ton of the movable catch (4) which governs the area of delivery holes that will be uncovered when the control handle (3) is moved from the closed to the open position. Movement of catch (4) along the threader shaft of handle (3) is accomplished by releasing the locknut butting against the catch, turning the catch to the desired position, and finally resetting the locknut against the catch to prevent further movement.

The appropriate location of the movable catch (4) for the desired rate of delivery for each crop to be sown is determined by calibration runs before going to the field. To accomplish calibration, the lower ends of the five flexible downspouts on each half of the drill are removed from the disc furrow-openers and placed into a pail wired onto the tractor frame. Seed dispensed and caught in the two pails over a measured distance, at the rate of travel to be used in the field, is weighed to determine the rate of sowing.

The agitator in the bottom of the seed hopper was altered from the design used in the lawn-fertilizer spreader. The original agitator was a series of small-diameter metal rods mounted in a cylindric arrangement around, and parallel to, the main agitator shaft. It was found that this agitator crushed some seeds, especially peas. The present agitator, as shown in Figure 3, utilizes the original agitator shaft (6) with short collars of pipe (7) bolted to this shaft immediately above each of the 10 delivery holes in the hopper. Six short fingers were welded to each collar. When the agitator turns, these fingers cause effective agitation and uniform delivery of the seed without damaging it.

The agitator is driven by a series of two chains. The first and longer chain (8) is driven by a sprocket (9), made by the tractor manufacturer, attached to the left rear tractor wheel. This chain drives an idler shaft (10) which in turn drives the shorter chain (11). This shorter chain then drives the sprocket (12) affixed to the end of the agitator shaft (6) which protrudes from the seed hopper.

The hopper is so constructed that its only mounting attachments are the two end bearings of the agitator shaft and a small, support rod (13). Removal of a wing nut from the support rod (13) permits the hopper to pivot on the agitator shaft bearings and tip forward as shown in Figure 3. All seed is easily and quickly removed as illustrated. A metal cover (14) for the seed hopper is shown in place in Figure 1. This cover, when inverted, is used to catch seed when the hopper is tipped forward as shown in Figure 3.

This drill has given very satisfactory service at this station. Barley, oats, wheat, rye, and peas have been planted. Much credit for the design and operation of this drill is due Lucius M. Ross, former technician with this department, now deceased. We gratefully acknowledge the assistance of J. J. Koranda in preparing the photographs used here.—L. J. and R. L. Taylor, Agronomist and Senior Agronomist, Alaska Agricultural Experiment Station, Palmer.

ZERO TILLAGE FOR CORN FOLLOWING WINTER GRADE

The concept has been advanced that certain soil conditions may be the ultimate limit of minimum tillage for corn. Zero tillage means elimination of all tillage or soil manipulation in the seed and sod, except for the narrow slit needed to place the seed into the soil.

Moody et al. in Virginia reported growing corn without tillage following an orchard grass sod. The grass was an excellent mulch. However, instead of leaving the grass, they removed a soil core with a tube sampler, dropped it into the seed hopper, and crumbled soil on top of the 100 percent of which was topdressed prior to planting and 20% with a conventional planter at time of seeding.

Trials with different herbicides and times of application in 1959 and 1960 showed that a spray mixture of Atrazine and Amino-Triazole (3 and 2 pounds per acre) applied 4 to 6 weeks before planting was protective in killing the existing sod and in controlling weeds. This was the only herbicide treatment used.

Protective crop residues left on the soil surface to protect the soil to some degree during the growing season. Probably more residues and an even better soil condition would have been present with a higher percentage of grass in the alfalfa mixture.

Yields under zero tillage, shown in Table 1, averaged 95 bushels per acre in 1960 and 128 bushels in 1961. Although not significantly different, this was 10% less than under conventional plowing, fitting, and cultivating.

Table 1—Yields of corn with conventional tillage and zero tillage following an orchard grass sod.

<table>
<thead>
<tr>
<th>Year</th>
<th>Conventional Tillage</th>
<th>Zero Tillage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1959</td>
<td>137.1</td>
<td>127.9</td>
</tr>
<tr>
<td>1960</td>
<td>138.5</td>
<td>128.0</td>
</tr>
<tr>
<td>1961</td>
<td>137.1</td>
<td>127.9</td>
</tr>
</tbody>
</table>


1 Contribution from the Northeast Branch of the Conservation Research Division, ARS, USDA, in cooperation with the Department of Agronomy, Cornell University.