Abstract

Current domestic fruit pickers aim to allow the user to easily pick small amounts of fruit from otherwise unreachable branches. However, they often knock down fruit from other branches and fail to dislodge the fruit easily on the first try. The purpose of the Giraffe Staff Fruit Picker is to easily and effectively pick and catch only the target fruit without damaging the fruit or the tree.

Design Overview

The solution to the problems faced when picking fruit is shown by the system in Figures 2 and 3. Figure 4 displays our prototype design. The design features of this system are listed below:

• Cutting mechanism at top of fruit picking pole to snip the stem without damaging the fruit or shaking the tree, and then return to its natural open position by spring force
• Twistable handle to activate the cutting mechanism with one natural, fluid wrist motion that will not compromise the users grip on the pole
• Conveniently placed basket to catch the fruit as it falls and make fruit retrieval simple
• Lightweight fiberglass pole for durability and ease of use

Testing and Analysis

Testing and analysis was performed on the benchmark, model, and prototype to validate our design:

• Field tests proved that benchmark was unable to pick fruits smaller than 1.25”
• Finite element analysis, shown in figure 5, proved that with maximum expected stresses the blade would not yield
• Based on torque analysis, the worst case scenario with the stem located at the blade tip corresponds to a string force to cutting force ratio of 1.14:1
• A 90° handle rotation translates to 1.26” of blade tip separation

Conclusion

Prototype testing proved our design concept was valid. The twisting motion of the handle effectively closes the blades of the cutting mechanism. Further iterations of our design would include a Kevlar string to eliminate string breakage, and a fiberglass pole to make the design more lightweight and durable. It would also include a redesigned basket to minimize fruit bruising. The prototype proved capable of cutting fruits within the desired range, and was below the required weight. Therefore, the Giraffe Staff Fruit Picker meets the performance requirements.

Acknowledgments

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References

www.amazon.com

Relevant Patents: US7076937 B1, USD682638 S, US5700343 B2