MECHANICAL TREE BALER

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In 1960, for three main reasons, we started work on a mechanical tree baler.

First, costs have been increasing. Labor costs have risen 60 percent in the last 5 years. Costs of material--moss, paper, and wire-for packing trees have also been increasing. Because nursery stock has been getting bigger, fewer trees have been placed in each bale; therefore, each bale was costing more to produce.

Second, Minnesota has a very short packing season. There is a 5- to 6-week period between the time the ground thaws and new growth starts. Weather is also a factor. We often have only 20 working days to ship 18 to 20 million trees. Therefore, the trees must be baled rapidly.

The third reason we needed a mechanical baler--the need to improve our tree bale-was of utmost importance. Often 15 to 20 hand baling boxes were running simultaneously, and the foreman could not observe the entire operation; consequently, some bales did not have the proper amount of moss, and some were poorly baled with wasting of moss and wrapping paper. When the mechanical tree baler is in operation, all the workers can be seen by the foreman. There also is a baler operator who can spend part of his time supervising.

One of the biggest assets of the baler is that the bales are baled in a jellyroll fashion. The paper is used only as an outside wrap. From the outside wrap of paper, we alternate a layer of moss and a layer of trees. This arrangement permits a free exchange of moisture between the layers of trees; each layer of trees has moss on both sides.

The mechanical tree baler (figs. 1 and 2) is a modified hay baler with a 50-foot conveyor to carry the trees and moss into the baling machine. At the end of the conveyor opposite the baler, a mechanical device measures the paper, cuts it into 5-foot pieces, and deposits it at proper intervals on the belt. There is also a mechanical device which, as the conveyor belt passes beneath it, distributes the moss continually on the conveyor belt.

The trees are baled in an assembly line type method. Twelve men and 1 foreman are needed to operate the baler. One man watches the paper and puts a 1- by 112- by 36-inch carrying stick on the belt. Just up the belt from the moss laying machine are two men (one on each side of the belt) who put the trees from tubs onto the belt. Both of the-men put on 500 trees which have been counted and placed in the tub in the field. The belt then moves these bunched trees forward. Then four men, two on each side of the belt, lay the trees in a thin layer on moss over a 10-foot area on the belt, up to the paper which will be wrapped around the outside. The belt then proceeds forward to two men stationed along the belt just before the trees go into the baling

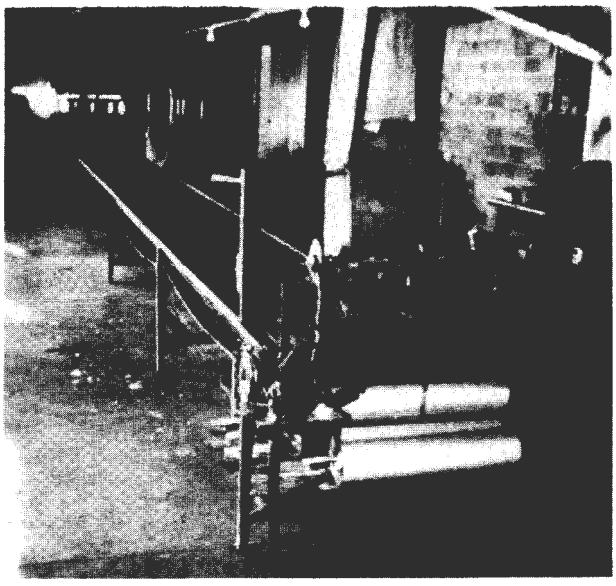

Figure 1.--View showing paper feed and moss duct feeding onto conveyor belt.

[1] Credit for the mechanical tree baler discussed in this article is given to Roland Ekstrand. repairman for General Andrews Nursery.

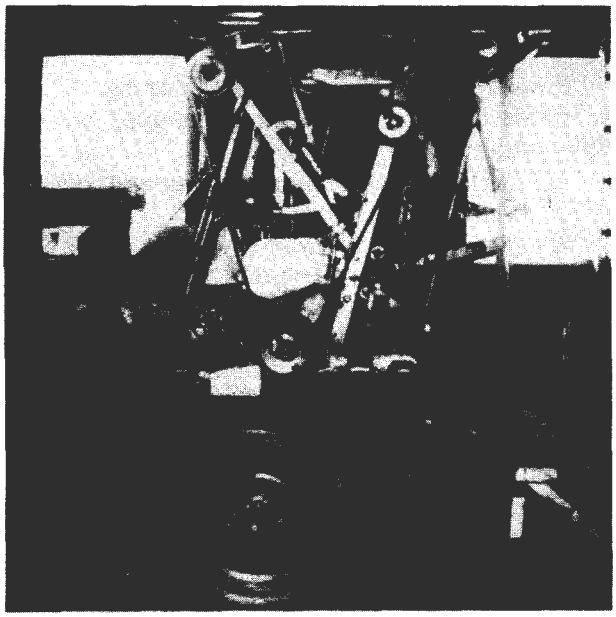

Figure 2.--Side view of tree baler at end of conveyor belt.

machine. They check the trees to see that the tops are properly aligned, that the moss is properly distributed, in the bale and on the paper that will be the final outside wrap, and that all the material is in the proper order. At this point the baler operator has a clear view of the condition of the trees and the overall workmanship of the bale. Anything amiss in this potential bale of trees can be corrected at this time. After this final check, the machine operator moves the conveyor forward and feeds the trees into the baling machine, where they are baled, wrapped with paper, and tied with twine in 8 to 10 seconds. During this baling, wrapping, and tying, the workmen along the belt put the trees on and spread them. The bale is then ejected automatically by the machine. A man at the back of the machine staples the loose end of twine to the carrying stick which is just under the paper. He then transfers the bale to a pallet which holds 10 bales. A forklift moves the pallet to the storage areas.

This past spring we averaged 21 bales per minute. Production could be accelerated to 4 bales per minute if trees could be supplied and there were no mechanical breakdowns. Approximately 14 million trees were baled last spring.

Questionnaires were sent to our ranger districts receiving mechanically baled stock. Field checks were also made on stock baled on an experimental basis in the spring of 1962. It is gratifying to know that tree survival was as good as for stock that was hand baled, and that our customers prefer mechanically baled seedlings.

This mechanical baler needs modification. However, it is a start toward solving our three basic problems--(1) higher costs, (2) a short packing season, and (3) the need for a better bale.