the fabrication of each components and its material.

SR.NO	COMPONENTS	MATERIALS	OPREATIONS REQUIRED
1.	Shaft	Stainless Steel	Feeding, Folding, Gluing, Cutting , Punching
2.	Body Frame	Mild Steel	
3.	Conveyor Belt	Rubber	

4.	Fiber Board	Fiber	
5.	Pedestal Bearing	Cast Steel	
6.	Cylinder	Stainless Steel	

5. WORKING

The output of the system is a paper bag when the paper roll is input into the machine .Motor is use in the system to transmit the power and operate conveyor speed reduction mechanism, feeding and folding mechanism. The paper from paper roll is pulled with the help of pulling mechanism then this paper which will passed to the folding mechanism by using roller ,belt and conveyor . Gluing mechanism is used in the system to apply glue on the paper. After this operations the cutting operation is carried out and then punching on the top side of the bag. In these way final product is taken out that is paper bag.

6. FINAL PRODUCTS

Fig.6.1:- Paper Bag

7. COST ANALYSIS

Sr. No.	**Component**	**Quantity**	**Cost (In Rs.)**
1.	Conveyor Belt	1	275
2.	Pulley 2.75 inch 2 inch 10 inch	 1 1 2	 270 230 1800
3.	Motor	1	2500
4.	V- Belt 44 inch 52 inch	 1 1	 180 110
5.	Bearing Pedestal Bearing Roller Bearing	 6 10	 3330 400
6.	Roller	4	1200
7.	Pneumatic Cylinder	1	2000
8.	Glue	3	1000
9.	Fabrication	-	23475
	Total		40000/-

8. CONCLUSION :

We have been able to design and develop a low cost semi- automatic paper bag making machine. The machine converts paper into a paper bag with the help of paper bag making machine. We are able to reduce the plastic used.

9. FUTURE SCOPE:

The system can use for making various adjustable size paper pouch or bag as our requirement. This machine is useful for small scale production. By adding flexible folding mechanism to the system, paper bag for variable sizes can be obtained. Also we can produce paper bags of large size. Sensing mechanism can be developed to sense glue level. Work can be done to fully automate system and increase productivity.

10. ACKNOWLEDGEMENT

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