DESIGN AND FABRICATION OF PAPER POUCH MAKING MACHINE FOR UTILIZATION OF WASTE PAPER

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ABSTRACT

We have proposed a cheap, portable paper pouch making machine fabricated to produce paper pouch and reduce the usage of plastic pouch for a clean, safe and green society. The system is semi-automatic which is capable of producing a paper pouch from any waste paper. The system can be implemented in a small scale industry for producing paper pouch and it will automatically minimize the trend of plastic pouch.The harmful effects of plastic bags on the environment are well known. It is now appropriate to use alternative materials for manufacturing bags and in packaging industries. The disposal and recycling of plastic pouch has created destructive and danger to the environment. Suitable solution to come out of this difficulty is to replace, wherever possible, plastic Pouch with other bio-degradable materials such as paper Pouch. Paper bag is closest economical alternative to the plastic bag.

Keywords: *Implemented, Fabricated, Destructive, Manufacturing, Bio-degradable*

I. INTRODUCTION

This project is based on reuse of waste papers for manufacturing paper Pouch instead of using recycled papers. It also aims on switching traditional manual method of paper bag manufacturing to low cost semi automated system in order to achieve the goal of mass production of paper bags through automation. Due to mass production, the cost of the final pouch is expected to be low as compared to the paper pouch available in the market made by traditional manual method. As these Pouch are environment-friendly, reusable, have great holding capacity; contain more than 45% of recycled material. Therefore, its demand is rapidly growing in the market. In this 21st century, with increasing population, markets and industries, and large production, usage of plastic pouch has rapidly increased. On the counter side, plastic is non-biodegradable and is toxic. Further, people dump plastic bags at many places which results in environmental degradation. These bags are sometimes consumed by domestic animals, leading to their death. Everyone does something with the best of their knowledge to save earth from demolition. This is the major reason why most of the companies move from plastic bags to paper pouch. As these pouch are environment-friendly, reusable, have great holding capacity; contain more than 45% of recycled material. Therefore, its demand is rapidly growing in the market. Plastic, although considered as one of the greatest inventions by virtue of its use in carrying things has become a major element in polluting the environment. It is almost impossible to destroy plastic bags. Plastic bags remain in the soil for centuries and damage the soil. To overcome this problem we want to replace plastic pouch with paper pouch.

II. LITERATURE REVIEW

FRANCIS WOLLE [1] in 1852, he invented first paper bag making machine. In 1869 he and his brother founded a paper bag making company called "Union paper bag Machine Company" in savannah. His company generated $ 4 million income in one year. Currently his company in under the ownership of International Paper. This invention consists in certain devices by the combined operation of which pieces of paper of suitable length are given out from a roll of the required width, cut off from the roll and otherwise suitably cut to the required shape, folded, their edges pasted and lapped, and formed into complete and perfect bags which when dried will be ready for use.

MARGARET E. KNIGHT [2] she was an American inventor, notably of the flat bottomed paper bag. In 1868, Margaret knight invented a machine that folded and glued paper to form the flat bottomed brown paper bags. Knight build a wooden model of the device, but needed a working iron model to apply for a patent. She has been called "The most famous 19th century woman inventor". This invention relates to machines for making paper bags of the satchel-bottom class, and is an

improvement on the machine represented in United States Patent No. 116,842, Granted to M. E. Knight on July 11, 1871, to which reference may be had. The paper from a reel is formed into a tube And pasted together before being folded for the bottom of the bag. The bottom of the bag. This my present invention relates, chiefly, to the main folding-blade and an auxiliary feeding-blade having certain time and order of motion relatively to the finger and side-folders, as hereinafter described, whereby the bottom of the bag ls completed, except as to its last fold, in an easy and rapid manner, without tearing or straining it out of shape; also, to the combination, with the side-folders, of pasting mechanism to apply paste to the said side-folders, they applying paste to one of the overlapping corners of the bag bottom.

CHARLES STILWELL [3] in 1883, he patented a machine that made square bottomed paper bags with pleated sides making them easier to fold and store. This style of bag came to be known as the S.O.S. or "Self-opening sack". Stilwell dedicated his free time to manufacturing an improve paper bag. Paper or grocery bags already existed, but they were not easy to fold or to store. They also could not stand on their own because of their v-shaped bottom. On June 12, 1883, The U.S. patent office granted Stilwell a patent for a machine that Manufacture a square-bottom bag. The bag also had pleated sides. The square bottomed allowed the bags to stand on their own, while the pleats permitted easy folding and storage of the bag. The S.O.S. because of the bags ability to remain standing and open without assistance of a person. Stilwell's invention dramatically improve the bag, making it much more desirable to American consumers. In essence, Stilwell bag was the precursor of modern day paper bags.

THOMAS PARKER SMITH [4] in 1905, He invented new and useful Improvements in Paper bag making machines, which of the following specification. This invention has reference to machines for making those paper bags which are of comparatively large size, such as millinery and laundry bags, which are made of cap paper or other thin paper and which, owing to the thinness of the paper and the comparatively large size of the bags, have before been difficult to make by machinery. By constructing the bags and the machines for them in accordance with this invention it is enabled to produce the large-size bags much More quickly than before and with practically no waste. In carrying out my invention I employ a thin-paper-bag making machine of the well-known kind in which the thin paper bags are made continuously from a roll of paper and Are cut off and one end to form the bottom is folded and pasted and the paper bags passed round a drying-cylinder, so are delivered by the machine finished and dried ready for use.

HARRY ALFRED BARNETT [5] a residing of Romany Manor, Park, London, England, In 1913 he invented certain new and useful Improvements in Paper-Bag-Making Machines, of which the following is a specification. This invention relates to the manufacture of bags, envelops or the like, of paper or other material, and refers to an improved machine or apparatus by means of which the paper bags, envelops or the like can be made up from suitably shaped blanks, which blanks are picked up from a pile, folded, and the edges pasted or gummed and turned over, the unfinished bag or the like being then passed through suitable pressing roller's into a delivering device or collector, from which the finished bags or the like may be removed by hand or from which they may pass to a suitable printing machine. The collecting device is also suitable for use for collecting sheets, bags, envelops or the like generally, when delivered from bag-making, printing or other machines, from which sheets or the like have to be delivered at a high rate of speed. In order that my said invention may be clearly understood.

III. PROBLEM IDENTIFICATION

The study of above Research papers and actual visit to the paper bag manufacturing industries. We find that Bag making machines produce bags / pouches that are used to pack various types of goods in food and beverage, pharmaceutical and consumer product industries. In general, these machines are fully automatic and require skilled operator. But these machines are costly and they require recycled papers as the raw material. These recycled papers are strengthened by adding chemicals in order to make them bear load in the form of paper pouch. However, this strengthening of recycled paper by adding chemicals creates a lot of pollution which in turn harms the environment. The major drawbacks of the existing machines are too large, occupy huge area, imported, too costly, required many people to operate, need of separate machines for creasing, folding and gluing. So the current method of manufacturing of paper bag from this recycled paper has above mentioned disadvantage which is the problem statement. Our project aims at fabrication and development of compact, low cost paper pouch making machine from newspaper or any waste used paper. The machine will be able to produce paper pouch made of recycled or reused papers. The paper bag produced will be an alternative to a particular category of polythene pouch usually used.

IV. PROPOSED DESIGN

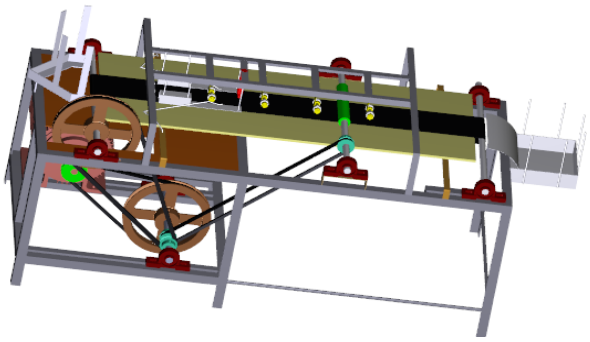

Fig-1

V. MAIN COMPONENTS

1. AC MOTOR:

Fig-2

- AC motors convert electrical energy to mechanical energy.
- 1 HP Motor is used having speed of 1440 rpm which is reduced to 80 rpm**.**

2. PULLEY AND V-BELT DRIVE:

Fig-3

- For speed reduction, Pulley and V-Belt drive mechanism is used.
- We use three pulleys of diameter 5.08 cm, two pulleys of diameter 25.4 cm & one pulley of diameter 7 cm.

3. PEDESTAL BEARING:

Fig-4

- Pedestal bearing is also known as Plummer block bearing.
- Pedestal bearing is used to support the rotating shaft with the help of compatible bearings.

- The fundamental application of pedestal bearing is to mount a bearing safely enabling its outer ring to be stationary while allowing rotation of the inner ring.

3. ROLLER BEARING:

Fig-5

- Roller bearings have a roller as the rolling element & are used to provide smooth, low friction motion.
- Roller bearing is also used for maintaining the pressure on conveyor belt.
- Roller bearing consists of an inner and outer ring, rollers, and usually a cage or roller separator.

VI. PROPOSED WORK

This system is a semi-automatic, requiring one human every time. In our system, the paper is feed with the help of conveyor belt paper moves in forward direction. Thus we have reduced the speed using Speed-Reduction Mechanism.

1. SPEED-REDUCTION MECHANISM:

The shaft that turns a machine does not always match the speed available from any motor. Belt and pulley systems can be use for speed reduction. 1 HP Motor is used having speed of 1440 rpm which is reduced to 80 rpm using speed reduction mechanism.

2. FEEDING:

A belt conveyor is the connecting link in an automatic feed supply system whether for short or long distance. In feeding, we feed 22 X 22 cm paper as a raw material.

3. FOLDING MECHANISM:

After feeding mechanism, Paper moves in forward Direction. For folding operation Aluminium sheet is used. The arrangement of sheet is such that when paper passes through conveyor belt it fold automatically and to maintain the pressure roller bearings are used. and two side of get folded.

4. GLUING MECHANISM:

When two sides get folded, one side is remaining. Glue is apply on that remaining side and then it is fold over first two sides which are already folded. After folding, it is passed through a roller. This roller maintain pressure over paper. And we get a Final Product.

VI. RESULTS AND CONCLUSION

Thus, we have come up with a low-cost semi-automatic paper pouch making machine. The overall analysis shows that, Plastic pouch which harm our environment, aquatic life and human health and moreover are not degradable, have paper pouch as an alternative. And existing machines are too large, occupy huge area, imported, too costly, require many people to operate, need of separate machines for creasing, folding and gluing. We designed a paper pouch which will not only be eco-friendly and degradable, but also will Have high load carrying capacity, and nice aesthetics. Waste paper will be used as a raw material for manufacturing paper pouch of our design. This fabricated setup used waste paper as raw material due to which its raw material cost got reduced. This machine is cheaper, compact and portable than currently available paper pouch manufacturing unit.

VII. FUTURE WORK

The system performance and speed can be improved by replacing pulleys. Further, by adding flexible folding mechanism to the system, paper pouch of variable sizes can be obtained. Also we can produce paper bags of larger size. Sensing mechanism can be developed to sense glue level. Work can be done to fully automate the system and increase productivity.

VI. REFERENCE

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