TIPS ON TREE SHAKERS

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M. G. Huber

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Wm. A. Schoenfeld, Director
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Many hours of back-breaking labor can be eliminated, and the work of harvesting prunes and nuts will be made much easier by use of the mechanical tree shaker. Observations indicate that mechanical shakers save one-half, and usually more, of the man hours normally required for shaking.

Trees can be cleaned as well mechanically if not better than they can be cleaned by hand. It is possible to give the whole tree a vigorous shaking, including the tall upright branches that are usually hard to reach. When prunes are picked twice, growers will find that the mechanical shaker will clean out more of the ripe fruit the first time over than hand shaking.

Shakers may be classified into two general types, the pull type, which uses a flexible cable and hook between the power unit and the tree, and the push or boom type. The general principle of these mechanical tree shakers is a reciprocating device mounted on a tractor which shakes the fruit from the tree by means of a taut cable or boom. There is no established design. The number of designs that can be made depends upon the kind of tractor used, the material available, and the ingenuity and mechanical ability of the builder.

Mechanical tree shakers can be mounted on both wheeled and tracklayer-type tractors. On the shakers observed, the power was supplied either from a power take-off or by a separate engine power unit.

The cable type requires two persons to operate, one man to operate the tractor and one to place the cable on the trunk or limb. A skillful tractor operator can increase the speed with which the operations are carried out as soon as he gains a little experience. He will know how much to shake the tree and will produce the correct tautness of the cable to obtain the maximum snap action required to loosen the fruit. The boom-type shaker requires only one man to operate, but it is more complicated to build and requires more careful design.

Numerous means can be devised to power the tree shakers. Some of those observed had a face plate with an offset crankpin attached to the belt pulley or a crankpin attached to a flywheel or pulley on the power take-off. However, when attaching directly to the belt pulley or power take-off there is danger of breaking the housing mounting as it is not strong enough to withstand the jerking strain placed upon it.

It will be found preferable to have the cable on the front of the tractor. This arrangement will enable the operator to see what he is doing without turning around. Numerous linkage methods may be devised to bring the cable around to the front of the tractor. A bell crank is used to transmit the power around a right angle.
Different types of hooks and cable slings are being used to attach the cable to the branches. However, a padded hook that is heavy and rigid is satisfactory and causes little bark injury.

Observations indicate that a shaker having continuous power will do a more effective job of shaking and will clean the trees better than any others observed. The speed also can be easily controlled on this type unit. The operator and one man using an engine-driven shaker did the work in two hours that eight men accomplished in one day by hand shaking. Anyone considering the construction of a shaker should consider the use of continuous power drive, such as an auxiliary engine or a continuous power take-off.

The following suggestions regarding the construction and use of mechanical shakers are based on observations made during the 1945 season.

1. There is some danger of breaking the power take-off or belt pulley housing if the crankpin and cable are attached directly to a face plate on the belt pulley or disk crank on the power take-off. Most tractor mountings are not strong enough to absorb the tractor's maximum pull.

2. The length of stroke and speed found most satisfactory was from 1 1/2 to 2 inches at 300 to 400 jerks per minute.

3. The cable should be 5/16 to 3/3 inch in diameter and made of the best plow steel. Length of 20 to 30 feet will be ample.

4. An engine-driven or continuous-driven shaker will do a better job of cleaning trees in less time than the power take-off type.

5. A padded hook for attaching to trees is quicker than a cable sling. A hook-throat opening should be 6 1/2 to 7 inches across.

When shaking trees, the first few jiggles are the most effective. For some reason, some fruit will jiggle with the branches without loosening, but when snap action is applied while the fruit is hanging at rest it will fall free. Trees in firm ground shake more easily than those in extremely mellow soil because a firm tree provides the snap action which is necessary to dislodge the fruit.

Long pendulous branches and small pendulous limbs branching out of tree forks are hard to shake. The grower using a mechanical shaker must make up his mind that some fruit will be left on such branches. A proper pruning program will help make mechanical shaking more successful. Trees having several heavy spreading branches may have to have the cable attached to each branch, which increases the time required to clean the tree.

Some mechanical difficulties have been experienced with poorly designed shakers, but where excessive mechanical difficulties have not been encountered users have been quite well satisfied with the results obtained. With a more general adoption of the use of tree shakers, a highly satisfactory standard design will evolve. There is no doubt that the use of a mechanical shaker effects a considerable saving in labor when compared with hand shaking.
The top two photos show the shaker mechanism mounted on front of the tractor and both are driven from the belt pulley. The lower photo shows the shaker mounted on front of a track type tractor using an auxiliary engine to drive the shaker.
The top photo shows a crankpin attached off center to a face plate on the belt pulley. The second photo shows the base of an old gasoline engine with the cylinder removed and using the crank to supply the reciprocating motion. It is driven by a belt from the tractor belt pulley. The lower photo shows a push type mounted on a wheel tractor.