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Modification of a Ransomes No. 4A Corn Sheller for Experimental Samples

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A sheller was required to shell small samples of hand picked corn from experimental plots. Requirements were for a hand fed sheller which was self cleaning and produced a clean sample without seed loss, contamination, or breakage. A Ransomes 4A Sheller was chosen and modified to eliminate seed loss and seed lodging within the machine.

The Sheller

The Ransomes 4A is manufactured for small holdings in underdeveloped countries. Husked corn cobs are shelled individually on each side of a rotating toothed cast iron shelling plate as the cobs are forced through a feeding device. Spring loaded "stripping claws" hold cobs against the shelling plate. Spring tension and size of opening is adjustable. A cleaning shoe is located below the shelling mechanism where corn is cleaned and graded. Three screens were provided, a 19 mm (3/4 in) round hole upper sieve, a 10 mm (3/8 in) grading sieve and a 3 mm (3/16 in) lower sieve to remove chaff. The cleaning shoe is oscillated through a crank pin.

Modifications were required to prevent seed loss and lodging of kernals within the sheller and to power the machine. The following is a description of the modifications.

Loading hopper

A false bottom made of 19 mm (3/4 in) plywood was fitted into the hopper to cover bolts and exposed slots in the original hopper bottom. The plywood was tapered at the hopper mouth, and the space

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between the hopper bottom and the stripper claw casting was filled with RTV silicone rubber. A 40 cm (16 in) high deflector was attached over the hopper mouth to direct into the hopper any kernals thrown back by the shelling plate.

Cleaning Shoe

The intermediate grading sieve (10 mm) was removed as grading is not normally required for experimental samples, and a sieve in this position was inaccessable for cleaning should kernals become lodged. The large seed spout which received seed from the intermediate sieve was removed and replaced with a deflector to direct all kernals into the small seed spout. A removeable plate was attached to the end of the top sieve to retain shelled cobs for inspection. A baffle was attached to the seed spout to direct kernals down to permit collection of seed in a small pail.

Sieves used were a 11 mm (7/16 in) round hole screen in the upper position and a 3 mm (3/16 in) hole screen in the lower position. The upper sieve is easily exchanged and hole size will depend on varieties being processed. The 11 mm screen was shop made using a single stroke punch in 19 gauge sheet steel. A 12 mm sieve is available and should be ordered with the machine. The 10 mm sieve previously used as a grading sieve was extended to permit use in the upper position.

Sheller body

Excessive clearances between the sheller body and cleaning sieve left spaces where seed could bounce out of the machine. Sheet metal extensions were riveted to the sides and front of the body to reduce the clearance to a minimum. The canvas curtain was repositioned to inside of the thresher body and sheet metal fillers were added to close the gaps between the curtain and tapered section of the body. A shaped plate was attached to the top of the body to close the gap between the body opening and the stripping claw casting.

Motor Drive

The original machine is designed to be hand cranked or driven by a small engine. An electric motor drive was added by mounting the motor low on the frame under the hopper on a pivot mount and a groove cut into the fly wheel for an A section V-belt. All electrics are totally enclosed to operate in dusty conditions.

Specifications of motor drive components

Motor: ½ H.P. Totally enclosed. Fan cooled. 220 volt, 1720 rpm (Brooks - Type TESC No. C2830X)

Switch: Magnetic contactor with dust proof cover. Overload heater to suit motor (Allen Bradley - Bulletin 709 AJH Size 0 starter form 1)

Pulleys: Sheller drive motor pulley - A section 33 in. P.D.

Belts: Sheller drive A-105

Speed: The large fly wheel speed was 178 rpm with components listed

Transport Equipment

Two 4.00 x 8 pneumatic wheels on an axle where mounted to balance the sheller heavy on the hopper end. Legs were positioned under the hopper to keep the machine level. A kick stand at the opposite end provides a firm stand while operating. Handles under the hopper facilitate moving the sheller from storage to work areas.

Guards

Guards are placed over the large pulley flywheel and over the gear drives for safety.

Blower

A Delhi G-7 blower was mounted to direct an air blast into the receiving end of the cleaning shoe but was later removed as it did not contribute to a cleaner sample. The 3 mm cleaning sieve is sufficient to remove dust and small particles.

Comments on the Original Machine

The Ransomes 4A sheller is a low cost machine meant for small holdings and as such is crude in comparison to modern machines. However, the components required to do a good job of corn shelling at a rate suitable to the requirements for experimental samples and with minimum breakage are present. Modification as described has made the machine suitable for experimental shelling. Capacity is sufficient that two men can feed the sheller without overloading and the sheller is now completely self cleaning.

Manufacturer

Ransomes, Sims and Jefferies Ltd,
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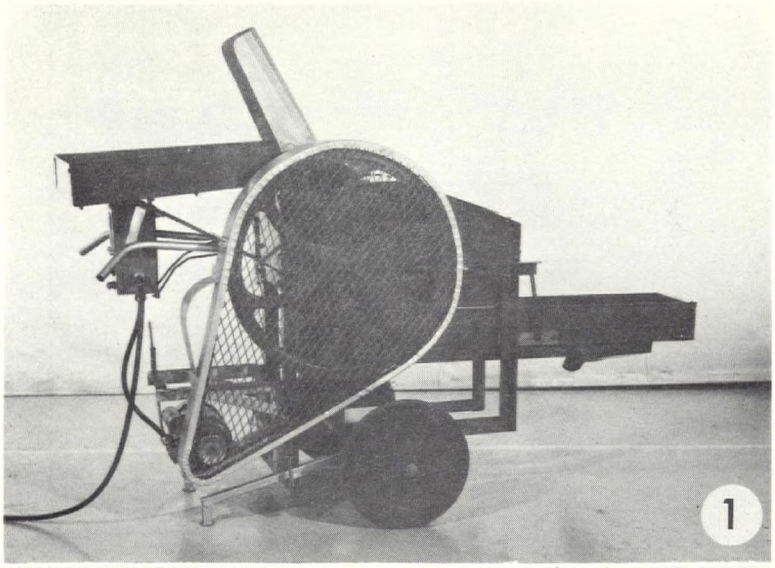
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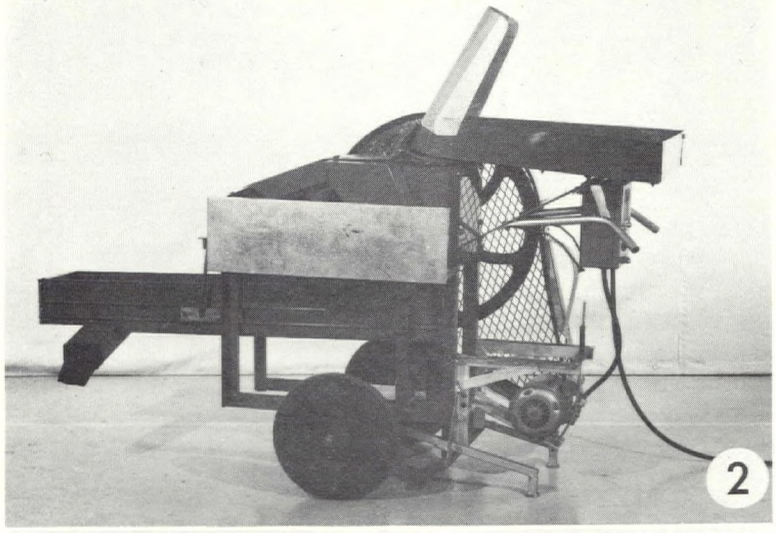
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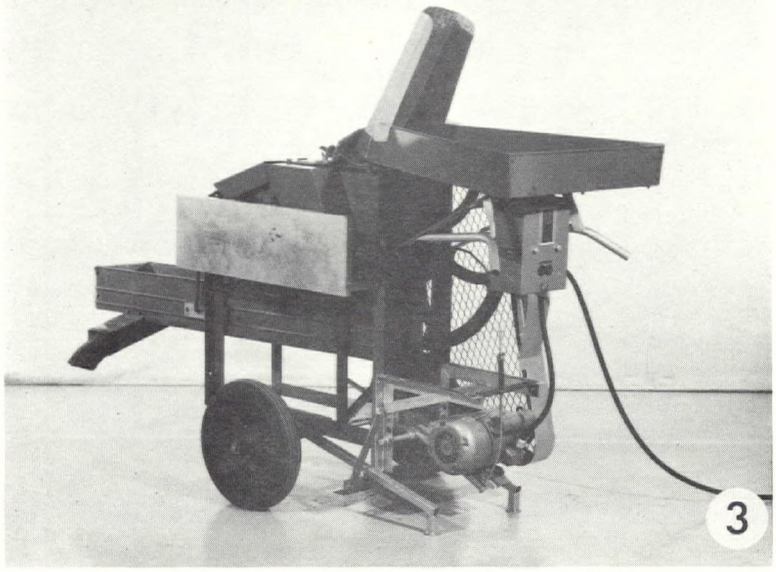
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