A Multiple-cell, Belt-type Distributor for Use with Tractor Implements in Fertilizer Tests with Field Crops

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This paper discusses an experimental fertilizer hopper in which the three elements of a complete fertilizer placed separately in various proportions can be mixed and dispensed to soil tools. The design of the hopper is based on the single-cell, belt-type hopper previously described by Fairbanks and Minges (2) and is a further refinement of the multiple-cell hopper developed by Rea and Meek (3). An adaptation of this hopper to a combination fertilizer drill is also described. This drill has means for placing the fertilizer in numerous positions in relation to the seed being drilled. The hopper and its adaptations were developed to facilitate the application of a wide range of rates and ratios of fertilizer, including radioactive phosphate, simultaneously with planting small experimental plats.

DESCRIPTION OF THE HOPPER

Fig. 1, A and B, respectively, show a side and top view of the hopper. As may be seen from Fig. 1 B and subsequent illustrations, the hopper is partitioned into six cells or compartments. These compartments constitute the fertilizer tray. The rear of the tray is attached to a rubberized belt. This belt forms a common false bottom to all compartments in a single tray. The tray is moved forward mechanically, and pulls the belt around a 1-inch roller at the front of the tray and a 3-inch roller at the rear. A spliced belt is used on the hopper since the belt never makes a complete revolution around the roller. The tray moves back and forth the distance of its own length, and the belt travels with it. In Fig. 1 C, the fertilizer tray and the belt have been removed to show the rollers. In Fig. 1D, the front roller has been moved to show the top of the fertilizer funnels.

In operation, the fertilizer tray is driven mechanically until its complete length has passed over the funnels. To put the tray in the starting position, the belt is pulled back by hand after disengaging the drive. Fig. 2 A shows the front end of the fertilizer tray at the starting position. The front wall of the tray is just over the break-over point of the front roller, and the tray is driven forward, the belt leaves the bottomless compartments and is pulled down around the front roller, and the bottomless compartments start across the top of the fertilizer funnels. Any loose material in the compartments immediately starts falling through the fertilizer funnels and continues until the compartments are empty. Fig. 2 B shows the front of the fertilizer tray after it has traveled a short distance. A similar view, with fertilizer in each compartment, is shown in Fig. 3 B.

When the fertilizer trays are at the starting position, at rest, and are ready for loading, the six compartments in each tray are loaded in sets of threes, using a separate compartment in each set for nitrogen, phosphorus, and potassium materials, respectively. This makes it unnecessary to premix the fertilizer. If suitable measuring cans, such as are shown in Fig. 3 A, are used, it is unnecessary to weigh the fertilizer. If a complete fertilizer is to be used, all compartments in each set are leveled with the straight edge of a wooden block down into an individual compartment. If an

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