

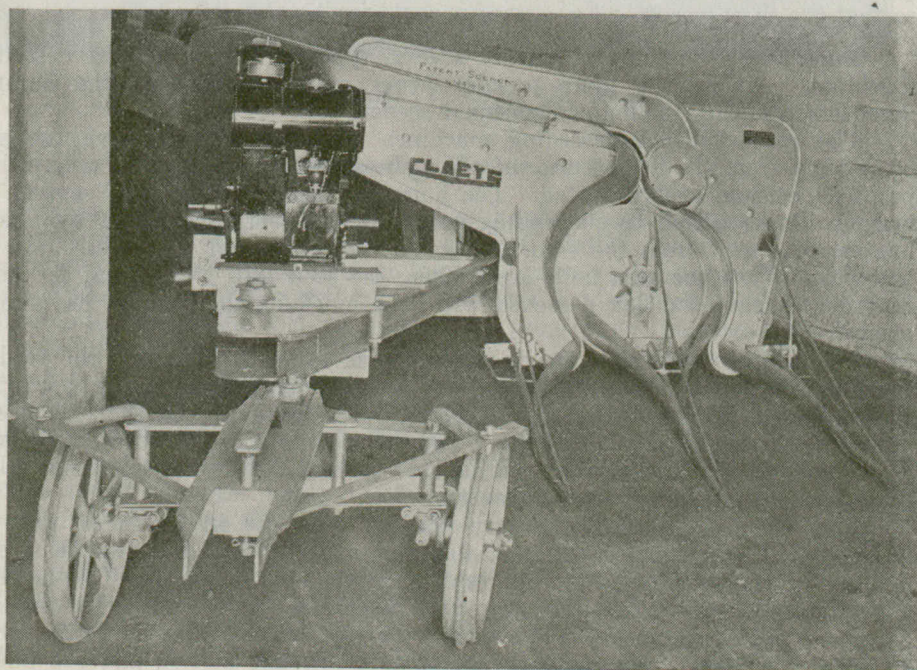


### Modern Machinery for Harvesting and Processing Fibre Flax

In order to produce flax fibre and tow on an economically sound basis, it is necessary to use the more specialized type of harvesting and processing machinery. Rapid advances have been made during the past few years in perfecting this specialized equipment.

#### Harvesting Machinery

*Flax-Pulling Machines.*—Until comparatively recently flax for fibre purposes has been pulled by hand. On the average, one man can pull about  $\frac{1}{6}$  of an acre per ten-hour day, depending of course on the condition of the crop itself. Flax for fibre must be pulled in order to secure the maximum quantity of fibre in the



Flax Puller and Spreader

Authority of Honourable J. G. Gardiner, Minister of Agriculture, Ottawa, 1940



stems. If the flax is cut, the loss due to stubble left in the ground is excessive. Flax cut with a binder leaves the root ends of the straw open and very often subject to premature retting if left standing in the stook for a period of time. Pulled flax, on the other hand, with the roots connected to the stems, has the ends of the fibres sealed, enabling it to mature more evenly and satisfactorily.

There are two commonly accepted types of pulling machines in commercial use today, both bearing the name of Soenens, the Belgian inventor. One of the machines is known as a puller and spreader and the other a puller and binding machine. The puller and spreading machine is horse drawn but the pulling mechanism is powered by a one-cylinder 5 h.p., air-cooled gasoline engine. Thus the speed of the pulling parts of the machine is maintained at a constant rate regardless of the speed of the horses. When this machine is used, the flax is pulled and spread with the seed still on the plants in the seed boll. In other words, the flax is pulled and spread in one operation. It lies on the field for retting for a period of a week to ten days, depending on the weather conditions.

The puller and binding machine pulls the flax and binds it into sheaves similar to those produced by a grain binder. The machine is hauled by a tractor, and the pulling and binding mechanism is activated from a power take-off on the tractor. The sheaves of flax are stooked like those of other grains, and when the seed is matured the sheaves are taken to a deseeding machine, where the seed is removed. The deseeded straw is taken back to the retting field, where it has to be spread thinly and evenly. Some difficulty has been experienced with this type of pulling and binding machine in producing an even butted sheaf, but further experimentation, no doubt, will remedy this slight fault. Both of these machines will pull a width of 36" of standing flax.

The pulling mechanism is so built that as the machine travels ahead, the straw is bent over and gripped by endless rubber belts and pulled out of the ground. These gripping belts function at about 6 to 8 inches above the ground so that the short weeds and grass are passed over by the puller.

*Deseeding Machine.*—There are several types of fairly efficient deseeding machines. Among the more popular types are the whippers, the hammer deseeders, and the rippling or Soenens deseeders.

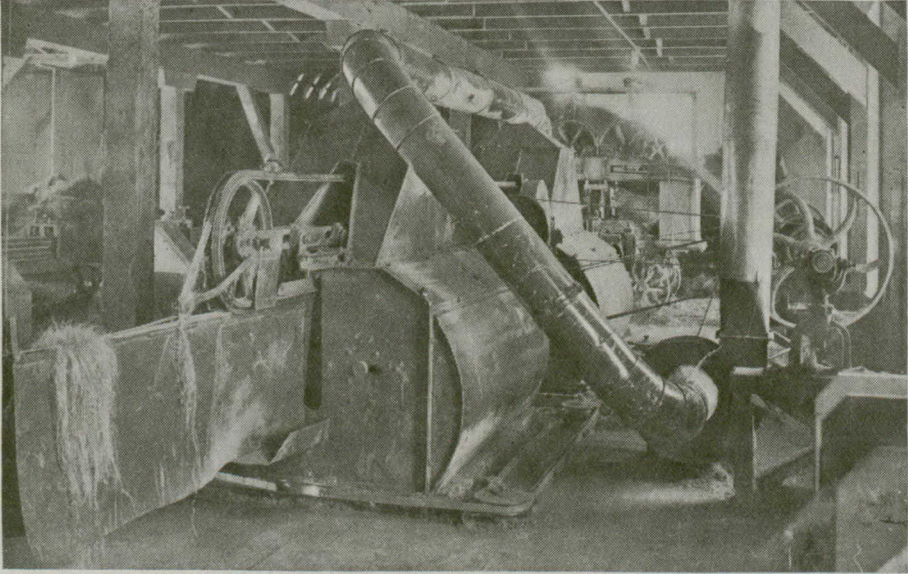
The most efficient deseeding machines are those that remove the seed completely from the flax stems, yet allow the straw in the sheaf to remain in a parallel position, evenly butted. The hammer deseeders consist of several flat wooden blocks bolted to suspending springs which work in such a way as to hammer the seed from the seed bolls on a sort of special table built into the machine. When the seed bolls are broken, the seed falls away from the hulls. In order to have the flax deseeded with this machine, the sheaves have to be opened out.

The whipper-type machine is not quite as rapid in removing the seed as the hammer type, but nevertheless does a very complete threshing job. The sheaf remains intact during the deseeding. The head of the sheaf is passed between two rapidly revolving rollers, and the seed bolls are crushed in this way. The two large steel rollers have adjustable springs and rubber blocks to allow for different sizes and types of sheaves.

The Soenens deseeders are a very efficient type, set on wheels so that the machine can be moved to different fields or may be placed on the floor of a modern flax mill in front of the brakes of a turbine scutching unit. This deseeders has two combs working at either end of the flax straw. One comb straightens and cleans the root ends, and the other combs the seed bolls off the top of the straw. The machine itself works in somewhat of an elbow-like motion and can be run by a 2½ h.p. motor. The seed that is combed from the flax is conveyed into a hopper in which are two steel fluted rollers, where the seed bolls are broken and the seed released. The flax straw passes in a direction at right angles to a rubber



conveyer belt and over a pneumatic tire, which works in such a way as to hold the straw parallel. This machine will deseed retted straw just as efficiently as ripe straw. If the straw is ripe from the stooks, there is a binding attachment that can be placed on the delivery end of the deseeder so that sheaves may be made from the deseeded straw for convenience in handling and carting to the retting field. If retted straw is to be deseeded, it passes through in much the same manner, with the exception that the deseeded retted straw continues directly into the breaking rollers of the turbine.



General View of Flax Turbine set-up for Line Fibre Production

### Processing Machinery

*Scutching Flax on the Turbine.*—The Vanhauwaert turbine scutcher has given very efficient performance so far under Canadian conditions. There are other makes available which may or may not prove to be superior in performance. Although the braker unit of the scutcher is a separate machine, it may be built into the turbine sections so that the progress of the retted straw from the deseeding machine is uninterrupted. The braker unit consists of two series of fluted rollers, the upper four in the series meshing with the lower four rollers in the same series. The pressure of the rollers may be increased or lessened by adjustment of special coil springs with bolts attached.

After the retted straw passes through the brakes, a rubber retainer belt inside a metal conveyer belt grips the broken straw two-thirds of its length from the root end. As the straw is carried forward, the root ends are scutched in the first turbine drum. The beating action of the blades, which revolve within each other like the blades of an egg-beater, does the scutching. As the partially scutched fibre passes along, it is gripped by a second conveyer belt, which introduces the flax to the second turbine drum. Here the remaining portion of seed ends of the broken flax becomes scutched. The line fibre is delivered on a metal arm, where it is removed by hand, rough dressed, and placed on the grading table, after which it is finally taken to the grading room for final examination. Since the turbine unit is always located on the first



floor of the mill, a chute is built in the floor underneath the total length of the two turbine scutch drums and the tow from the turbine falls away from the revolving blades and drops down this chute. The tow falls on to a tow shaker, which is located at the mouth of the chute on the ground floor.

*Tow Shaker.*—This is a machine about four feet high, somewhat similar to a table, with the top built of narrow wooden slats through which appear long spike-like agitators working on an eccentric. This action shakes the dirt, shives and woody particles from the tow which is carried down the chute from the turbine on the floor above. Dust- and shive-extracting fans carry the refuse by means of pipes to a dust box built on the outside of the building. The tow from the shaking machine is taken and finished on the Flemish knives by hand labour.

*Seed Cleaning Equipment.*—It should be pointed out that a rough seed cleaner and a No. 150 final cleaner work in conjunction with most turbine set-ups. Conveyer chutes under the deseeding machine carry the seed to the rough cleaner, and from there the partially cleaned seed is placed in the final cleaner for grading and bagging.

Some modern mills have what is known as a tow-cleaning machine. This is used in conjunction with Flemish knives. The pullings and short fibres of the flax are conveyed to the machine, which is composed of a long axle with spikes revolving in a sort of cradle-like, half-circular, metal frame. Here the fibre is wound around the shaft, and the dirt and shives are dropped into dust or refuse boxes. The fibre is removed periodically from the shaft, which may be stopped revolving at convenient intervals.

*Baler.*—Modern power balers are capable of producing a good bale of flax. The type in common use has a reversible motor so that the bale rack may be raised or lowered by means of electric power, according to the quantity placed in the bale. This makes very compact and satisfactory bales for shipment overseas.

*Production of Green Tow.*—The ordinary grain binder, with suitable, well-sharpened knives, may be used for cutting flax for green tow purposes. The seed is removed from the ripe straw, and the straw is passed two or three times through the ordinary Donkey brakes, producing what is known as grain tow, used in the furniture upholstery trade.

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