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DESIGN OF A SILK COCOONS COLLECTOR FOR FARMER

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Abstract: Silk has a long history in India. It is known as Resham in eastern and north India, and Pattu in southern parts of India. India is the second largest producer of silk in the world after China. About 97% of the raw silk comes from five Indian states, namely, Andhra Pradesh, Karnataka, Jammu and Kashmir, Tamil Nadu and West Bengal. The life of raw silk cocoons is only six day, Hence in the six days' time farmer has to collect silk cocoons from net, transport to market and selling also which is very hard to a farmer. Farmers collect raw silk cocoons manually from the plastic net which is a time consuming process, requires more man power and money. In this machine all three problems overcomes by the silk cocoons collector. It collects silk cocoons automatically in less time, less man power and money.

Keywords: Silk cocoons collector, cocoons collection, sericulture technology, silk and technology.

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INTRODUCTION

Silk is a natural protein fiber, some forms of which can be woven into textiles. The protein fibre of silk is composed mainly of fibroin and is produced by certain insect larvae to form cocoons. The best-known silk is obtained from the cocoons of the larvae of the mulberry silkworm *Bombyx mori* reared in captivity (sericulture). The shimmering appearance of silk is due to the triangular prism-like structure of the silk fibre, which allows silk cloth to refract incoming light at different angles, thus producing different colours. Silk has a long history in India. It is known as Resham in eastern and north India, and Pattu in southern parts of India. India is the second largest producer of silk in the world after China. About 97% of the raw silk comes from five Indian states, namely, Andhra Pradesh, Karnataka, Jammu and Kashmir, Tamil Nadu and West Bengal. While spending 3 weeks inside of the cocoon, they shed their skin and change into a pupa and then into moths. At this time cocoon becomes matured for selling, but after six days of matured cocoon the moth will then emerge from its cocoon and they will also “urinate” a reddish-brown fluid shortly after emerging from their cocoon since it couldn't “pee” while inside of the cocoon.

It means we have only six days for collection, transportation and selling in the market. On the basis of surveying in some cities & villages of Maharashtra like Wardha, Sevagram, Kharangna and Zadgaon it is found that, For collection of 100 kg cocoons farmer has to hired 6 workers for 2 days. Hence farmer has to transport cocoons and selling it only in remaining 4 days which is very difficult. Hence in the 6 days life of matured cocoon time is very important. With the help of Silk Cocoons Collector we can save the time, man power and money required for collection of silk cocoons from the net. Silk Cocoons Collector specially designs with the thinking of the need of time requirement to a farmer. In this machine operation we can collect cocoons from net with more speed, less man power & money required for collection.

MATERILS AND METHOD

Sr. no	Main Parts	Quantity	Specifications
1	Motor	1	1 HP, Speed= 1440
2	Housing Bearing	10	Inner housing= 2cm
3	Spur gear	6	4 gears=3 inches 2 gears=5 inches

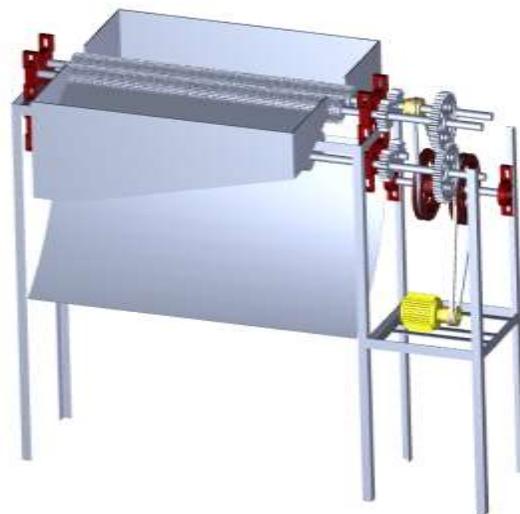
4	Shaft	4	Diameter= 2 cm, Length=1.2 meter
5	Brushes	All over upper shaft	Length= 7 cm
6	Rubber Bushes	4	Diameter= 3 inches

Manual operation for collection of silk cocoons:

Workers collect silk cocoons manually from net which consumes so much time, more man power & money required for collection. Time required for collection of cocoons is about 12 hours, 6 to 10 workers for 100 kg and money for collection of cocoons will be $6 * ₹ 200$ which is equals to ₹ 1200 per 100 Kg silk cocoons.

Machine operation for collection of silk cocoons:

Silk cocoons collector is an automated collecting machine which is specially designed for the collection of silk cocoons more rapidly with less man power and money than the manual collection operation.



In this machine, 1 HP motor with speed 1440 rpm gives the rotational motion of 480 rpm to the pulley seated above the motor and this pulley transforms motion of 720 rpm to the upper shaft with flat belt. By using gearing arrangement upper right shaft rotates in clockwise direction and

left shaft in anti-clockwise direction. The lower right shaft rotates in anti-clockwise direction and lower left shaft rotates in clockwise direction. The soft plastic brushes of 4 cm mounted all over the upper shafts as shown in given figure.

Now drop the cocoons attached net to vertically downward in between the upper two shafts. The motion of net will be in vertically downward direction gated from the lower shafts which is mounted with two bushes on each shaft helps to give the downward direction to the net. As the brushes present on the upper shafts rotates in opposite direction to the net, cocoons collect away from the net in both hoppers. At the bottom of both the hoppers there is a square hole present which is used to collect the silk cocoons.

RESULTS AND DISCUSSION:

In Manual operation: (5 workers)

7 minutes required for 1 kg cocoons

Total time required for 100 kg cocoons = $100 * 7$

= 700 min

= $700/60 = 11.67$

Collection rate = $100/11.67$

= 8.57 kg/Hr

In machine operation:

1 kg cocoons present on 1 net

2 minutes will be required for 1 kg cocoons (for 1 net)

Total time required for 100 kg cocoons = $100 * 2 = 200$ min

= $200/60 = 3.33$ Hr.

Collection rate = $100/3.33$

= 30.03 kg/Hr

It increases collection rate about 30 kg/Hr. i.e. 3.5 times more than manual operation.

1. It decreases the production cost
2. It increases the production rate about 7 times more than manual operation
3. It decreases the man power required for cocoons collection
4. It is easy to handle
5. Machine operation is cheaper in cost than the manual operation.

But, Installation cost is high and it requires electricity.

CONCLUSION:

- Silk cocoons collector is the new technology and it will be very helpful in the future of sericulture.
- It increases the cocoons collection rate up to 30.03 kg/Hr (3.5 times more than manual operation), Reduces man power & collection time.

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