Development And Fabrication Of Pedal Operated Yarn Dyeing Machine

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ABSTRACT

Today in country like India or all over the world suffering from big problem like availability of water and electric power. textile industry in India dominating 60% of total Indian economy. in such industries the major operation of dyeing is done by using electrically powered machine. but in small scale industries it is not possible to use such costly machines so by using pedal operated yarn dyeing machine we can overcome the problem of cost water and electricity.

In this paper, design and construct pedal operated yarn dyeing machine which used in small scale industries and gramodyog. The pedal operated yarn dyeing machine can be constructed using some local material and skill. A machine includes a yarn ring rotated by chain and sprocket mechanism. The drum carrying dye and water over a frame It works on the common principle of dyeing. These pedal operated yarn dyeing machine can dye yarn up to 10kg per day(8hrs).

Index Terms—*yarn ring, shaft, chain drive, drum, ball bearings.*

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1. INTRODUCTION

1.1 Present Method for yarn dyeing

By using electric yarn dyeing machine can dyes a yarn in spools arranged vertically along y-axis. the machine can convert electrical energy into rotational kinetic energy. The rotational energy comes from electric device like motor. the dyeing water inside the drum comes in contact of rotating spools and dyeing takes place.

Common uses include dyeing of :

hosiery industries, handloom industries, furnishing industries.

Fig. 1 Existing Yarn Dyeing Machine

2. RESEARCH METHODOLOGY

2.1 3-D Modeling of proposed work

Generally we can use electrically operated yarn dyeing machine for dyeing purpose . For electric power saving we can used the mechanism like chain and sprocket. By using these mechanism manual power is applied to perform the operation.
Whole mechanism of pedal operated yarn dyeing machine mechanism for yarn dyeing proposed work shown by 3D-modeling.

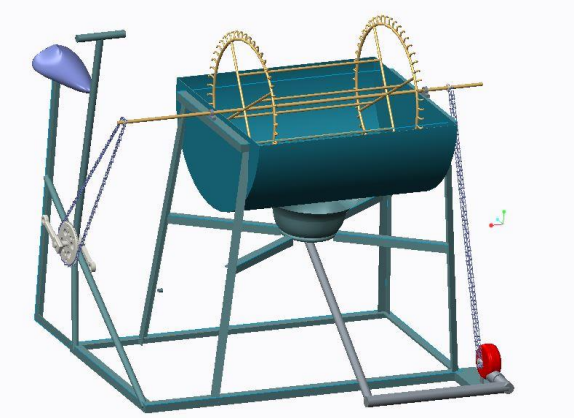

Fig. 2 3D Model of Pedal Operated Yarn Dyeing Machine

2.2 Introduction of mechanism

Pedal operated mechanism consists of single strand chain with two sprockets. Smaller sprocket(Driven) mounted on the yarn ring shaft. While larger sprocket(Driver) with seat arrangement can dive the chain with application of foot force on the pedal.

Paddling for few minute to dyeing of 3 Kg of yarn in just 10 lit of water. Our project helpful for rural industrialization and small scale industries; which are facing electric and water problem. It can be used mainly for yarn washing as well as dyeing.

Pedal operated yarn dyeing machine is operated by pedal which drive larger sprocket to smaller sprocket with the help of chain. as the pedal is rotated the ring having 3Kg of yarn (100 Spools) get rotated in hot dyeing water.
the dye is poured in water then water is heated up to 80^0c by burning of coal.

3. REQUIRED PARAMETER

Minimum rpm required for ring shaft = **20-25 rpm**
Rpm available at driver sprocket = **12-15 rpm**
Diameter of shaft= **0.020m**
Length of shaft= **1.5m**
Diameter of Ring = **0.38m**
Diameter of drum = **0.66m**
Length of drum **= 0.56m**
Diameter of driver & driven sprocket = **0.19m & 0.08m**
Bearing Number= **Deep Groove Ball Bearing 6205**
Length of Chain = **0.8m**
Velocity Ratio between driven to driver sprocket=**1/2**

4. ADVANTAGES

- By using this mechanism we can easily obtained throughout dyeing.
- By using these we can save the electric power as well as water.
- It allows easy loading and unloading.
- It has low initial as well as operating cost.

5. DIS-ADVANTAGES

- It is not suitable for large scale industries.
- High man power required.

6. CONCLUSIONS

As per the study over the topic that the pedal powered yarn dyeing machine is a very advantageous especially for rural industrialization.
This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical a lot of practical knowledge regarding planning, purchasing, assembly and machining.

While doing this project work we feel that the project work is good solution to bridge the gates between institutions and industries.

Thus we developed the 'Yarn Dyeing Machine' which helps to know how to achieve low water ratio. the operating procedure of this machine is very simple, so that any person can operate it. By using more techniques, it can be modified and developed according to the applications.

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