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Magnetic Seed Cleaners

MMAGNETIC SEED cleaners are not strictly new, but only in recent years have they received much attention.

Although by no means the answer to a seedsman's prayer, the machine does offer an effective method of cleaning certain types of seed. Like other types of seed cleaners, it has both advantages and limitations.

The magnetic cleaning process has been useful in making some seed separations that are difficult or often impossible with other types of cleaning machines. Increasing numbers of seedsmen in clover- and alfalfa-producing areas are finding that magnetic cleaners do an excellent job of cleaning in their plants.

The principle of magnetic cleaning is simple. Powdered iron is mixed with the seed. The powder adheres to cracked and rough-coated seed but doesn't stick to the smooth seeds of clover and alfalfa. After the seed and powdered iron have been thoroughly mixed, the seed is passed over a magnet which takes out inert matter and weed seeds such as dodder—because of the iron coating.

The smooth-coated crop seeds contain no free iron, so they are not attracted to a magnet. Thus, they pass the trap and ride "merrily on their way."

However, there is one precaution. If the dosage material is not applied to the seed uniformly and in the right amount, some of the undesirable seed will not be coated with iron and, therefore, not be separated.

The mixing mechanism and the magnetic-separating device are two main parts of the cleaner. Two meth-

ods are used to mix water, or oil and water, and the iron powder with the seed. One is the batch mixer, and the other is a continuous-flow system. The latter has an unbroken stream of seed passing through a series of auger-type mixing chambers. The right dosage is metered into the moving stream of seed and mixed thoroughly as it flows toward the separating unit.

The separating device may be an electromagnetic drum or it may contain permanent magnets. The magnetism is normally put into the drum by stationary electric poles. Seeds which have the metallic powder on their coats are retained on the drum's surface by magnetic force, while those with no iron powder attached to them simply pass over the drum.

Seed clinging to the drum either fall off by gravity or are brushed off into the spouts provided for the inert material, weed seeds and other waste.

To clean seed over a magnet is not a fast process. Depending on the dodder count and the size of machine, 200 to 1300 pounds of seed can be cleaned per hour. With large lots of seed, the

loss is normally less than 1 percent. There is no rerun of rejected material. The magnetic process usually increases germination by pulling out the broken seeds, since the metallic powder adheres to the rough exposed part of the chipped or cracked seed.

The cost of magnetic separation is said to be nominal. Powdered iron is used at about $\frac{3}{4}$ of a pound to 100 pounds of seed, and the cost is less than 30 cents per pound for the material.

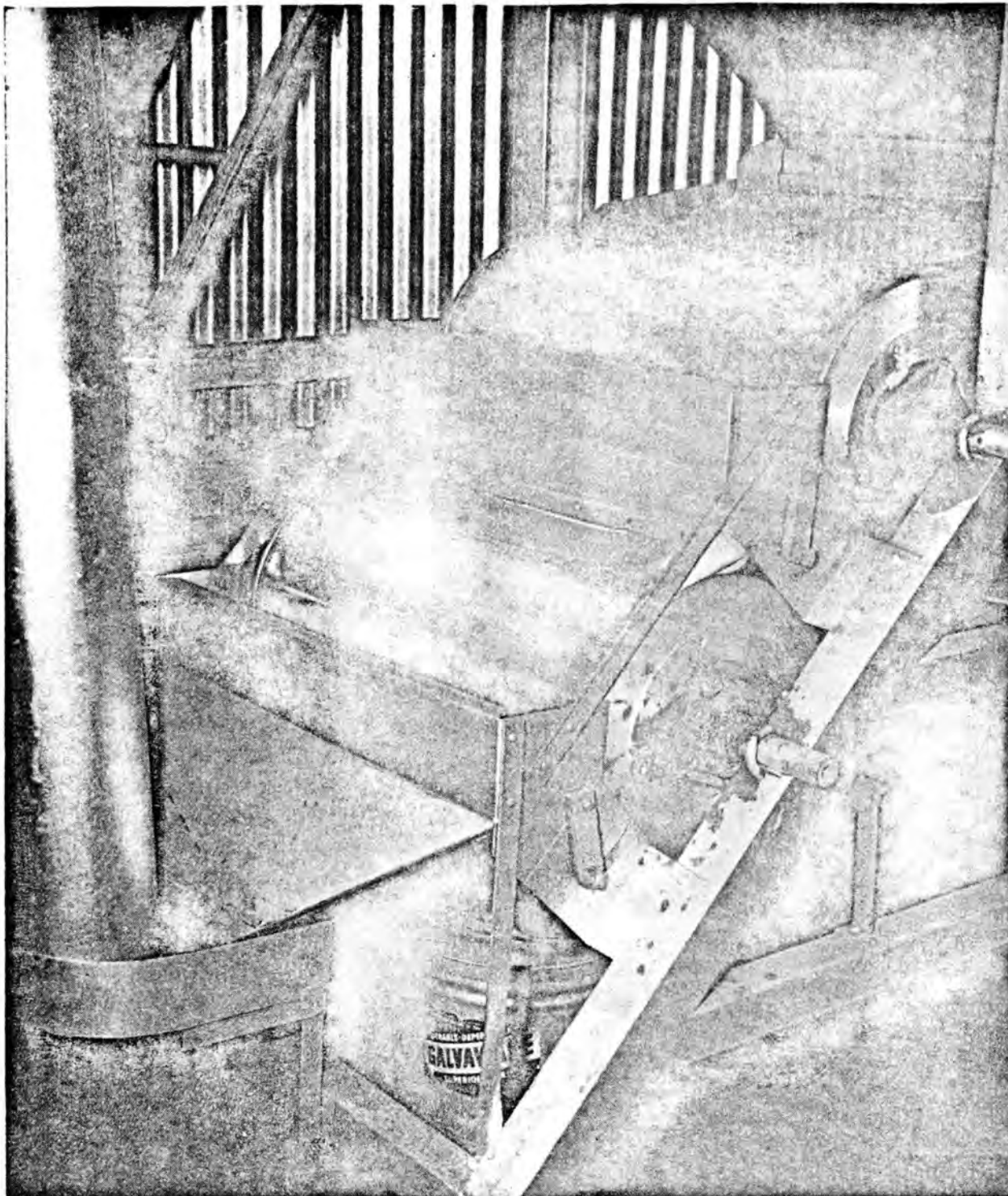
The high initial cost of the machine is the main reason why the method is not used more widely. Imported magnetic seed cleaners cost several thousand dollars. In addition, a number of unsatisfactory machines have also been built.

BELOW—Seed cleaning research is carried on at this laboratory at Mississippi State University. At left is an electrostatic separator, and at right is a magnetic seed cleaner.



Acknowledgement

The material for this article was taken from reports presented at the 1958 Mississippi Seedsmen's Short Course. The main contributors were H. D. Bunch, Mississippi State University seed technologist; C. E. Moore, seed service supervisor, Five Points, Calif.; and J. F. Grisez, seed processor and cleaning machinery manufacturer, Crow Landing, Calif.



ABOVE—The two rollers on this seed cleaning machine are permanent magnets, which separate iron-coated weed from legume seed.

It is useless, seed experts say, to use an ordinary drum magnet of the type that is used to separate nails from grain. It simply won't work with small seed. Such machines are always a poor investment for seed cleaning.

Magnetic cleaning works best with clover, alfalfa, lespedeza, and other small-seeded legumes. However, it can also be used successfully with any smooth-coated crop seed infested with dodder, buckhorn, broken seed, and other rough-coated materials.

Getting the right dosage of iron powder and liquids properly mixed with the seed is essential to getting a good separation of weed seeds. This dosage often varies with different seeds. Generally, crop seeds that have

slicker coats take smaller dosages, have a lower cleaning loss, and give a more complete separation job.

High cleaning losses are often due to the treatment the seed got during the harvesting and subsequent handling, before it goes to the magnetic cleaner. Dirt, sticks, straw, and similar trash make the cleaning job more difficult.

A seed lot with a high weed seed content will require more iron powder for good cleaning than a lot with a lower concentration. Studies at the Mississippi Seed Technology Laboratory also reveal that scarified seed requires a higher dosage and normally shows a higher cleaning loss than the same seeds not scarified.

No, it's not a brand new method. But magnetic cleaning looks promising for seedsmen faced with tough problems in seed separation. ★

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