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BULK SEEDER FOR EXPERIMENTAL PLANTING

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C212
ERS contr.
376

Bulk Seeder for Experimental Plantings¹

G. B. Hergert

Bulk seeding of experimental plantings is done for various reasons including assessment of various fertilizer, pesticide, or disease treatments, testing of drainage, or cultivation methods, animal feeding trials field increase plots and large yield plots. Traditionally, these plots have been planted with a conventional seed drill, but this requires considerable time to ensure that the drill is completely cleaned between plantings. Equipment is described here which may be attached to existing plot and field seeders which have the advantage of being easy to load and clean. Suggestions are given for mounting the equipment on different models of seeders.

A suitable seed box or hopper for small plantings is the Øyjord Fluted Feeder (3, 4) made to fit the cone on Øyjord Experimental Seeders, and consists of a single large fluted wheel mounted vertically. (Fig. 1A) Seed is held in a hopper having a capacity of 1/4 cu. ft. (7.5 litres). A seed gate, operated by a lever controls the amount of seed being metered by the fluted wheel.

The complete hopper assembly fits over a vertical drive post which has a slot to engage a drive pin in the fluted wheel. To remove the hopper from a machine, the hopper is lifted up and over the drive post. The entire hopper then may be cleaned by inverting the hopper and turning the fluted wheel a small amount to remove all seed.

¹Contribution No. 376 from Engineering Research Service, Research Branch, Agriculture Canada, Ottawa, Ontario, K1A 0C6.

Mention of companies and trade names does not constitute an official Agriculture Canada recommendation.

A divider is used in conjunction with the feeder. Divider housings with opening for any number of rows between two and ten and 12 and 14 rows are available from the supplier, or other dividers may be used (3, 6, 7).^{1, 2} Accuracy of division of the dividers is discussed elsewhere (3). An important factor of accuracy with any of these dividers is that the smallest possible oriface must be used to feed the seed to the direct centre of the spinner which distributes the seed.

MOUNTING

Mounting on Seeders Equipped with Craftsman¹ Cone and Divider

The Øyjord fluted feeder is made to fit the Øyjord experimental cone feeder. However, it is often advantageous to mount a feeder on an existing machine already equipped with other equipment. Figure 1A shows the feeder mounted on a 14 inch Craftsman Cone, as supplied with Swift Current Seeders² (2). The cup spindle of the cone was exchanged for a drive post to suit the feeder, and a support and reaction pin was fitted on one side of the cone base (see Figure 1B and 2). A sheet metal ring, 3 in (7.6 cm) high was attached to the cone base to prevent seed loss. The plastic wind shield was replaced over the ring, but was cut to fit around the fluted feeder. A reaction post or support is required to stop the feeder from turning.

The original batch cup was changed by enlarging the centre tube to a size that fit over the drive post. A conical cup was soldered over centre tube to deflect seed into the cup. It is important that this centre tube be exactly centred in the cup to ensure even coverage of seed on the cone base and, thus, on the row.

Commercial Parts Required

1. Øyjord Fluted Feeder^{*1}

¹Craftsman Machine Co., 201 Princess St., Winnipeg 2, Manitoba.

²Rem Manufacturing, Swift Current, Saskatchewan.

*Refers to Source of Supply Table, page 8.

Mounting on Seeder Already Equipped with a Divider

To mount the feeder on existing seeders already equipped with a divider but not with a cone (such as some Univ. of Alberta type seeders mounted on Bolens Ridemaster Tractors (7)), a base plate and drive is required. The base plate may be ordered as a cone base plate from the supplier of the feeder, or fabricated as desired, but must provide an upright drive post with dimensions shown in Figure 2. A plastic funnel may be used between the feeder and divider inlet by fitting the funnel around the drive post to catch all seed falling from the fluted wheel. A drive must be provided between a land driven wheel and the drive post so that the post turns one complete turn when the seeder advances 29 ft (8.8 m). The drive should be equipped with a one way clutch to prevent the feeder being turned in reverse if the tractor is reversed for any reason. Variation in ratio between the land wheel and drive post is not required. A clutch is advantageous in this drive, but the same result is affected if the hopper is lifted so that the drive pin does not engage in the slot.

The base plate consists of a flat mounting plate and the vertical drive post mounted in bearings. The bearings must be suitable for moderate side thrust in both directions. A hole is required in the base plate to suit a plastic funnel. The spout of the funnel must align with the inlet of the divider. Wind protection is required around the fluted wheel opening.

Commercial Parts Required

1. Øyjord fluted feeder^{*1}
2. Øyjord cone base plate^{*1}
3. Bevel gears - 2:1 ratio set may be supplied^{*1}, or use Boston HL 1524-G and HL 152Y-P.^{*2}

For 1:1 Ratio set use 2-Boston HL 102Y.^{*2}

4. One way clutch - use Torrington RCB 162117 and inner race IR 1224.

Grind two notches in the end of the inner race to engage a pin on the pinion drive shaft. Use one way clutch in pinion shaft drive pulley.^{*3}

5. Wheel drive pulley - A drive is required between a land driven wheel and the pinion shaft. Suggested drive pulley is Dodge 8450 (4-3/4 O.D.).^{*4}

6. Driven pulley on pinion shaft - To calculate size of driven pulley

use the following formula for 1:1 ratio bevel gear set.

$$\frac{29 \times 12}{\text{load radius of land wheel (in)} \times 2 \times \pi} \times \text{Mean P.D. of Variable Pulley}$$

for 2:1 ratio set, use the following formula

$$\frac{29 \times 12}{\text{Load radius of land wheel (in)} \times 2 \times \pi} \times \frac{\text{Mean P.D. of Variable Pulley}}{2}$$

The mean pitch diameter of the specified variable pulley is 4.2 inches for a 5 L Belt.

7. Other standard components such as bearings and belts must be chosen as required.

Mounting on Seeder Equipped with Openers Only

If a bulk hopper is required on a seeder not equipped with a divider, such as field grain drills, or plot seeders equipped with single row cones, a divider must be placed between the fluted feeder and the openers.

Commercial Components Required

1. Øyjord bulk hopper *1
2. Øyjord distributor complete *1
3. Distributor head for desired number of rows *1
4. Mounting frame *1
5. One of either: base plate with upright post complete with 2:1 bevel gears *1, or Øyjord cone feeder for plot lengths up to 15 m if seeder is to be used for batch seeding as well.
6. Electric motor and drive for distributor *1
7. One set of seed tubes to carry seed between distributor and openers *1.
Order for number of rows.
8. Y units are also available if bulk hopper is used in conjunction with other seed dispensers and two openings into the openers are required. *1
9. Drive shaft complete with clutch and one way clutch may be ordered from Øyjord equipment supplier. Speed variator to vary row spacing if batch feeder is used - also available. *1

The above two units may be substituted for drive equipment mentioned for mounting the feeder on a seeder equipped with a divider.

10. Drive from land wheel is derived using the same formula and parts mentioned for mounting the feeder on a seeder equipped with a divider.

Other types of variable speed drive suitable for operation between cone drive post and land wheel are described by St. Pierre (8) and Dyck (2).

For New Seeders

Complete seeders, either self propelled or tractor mounted, equipped with bulk feeders are available from manufacturers noted.^{1, 2; *1}

References

1. Cherwick, W.J. 1954. An improved experimental plot seeder. *Can. J. Agr. Sci.* 34: 642 - 643.
2. Dyck, F.B. 1972. A self-propelled plot seeder for the seventies. *Proc. 3rd Int. Conf. on Mechanization of Field Experiments, Brno, Czechoslovakia. Paper 2.6 (I.A.M.F.E., 1432 Aas, Norway).*
3. Hergert, G.B. and F.B. Dyck. 1970. A four-way divider for plot seeders. *Can. J. Plant Sci.* 50: 513 - 515.
4. Øyjord, E. 1963. A universal experimental seed drill. *J. Agric. Eng. Res.* 8 (1).
5. Øyjord, E. 1968. Norwegian plot seeders. *Proc. 2nd Int. Conf. on Mech. of Field Experiments, Braunschweig, Germany. Paper #15.*
6. Penner, J.P. 1968. Five row dispenser for attachment to tractor. *Suggestion Award S-AGR-2880. Agriculture Canada, Research Station, Swift Current, Sask.*
7. Smith, W.E., J.E. Fitzsimmons and J. Rawlings. 1953. A four row plot seeder. *Can. J. Agr. Sci.* 33: 394 - 395.
8. St. Pierre, C.A. 1967. Une poulie variable pour régler la longueur du semis des parcelles de céréales. *Can. J. Plant Sci.* 48: 224 - 225.

Source of Supply

- * 1. Jens Shou Mek. Verksted,
Postboks 68,
1441 Drøbak,
Norway.
- * 2. Boston Gear
Canadian Supplier:
Meyer Industrial Dist. Ltd.,
133 Weber St. N.,
Waterloo, Ont.
- * 3. Torrington Bearing Co. Ltd.,
568 Orly Ave.,
Dorval, Que.
- * 4. Dodge Manufacturing Div.,
58 Pelham Ave.,
Toronto, Ont.

Source #1 represents a sole source of supply for items mentioned in the text with exception of 4 row dividers. Sources 2, 3 and 4 are given as information only and may be substituted with other brands as desired.

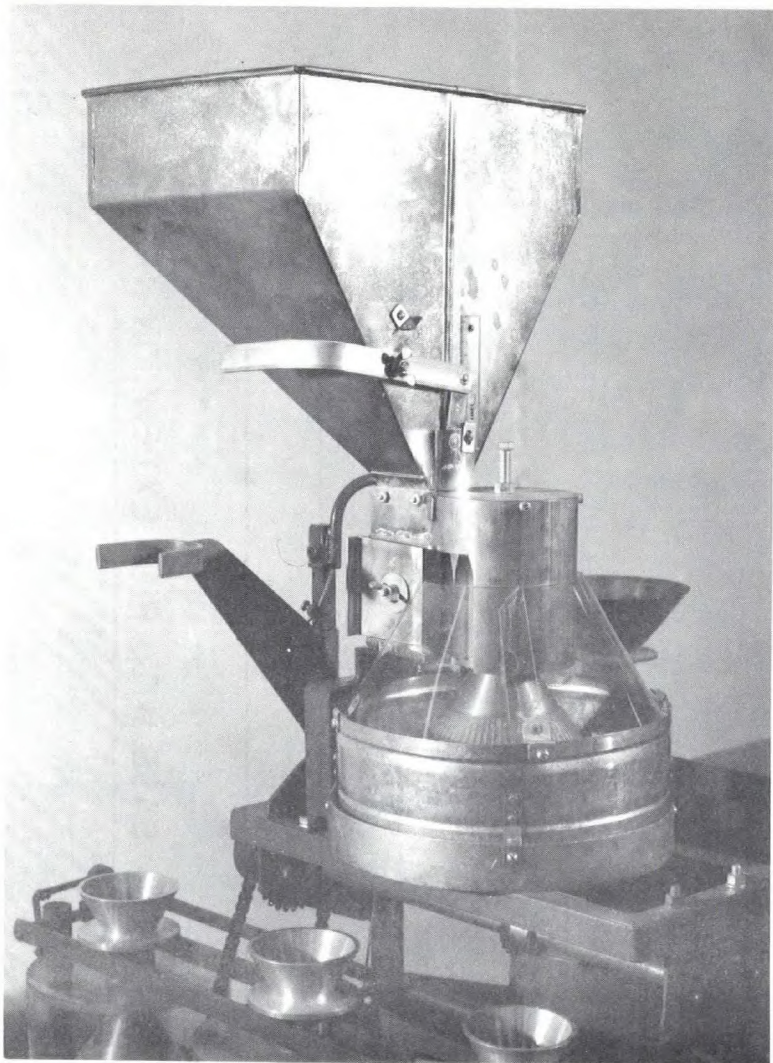
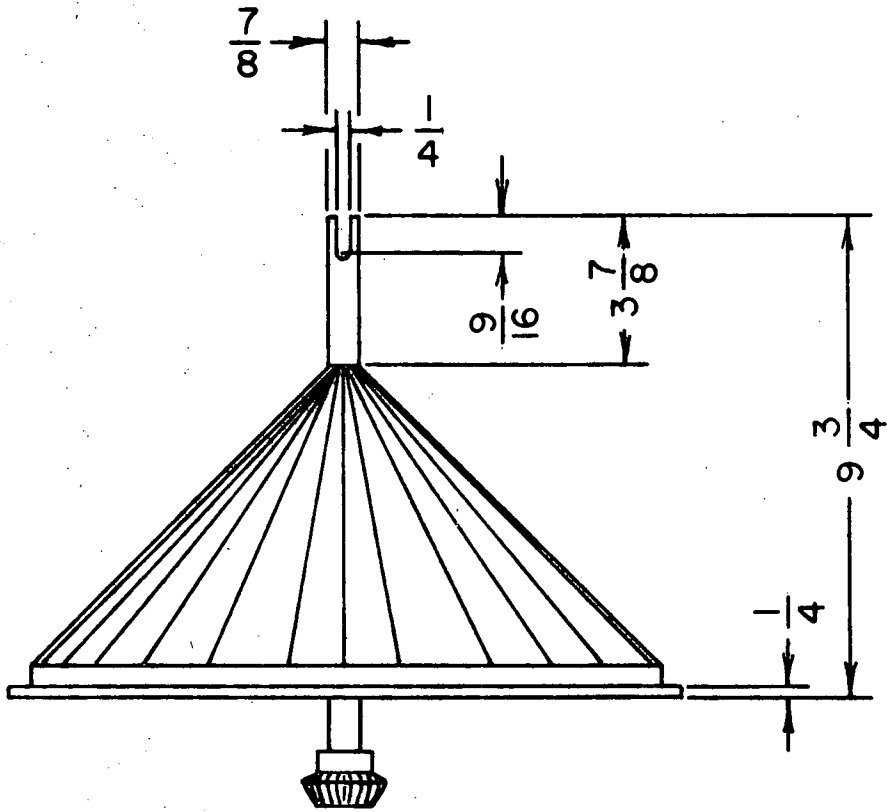


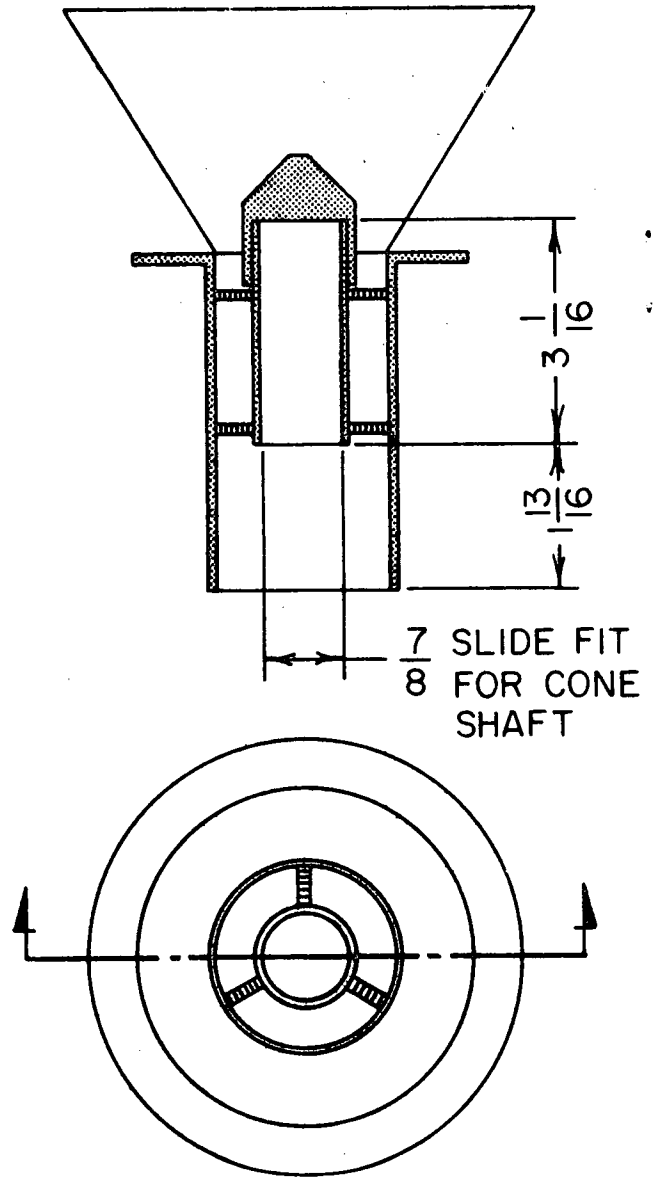
Fig. 1. A. Øyjord Fluted Feeder mounted on a Craftsman Cone.



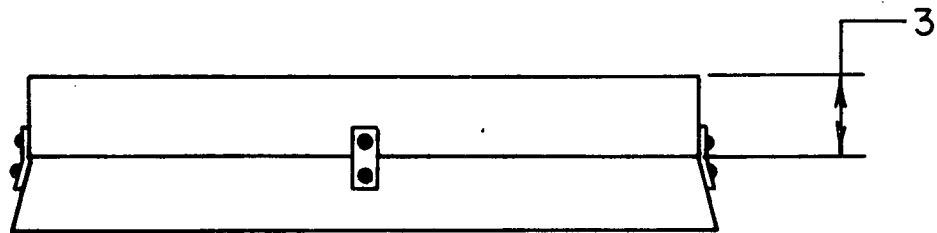
Fig. 1. B. View of modified cone showing drive post, sheet metal ring, plexiglass shield and reaction post.



MODIFIED CONE



CUP



CONE BASE WITH RING EXTENSION