THREE-SECTION ORCHARD ROLLER

by

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Introduction:

Experience has shown that proper preparation of filbert and walnut orchard ground surface previous to harvest is of considerable help in getting the crop harvested efficiently and quickly. This is especially true if any type of mechanical harvesting method is to be employed; but may also be quite important in getting and keeping labor when hand picking is the method used.

Proper preparation is best accomplished by using suitable drags and rollers which will smooth and level the soil surface, mash the clods, and compact the surface as hard and level as possible. Rollers which are very long tend to skip considerable area due to inability to bear on areas where the center is lower or higher than at the ends. The three-section type of roller, using short-length rolls mounted so they can follow the ground independently has been found to overcome this difficulty very well. The attached plan shows the construction features of such a roller, designed for a total width of ten feet.

Construction Notes:

The rolls shown on the plan are 18" in diameter, which is about the minimum size which has been found to be satisfactory for most soil types. If the soil is very loose and sandy, larger rolls are recommended.

If rolls are to be made of concrete, the shaft should go clear through the center, having several lugs or pieces a few inches long welded to it so that it will be firmly anchored in the concrete. The concrete can be poured into light gauge sheet metal forms which can be left on. Or a removable form of some type, such as is used for making concrete pipe, might be used. The rolls should be poured on end. One 18" by 3'-6" roll will require about 6.2 cu ft. of concrete, and will weigh approximately 900 pounds. The concrete used should not contain aggregate over 1\(\frac{1}{2}\) inches in size, and should not be a leaner mix than 1-2-4. It should not be a dry mix, but wet enough to puddle well. Reinforcement of heavy wire mesh fencing formed into a circle about 2" or 3" smaller than the roll would also be desirable, especially if the form is to be removed. Concrete rolls should be allowed to cure three weeks before use, keeping them covered and wet for at least the first week.
Larger concrete rolls will increase in weight so rapidly with increased diameter, that it would be better to use water-filled tanks for those over 18". This permits adjusting the weight to the job by adding or removing water, and simplifies transportation problems if the roller is to be moved very far. An 18" by 3'-6" tank roll filled full of water will weigh about 475 pounds, and a 24" will weigh about 850 pounds when full.

Tank rolls should be made of metal having a minimum gauge of #12 United States Standard for 18" and 20" rolls, and #10 gauge for those larger. If rocks are to be encountered, heavier metal is advisable to prevent denting. If the ends are concave, stub axles can be attached by welding, using 6" to 9" diameter flanges for reinforcement. Concave ends also permit setting in the bearings so that the axle ends will not protrude beyond the frames. The filler plugs should be located in one end rather than in the outside surface. Two 3/4" pipe plugs, 180° apart and close to the edge, greatly facilitate filling and draining.

Hardwood bearings about 4" long, equipped with pressure-gun grease fittings should be quite satisfactory for this service and can easily be replaced when worn.

The frame shown on the drawing is constructed of mild steel channel, but steel angle could be substituted. The sizes of angle should not be less than the following:

- **Sub-frames**: 3" x 3" x 1/8" or equivalent
- **Main frame cross-pieces**: 3" x 3" x 3/8" or equivalent
- **Tongue**: Two - 3" x 3" x 3/8" or equivalent

Under present shortage conditions, channel is easier to obtain than angle. The channel frame will weigh about 300 pounds, and the angle frame about 335 pounds.

A satisfactory wooden frame could be constructed, using 4" x 4", and 4" x 6" members, with all joints well bolted and braced. The life, of course, would be less. Joints loosen up from the swelling and shrinking of the wood. Unless kept tight, this results in cracking, splitting, enlargement of the bolt holes and other such troubles, often necessitating replacement of the members. For use on small acreage per year, the wooden frame might prove more economical if it were well cared for.
Steel Frame-Welded Construction.
Roller Diam. ~18" or More.
May be Concrete or Water-Filled Tanks.
Materials:
- Roller Sub-frames & Tongue Braces ~ 2"-2.57" Channel.
- Main Cross-Frame ~ 3"-3.5" Channel.
- Tongue ~ 4"-6.25" Channel.
- Center Cross-Bracing ~ \( \frac{1}{2} \times 2 " \)
- Hitch ~ \( \frac{1}{2} " \times 3 " \)
- Axles ~ 1½"
- Pivots ~ 2 bolts
- Eyes & Links ~ 4