



LOW-COST BATTERY-OPERATED PRUNING SHEARS: BOON FOR ORCHARD FARMERS

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Abstract

The main objective of pruning is to produce the strong, healthy, attractive plants. This low-cost battery-operated pruner maintains the plants health, structure sound and aesthetically pleasing trees. Orchard farmers and other tree professionals are continuously searching for an efficient solution for their pruning needs while minimizing time spent cutting. To expose branches to light and air or to remove dead or diseased wood are necessary responsibilities of a tree professional, but the problem still remains to find a device that can perform all tasks. Battery operated pruner will solve all the requirements of orchards farmers

Introduction

To prune means to clip, crop, cut back, and weed out. Pruning usually happens to overgrown trees and bushes, but can also be helpful for wild eyebrows and guest lists that are too long. Gardeners prune plants, cutting back dead branches and weak parts so they can thrive and grow better. Pruning is one of the most important tree maintenance practices that should not be ignored because it gives a big impact on tree's health and structure (Clark and Matheny, 2010). The work of tree pruning is not a safe practice for the farmers. Traditionally it consumes more time and required skilled labor for safe operation. Tree pruning is one of the most labor-intensive work. It is essential that pruning tools should be light in weight and easy to operate for both men and women. It helps to remove diseased, broken, or dead branches on mature trees and young trees. it will also protect the trees by preventing decay-producing fungi from penetrating and infecting other areas of the tree (Gilman and Grabosky, 2006). It increases light penetration and air movement throughout the crown of a tree (Harris, 1994). It will encourage trees to grow with strong branch structure which help in minimizing the injury from hazards (Ow, *et.al.* 2013).

Needs of Pruning

- Some pruning is done to change or train a plant growing pattern or to restrict growth.
- Other forms of pruning may be required to maintain or improve plant health or the quality of flowers and fruits i.e. it removing the diseased or insects-infested wood.

- Pruning for aesthetics involves enhancing the natural form and character of tree or stimulating flower production.
- Pruning can be used to stimulate the fruit production and increase the value of timber.
- Safely pruning can be largely avoided by carefully choosing species that will not grow beyond the space available to them and have strength and form characteristics that are suited to the site (USDA)
- Set the tree up with a good foundation for long term health.
- Give tree a clean, polished look that elevates your whole landscape.
- Say farewell to dead, broken or damaged branches.

Disadvantages of Traditional Tools/equipment Used in Pruning

1. To perform the pruning job successfully, it is important for workers to equipped themselves with the knowledge, skills and attitudes. One of the main problems occurs due to pruning works run by employees who do not have sufficient experience and knowledge in pruning.
2. There are different types of saws, sharpeners, cutting leverages, anvil pruners, bypass pruner and shear type tools such as ratcheting devices manual loppers, trimmers were found. All of these tools required to more finger force to push or pull to cut the plant limb.
3. Hand operated pruner have risk of falling from ladder or tree.
4. Traditionally farmers used hand operated tools which required more pulling or pushing force to operate which produce more strain on operator fingers.
5. All hand operated tools have very less efficiency because it depends on efficiency of worker.
6. Operator tired easily because hand operated pruners required more finger force to operate.
7. Time saving is very important for everyone, hand operated pruners takes more time in pruning and not cut the thick plant limb.

Need of Low-Cost Battery-Operated Pruner

1. Traditionally farmers used hand operated tools which required more pushing force to operate. Hand operated tools of pruning produce more strain on fingers. So, it will remove strain on operator fingers.
2. It will reduce the risk of falling from the tree or ladder because it will be operated by 21 V lithium battery.
3. One of the main needs of this pruner not required the pushing or pulling force to operate.
4. Efficiency of this pruner will be high compare to hand operated tools because it can be used up to 7-8 hours.
5. It will be offering outstanding cut for shoots and thinner branches.

Working of Low-Cost Battery-Operated Pruner

The common cutting mechanism used for tree pruning is hand operated saw and Secateurs. The saw is comprised of either a rotating or a reciprocating blade. These devices lend themselves to risks of the operators injuring themselves. So, battery operated pruner operated by a 21-volt lithium ion battery. Battery transfer the current to DC motor, where at the end of motor shaft one small wheel is attached. One connecting rod is attached to end of wheel and one moving handle of pruner. As the DC motor rotates, connecting rod change the rotary motion into reciprocating motion at equal interval.

Advantages of Low-Cost Battery-Operated Pruner

1. It will reduce the strain of operator fingers.
2. It will save time and labor.
3. You have to recharge the battery once time and can be used up to 7-8 hours.
4. It will be suitable for fruit growing farmers.
5. Operator not tired easily because it will take current from the battery.
6. It will be giving safe and reliable operation for both male and female workers.
7. This battery-operated pruner will be light in weight and easy to use.
8. It can cut two or three limbs in single operation.
9. Safety switch design, you need to press the switch for ON/OFF.
10. Really it will be boon for orchard farmers

Conclusion

It can be concluded as tree pruning is one of the most labor-intensive work. Traditionally farmers used hand operated tools which required more pushing force to operate. Hand operated tools of pruning produce more strain on fingers. So, for avoid all the above same battery-operated pruner will be beneficial and reliable for orchard farmers. Good pruning practice will produce a sense of awareness and good quality of pruning work. By increasing pruning knowledge, it is hope that the quality of pruning practices by low-cost battery-operated pruner will be improve to ensure the health of the trees and provide benefits to human's life.

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