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## Paper recycling machine

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### ABSTRACT

*Paper is one of the most important parts of human life as we know education, business, anything is not possible without the use of paper. As paper population increases day by day so the paper sourcing raw material is emerging. As a result, natural resources are being exploited. So recycling of paper becomes one of the important parts of the life to preserve our natural resources. Paper recycling is also helping to make paper making process easy and helpful. Paper recycling also helps in environment protection. This process does not create any type of pollution. The study concludes that weight of waste paper as a raw material within the cost of the factory is 43%.*

**Keywords:** Hydrapulper, Paper maker, Water remover, Dryer.

### 1. INTRODUCTION

Paper is one of the most important products ever invented by man. Widespread use of a written language would not have been possible without some cheap and practical material to write on. The invention of paper means that more people would be educated because more books would be printed and distributed. Industry would grow because all the plans, blueprints, records and formulae it uses would be written down and saved, together with the printing press, paper provided an extremely important way to communicate knowledge. The primary source of raw material for production of paper is vegetable fibres, obtained mainly from plants. To ensure that the forest is not depleted of these woods, there is need to provide alternative source of raw materials, this therefore leads to the invention of the process of recycling. Recycling, which is the extraction and recovery of valuable materials from scrap or other discarded materials, is employed to supplement the production of paper. The designing and fabricating of a used paper recycling plant is therefore a welcome development as it will ensure that the source of raw material for paper production is multiplied and also waste paper that could have constituted into wastes are recycled for various productive purposes. Designing a manually operated paper recycling plant ensures that a cheap and noncomplex method of production of paper product is guaranteed. This is the objective of this paper.

### 2. PROBLEM DEFINITION

In the present scenario, there is a high demand of paper as it is almost used everywhere. It comes in basic needs of life. As we all know paper comes from tree that is trees are one of the important producer of paper but one of the major issue in present generation is deforestation. There are lot of problems in the waste paper recycling machines which are used in present scenario such as cost, quantity, quality etc.

**2.1. Cost:** It is one of the important factor which is considered during the processing of the machines. The machine cost should be kept in mind while manufacturing it because if the cost will be high than there will be less demand. If the cost is within the reach of

common people that they can afford than there will be more profit in comparison to high cost. Waste paper recycle machines have a very high cost as there are different component involved for various operations which makes it out of reach of the common people.

**2.2. Quantity:** Quantity also plays important role in the machining process which could be the reason for increase of time. In the most of the waste paper recycling machines, the quantity is set at which the machining process will start which is one of the important reason for the increase in machining time or production time.

**2.3. Quality:** It is one of the major concern in the industries that they focus on specifically. When there is a paper recycled from the paper recycling machine, one of the major thing the consumer will notice is the quality of the paper. Therefore the quality should be in mind when manufacturing any machine that if the product obtained is of good quality or not.

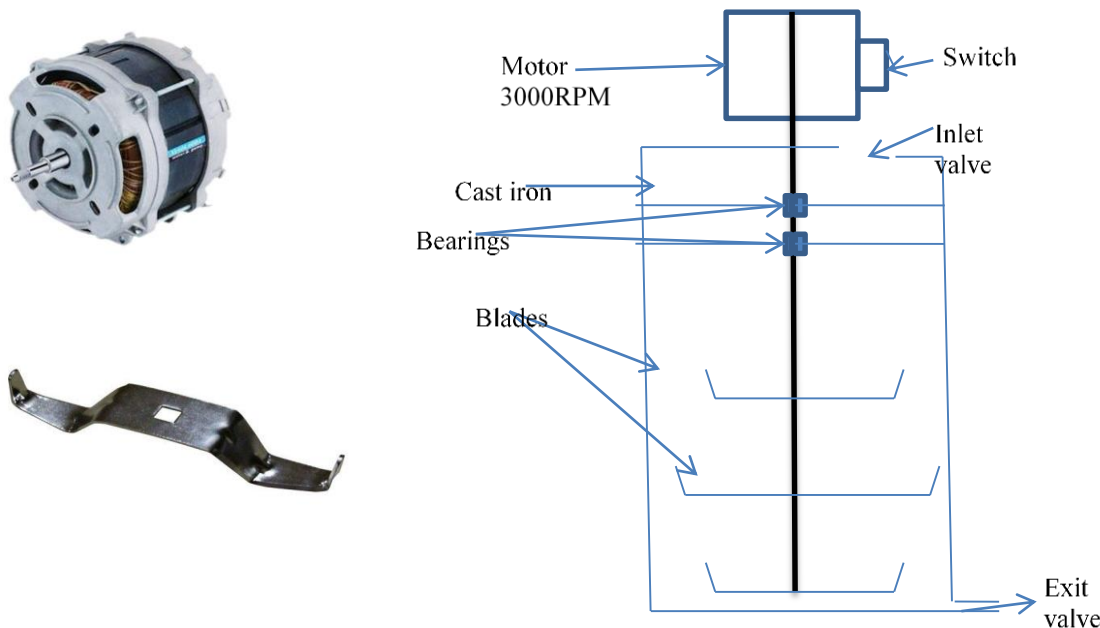
### 3. DESIGNING OF PROPOSED MACHINE

This machine uses all three type of waste to make new paper. Components of this machine are as follows:-

- Hadrapulper
- Paper maker
- Water Remover
- Dryer

#### 3.1. HADRAPULPER

It is the heart of machine which is made up of iron. It converts the paper into paper pulp. It is cylindrical in shape which having an inner diameter of 188mm. It having a thickness of 9mm. So the outer diameter is 206mm. The height of the cylindrical block is 251.3mm. A base plate having thickness 7mm. It is having an AC motor of 3000rpm. Blades are used to producing a centrifugal force inside the cylindrical block. These blades are connected to the motor by a shaft. The shaft has a length of 380mm. 240 mm length is inside the hydrapulper. In this length blades of high sharpness are welded to convert paper into pulp. The motor rotates shaft at 3000rpm and this power transfer to the blades. Bearing are used in the shaft to provide constant rotations. In this cylindrical block, we add 50% water 50% paper, alum, and starch. Now we start the motor with 230v AC supply. Blades start rotating. We use alum and starch for deinking of paper. Due to centrifugal force and sharpness of blades, the paper is converted into paper pulp.



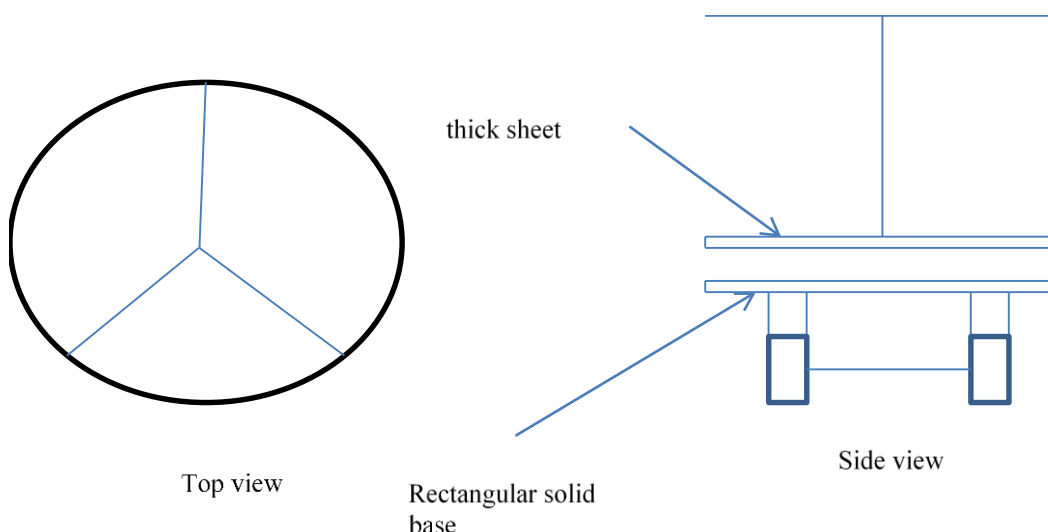
#### 3.2. PAPER MAKER

It is basically a machine that converts the paper pulp into the paper sheet. It is made up of iron. In this machine, it has a rectangular shape box having length 30inches, width 18inches and height 4 inches. this rectangular box only having base no top is there. Another rectangular box which does not have a base and tops having dimensions length 18 inches and width 12 inches. The base has an iron net that holds the cloth uniformly and helps to maintain the paper regularly on the cloth. In the paper making process, the outer box contains water. That water comes inside the inner box by iron net<sup>[5]</sup>. Now we pour paper pulp that comes from hydrapulper<sup>[2]</sup> inside the inner box. The inner box has cloth arrangement that makes the paper sheet by moving inner box upward direction. This paper sheet contains a high amount of water.



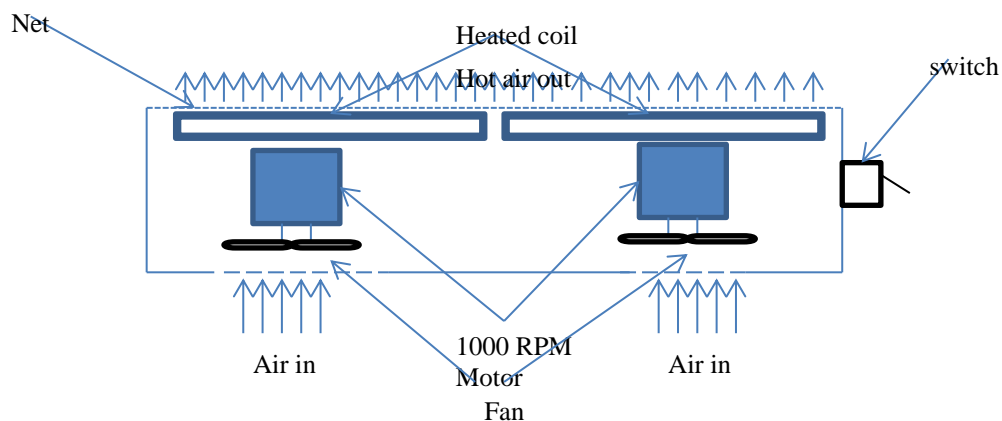
### 3.3. WATER REMOVER

It is a device which is used to remove water from the paper sheet which is produced by paper maker. It is made up of iron. This machine is the solid rectangular base of dimension 18\*12\*2 inches. A thick solid rectangular plate of dimension 18\*12 inches is connected with a shaft which having screw arrangement. This arrangement is used to make this plate up and down. This plate touches the solid base. The paper sheet is placed between the solid rectangular block and solid plate. Now, the plate is moving downward direction by screw arrangement. As plate moves downward, water starts removing from the paper sheet due force applied by solid rectangular base and pressure applied by a screw. Now water gets removed from the paper sheet.



### 3.4. DRYER

Now, water gets removed from the paper sheet. But, there is little moisture present in the paper sheet. To remove that moisture we use this device. This device is basically a wooden box which having dimensions 18\*12\*6 inches. Base and top are made up of the iron net. Two motors of 1000rpm are used in this device. These motors are connected to the fans. These fans take air from outside and a heated coil is used to make the air hot. Now, this hot air is used to remove moisture from the paper. And now recycling<sup>[1]</sup> process get completed and new paper formed.



#### **4. ADVANTAGES**

- It is Easy to use.
- It is very cheap to make this machine.
- It is Pollution free machine.

#### **5. DISADVANTAGE**

- It is a time-consuming machine.
- It is not fully automated.
- It is high electricity consuming machine.

#### **6. RESULT**

This machine produces a paper of 18\*12 inches. Size of A4 size paper is 210mm\*297mm .So basically is produces a paper sheet of size equal to the size of 2 A4 size paper approx. This machine recycles used papers and form new papers which have correct thickness and size. The cost of manufacturing of this machine is very low and processing cost for paper recycling<sup>[1]</sup> is also very cheap.

#### **7. CONCLUSION**

The development of a manually operated used paper-recycling machine is much cheaper than the automated recycling industries worldwide. The fabricated machine can serve dual purposes, it can be manned permanently at a stationary position or it could be shifted from one place to another as the case may be One great advantage to be derived from the use of this machine is that the cost of running it is minimal compared to what it takes to run a full plant. The simplicity of operation of this machine ensures that no too much technical skill is needed to operate it. When the machine is well maintained, its durability is guaranteed.

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