



SUGARCANE HARVESTER



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A sugarcane harvester is a large piece of agricultural machinery used to harvest and partially process sugarcane. The machine, originally developed in the 1920s, remains similar in function and design to the combine harvester. Essentially a storage vessel on a truck with a mechanical extension, the machine cuts the stalks at the base, strips the leaves off, and then cuts the cane into segments. These are then deposited into either the on-board container, or a separate vehicle traveling alongside. Waste material is then ejected back onto the field, where it acts as fertilizer. Sugarcane harvester usually is self-propel sugarcane harvester or connected with tractors. It has functions of picking up fallen sugarcane, cutting and paving the stalk. Sugarcane harvester can adapt to different land forms.

Sugarcane harvesting involves base cutting of the crop, detopping, detrashing, bundling, loading and transportation. Detopping and detrashing of crop itself takes about two-third of manpower required for harvesting. Several types of sugarcane combines and harvesters are used world over. They are normally used for crops, which are burnt in the field prior to harvesting for trash removal. Some harvesters are used in green crop and cane is burnt in windrow after harvesting. Some machines have been developed which can be used in the cane field without burning. This is particularly done where environmentalists object burning of cane. The sugarcane combine is a one-pass machine, which cuts the cane, detops, cuts in billets, cleans and conveys to transport cart/trolley. In case of sugarcane harvester, it cuts the crop, detop and put on the ground in windrow, which are loaded in trolleys by mechanical loader or grabber. Combine harvested cane must be processed within 16 hours to avoid deterioration and sucrose loss. Most of the sugarcane combines and harvesters is self-propelled machine. However, some tractor-drawn machines are also available.

MAIN COMPONENTS

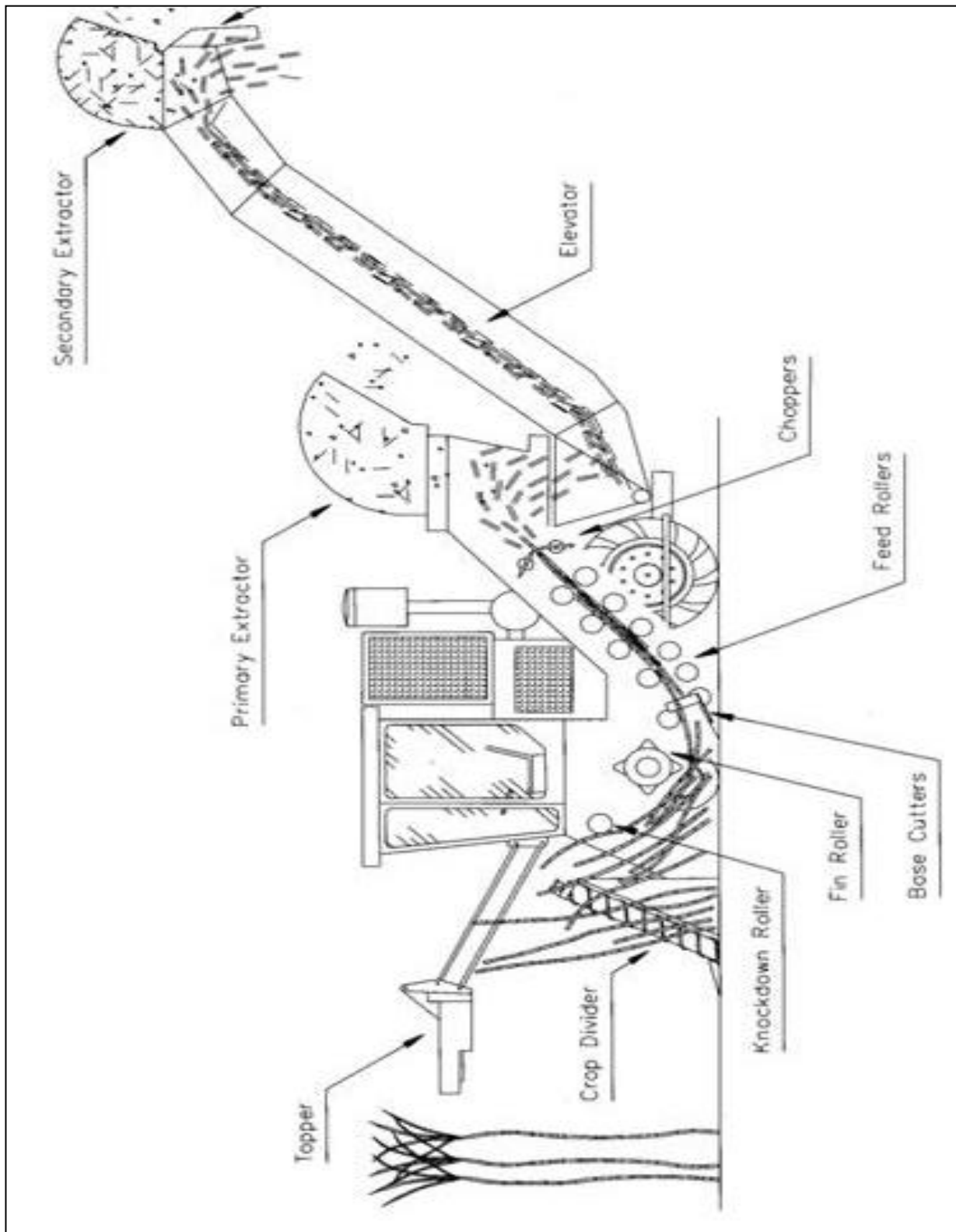
- Topper
- Crop divider
- Knockdown roller
- Fin roller
- Base cutter
- Feed rollers
- Chopper
- Primary extractor



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- Secondary extractor

CONSTRUCTIONAL DETAILS





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Gathering mechanism: Its function is to separate sprawled cane and align the row to be harvested. They are made of revolving scrolls fitted on gathering walls. It consists of two triangular walls, approximately 140 cm apart at the tips and converging to the throat width of the machine just forward of the base cutters. The tips of each wall are fitted with ground engaging points to get under and lift stalks that are lying on the ground.

Topping mechanism: Its job is to gather, cut and discard non-productive tops. The gathering operation is performed by gathering chains while cutting is done by a horizontally rotating disc fitted with mower blades which cut against a fixed anvil.

Base cutter: Its function is to cut the stalk at or just below ground level. At least one manufacture uses twin contra-rotating discs fitted with a number of replaceable knife blades. Some use single diameter blades for base cutting the cane. Researchers have found that tip speeds below 304.8 m/min do a very poor job of cutting. Recommended tip speeds for Florida conditions is 1524 to 1828 m/min.

Feed conveyor: Its function is to convey the whole stalks of cane from the base cutter to the choppers. In some machines it is made of endless chain slat conveyor. In others a series of rollers are used. In some machines augers are used for feeding cane to the chopper.

Choppers: Their function is to receive the whole stalks from the feed conveyor and chop them into short uniform billets. The design used by Massey Ferguson is a pair of parallel shafts each with paddle shaped blades, which as they rotated came together in the plane containing the shafts, and so gave a flying or travelling cut. There is other mechanism used for chopping. However, flying cut mechanism has the advantage of being aggressively self-feeding, and that once the swath is engaged by the chopper; it will be pulled in continuously until broken or forcibly interrupted.

Elevator: Its function is to receive the billets from the choppers and convey them into a receptacle for transporting to the mill. An inclined chain and slat conveyor is used. The elevator can be rotated 180 degrees in most machines. This facilitates in opening of the field and harvesting in either direction.

Air-blast cleaning: One of the biggest problems with mechanically harvested cane is the foreign matter in cane delivered to the mill. Foreign matter consists of leaves, tops, dirt, stones



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and many other materials picked from the field. In some machines one while in others two fans are being used for extracting leaves and dirt from the cane.

ADVANTAGES

- Increased yield because of effective **harvesting** as it roots down to the bottom level of the crop i.e. 2" below the ground level.
- Saves additional expenses spent on stubble shaving