HOW TO MAKE STRAIGHT ROWS WITH THE HOLLAND TRANSPLANTER

Howard W. Schneider, Nurseryman
J. W. Tourney Nursery
Forest Service, U.S.D.A.
Watersmeet, Mich.

Everyone likes to see long, straight seedling and transplant beds. In addition to providing the neat and manicured appearance that indicates a competent and efficient nursery job, straight, perfectly formed rows and beds permit the use of mechanized equipment for fertilizing, weeding, lifting, etc. without running over and damaging the seedlings.

Perhaps most users of the transplant machine are initially disappointed with the performance of the self-steering device. Unless almost ideal conditions existed, the rows created were not as straight as the nurseryman desired. The carefully constructed guide trench used on the first trip became crooked and more indistinct with each rerun. This problem was alleviated by marker wheels, front-end weights, wire guides, and other devices. We tried most of these improvisions, but not until 1950 did we develop a method that was both effective and reasonably efficient.

The basic principle is to have the steering wheel run on a track instead of in a trench. The track is in sections. Each section consists of two 1-inch iron pipes welded parallel to each other and three-eights inch apart. The pipes provide a smooth, rolling surface for the shoulders of the steering wheel and carry the weight of the front end of the machine. The slot between the pipes is a perfectly aligned guide for the flange on the steering wheel. The steering rod and shoe are not used. In addition to obtaining straighter rows, the track also carries a portion of the machine's weight, thus preventing the steering wheel from cutting into the soil; consequently, less operating power is required, and the transplanter can operate in loose sand and negotiate steeper grades without aid by pushing. Tire chains have not been used since we adopted our system. To enable us to detect side movement of the back end of the machine, which does occur and will throw the rows out of alignment, we suspended a string-nail plumb bob from the exact center of the rear drawbar. The end of the plumb bob hangs just above the track. When the nail is directly above the slot in the track, the machine is running true. If the nail is off center, a little push-or pressure applied to the side of the engine or rear tire will generally realine the machine.

The track should enable the nurseryman to make relatively good beds. However, where there is much slope at right angles to the direction of travel, the rear wheels of the transplanter tend to creep downhill. When, as one stands behind the transplanter, the plumb bob is to the right of the track, the front end of the machine must be moved to the right to center the plumb bob, and vice versa. To cope with this situation, the front end of the machine was modified. First, the mainframe head was unbolted from the frame. Next, using the same bolt holes, a piece of 1/2-inch iron plate was attached to the head, and a similar but smaller piece of plate was attached to the frame. This latter plate rests on top of the first, and both plates are joined and pivoted at the rear by a 1/2-inch bolt. By means of a 3/4-inch nut welded on the bottom plate and a 3/4-inch threaded crank on the top plate, it is possible to shift the engine end of the machine to the right or left without taking the flanged steering wheel from the track slot. Since some models of the machine have different front ends, no exact dimensions are given, but examination of figure 1 should clarify the principle.

Before track construction can be started, some preparation is necessary. Besides the pipes, 1-inch round iron rods are needed. Two 6-inch pieces are used per section. This rod fits easily, but not too loosely, into the 1-inch pipe and is used to connect

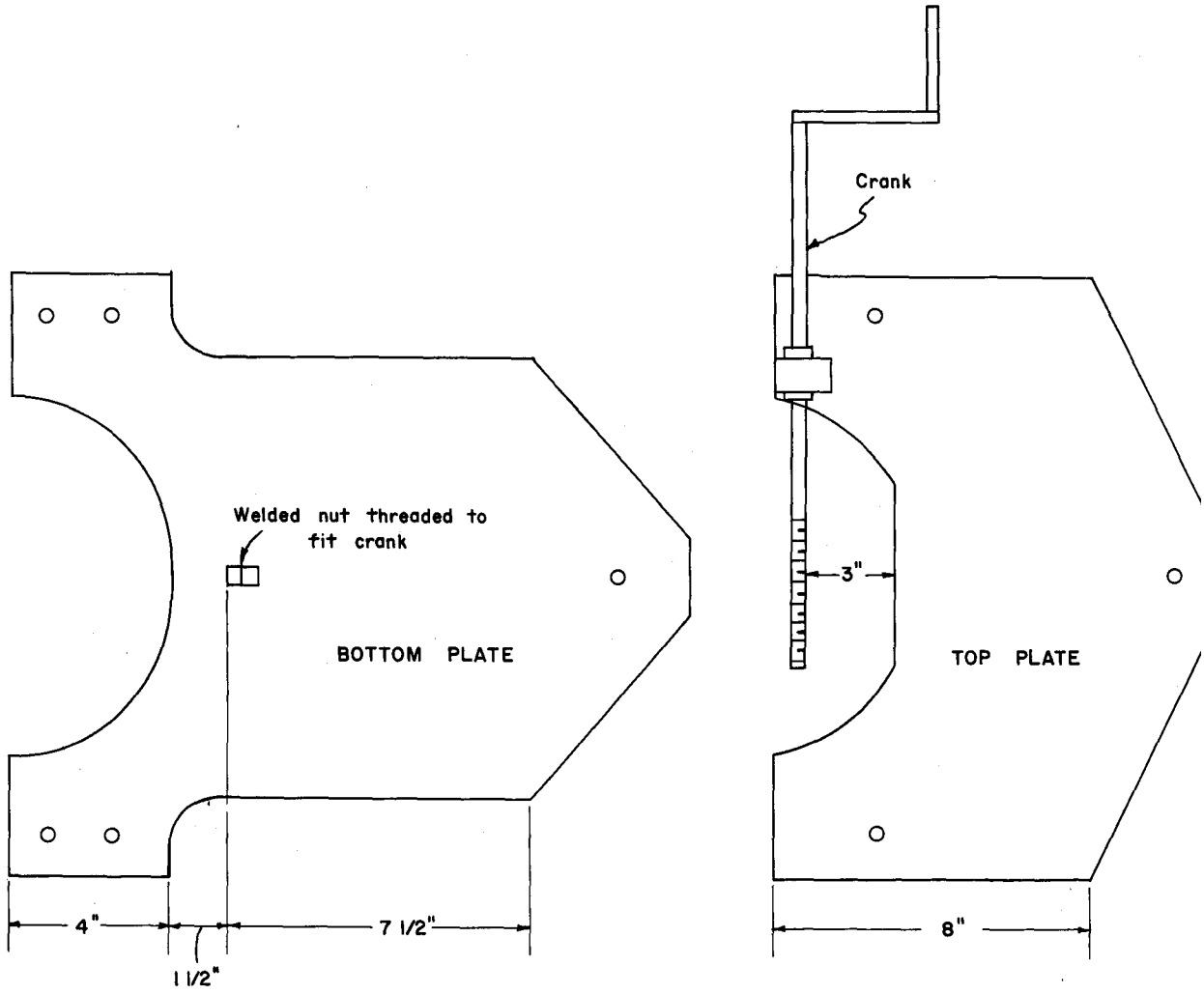

Figure 1

sections of track into a single line. Four U-shaped connectors are needed per section. They are made by cutting off 4-inch lengths of 1 1/2-inch pipe with a pipe cutter and then sawing each 4-inch piece in half longitudinally (fig. 2). These connectors:

1. Utilize the two pipes and maintain a 3/8-inch slot between them.

2. Allow the flange to sink below the underside of the pipes.

3. Anchor the track in the soil and prevent side movement.

Four pieces of iron, 1 1/2 x 4 x 3/8 inches, are used to maintain the spacing between the pipes during construction. They are then used for making track spacer bars. These are made by welding one on each end of a 3/8- or 1/2-inch iron rod 10.3 feet long (fig. 3).

Fabrication of the track proceeds as follows: Two 1-inch pipes of equal length (18-21 feet) are placed side by side on the floor. The iron spacers are put between the pipes at approximately the locations shown in figure 4 (exact measuring not necessary) and held in position with C-clamps. The connectors are then placed on the pipes just ahead of the spacers and electrically welded in place. The clamps and spacers are then

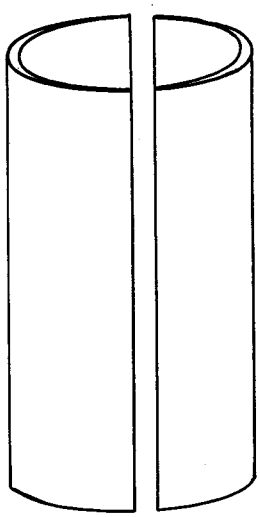

Figure 2

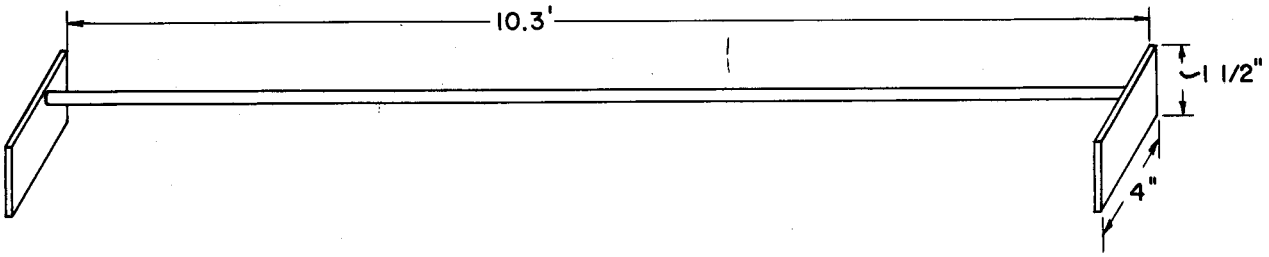

Figure 3

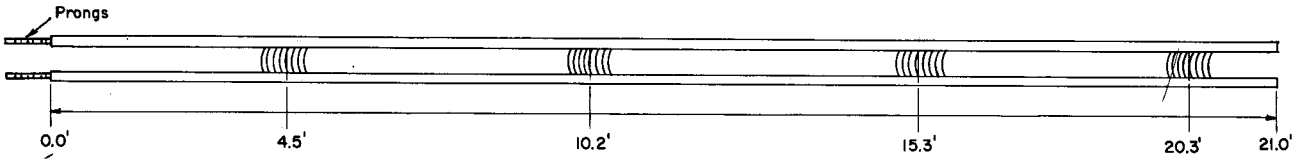

Figure 4

removed, and a prong (6-inch length of 1-inch iron rod) is inserted 3 inches into one end of each pipe and spotwelded in place. The prongs should be on the end of the track that is not near a connector so that the pipes can be squeezed together or spread if necessary for easy joining of the sections. To join sections of track, the prongs are inserted into the holes of the adjoining track in much the same manner used in assembling a toy railroad track. This connection should not be made too tight; in fact, a loose one is desirable. Enough track should be made so that two lines, allowing about 3 feet extra on each end, can be laid across the longest field on which the track is to be used. Ordinarily' three or more machines run up one track and return on the other. When the two beds are planted, the track is disjointed and moved for the next line.

To lay track in a new compartment, set stakes and run a string line where the center of the path between the first two beds is desired. Next, push nails into the ground about 16 feet apart (opposite each overhead pipeline support) so that the heads are directly under the string. We use 12d. double-headed nails that have been dipped in yellow paint.

Remove the string and stakes after the nails are in position. Place the first section of track on the ground so that the nail heads can be seen in the exact center of the slot. Lay the next section into place over the nails, and connect it to the first section. Repeat this procedure until the line of track is completed. Remove and save the nails for re-use. At this point it is well to sight down the line. Any small kinks that may have developed can be removed by a slight kick at the track.

The second line of track is located by use of the spacing bars previously mentioned. The track sections are set in approximate position and joined. One man slips the lip of his spacer in the slot of the established line while his partner adjusts the new track until his end of the spacer bar drops into the slot of the new line. Both men move up to the next joint and repeat the process with the second spacer bar. The men then retrieve the first bar and move forward to space the second joint. This procedure is repeated until the new line is finished. The man on the established line should stand on his track so it will not be disturbed while the partner is adjusting the second line into position.

Tracklaying is usually done with a part-time, two-man crew. They break track, carry it to the new location, join it, and space it. Occasionally two women transplanters are used to lay track. Very seldom is any planting time lost because of track moving, since the machine can begin using a new line as soon as several sections are in place.

The foregoing procedures may sound rather complicated, but actually most of the jobs are relatively simple. The pipe is somewhat expensive, but it apparently will last at least 30 years. We were fortunate in getting our pipe from surplus without cost. Perhaps pipe of some other material or smaller iron pipe can be used. Most visiting nurserymen observing our system have been impressed. We know that two Forest Service nurseries, one private nursery, and one foreign nursery are using our system or a slight variation. We have used it for 12 years and like it very much.