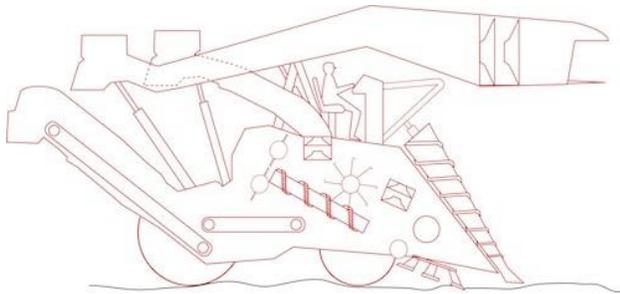
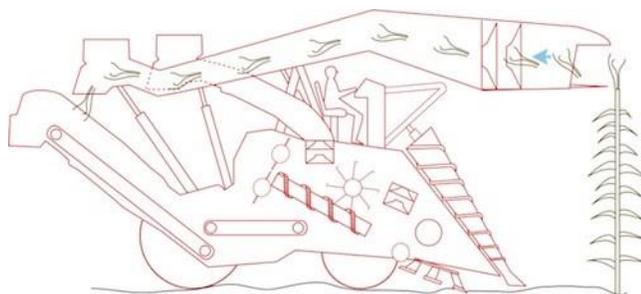


Proposed Sugar Cane Harvester

Because conventional cane harvesting machinery ejects the stripped leaves back onto the field requiring farmers to burn the detritus once harvest is complete, the following proposed harvester would collect the leaves for use in ethanol production. Protein-rich tops can be transformed into animal feed.

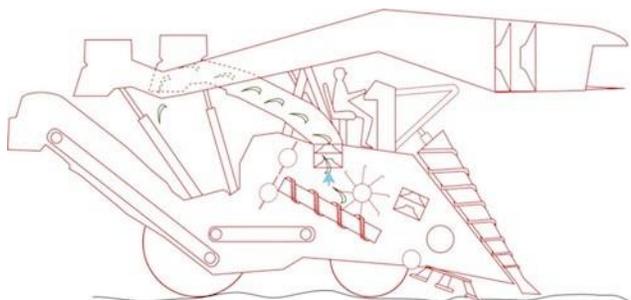
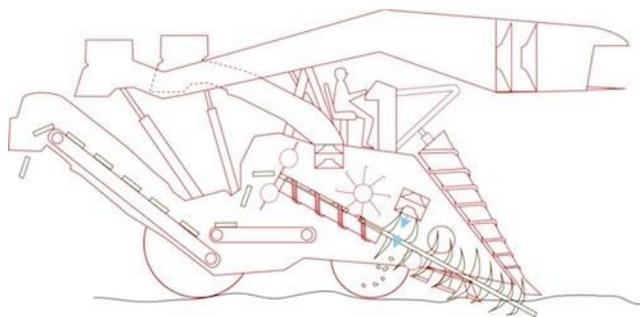


1. Cross section of the harvester.



2. A new attachment would cut and collect the heads of the cane before cutting the stalk. A vacuum system sucks the tops along a chute.

3. Using current techniques, the cane is cut and stripped of its leaves by a worm-drive. A blower removes dirt and rocks. Two rotating cutters chop the stalks into 18-inch billets, which are ideal for milling. A conveyor belt system delivers cane stalks to an accompanying collector wagon.



4. While the cane is being turned in the worm drive, stripped leaves are vacuum collected to be used as a raw material for ethanol production where it is added to the bagasse. The accompanying collector wagon is outfitted with three bins to transport tops, stalk and leaves separately. It is driven alongside the harvester.

A. Look at the accompanying illustration of the proposed sugar cane harvester and read the explanations/captions of how the different parts operate. This machine does not yet exist, but is being offered as a more sustainable solution to current harvesting technology.

B. Then, answer the following questions based on what you may already know about sugar cane agriculture. If necessary, you may also wish to conduct some additional research to be able to extrapolate and draw conclusions about the subject matter.

1. Why are the tops removed from the cane stalks as illustrated in image 2?
2. In image 3, why is it important to remove dirt and rocks from the harvested cane?
3. Why do you think 18-inch billets are the ideal size for milling?
4. What important process takes place in image 4?
5. Why is it important to collect the leaves as well as the stalks? What might the leaves be used to make? Conduct some research about the sugar industry in Brazil. What do they use the cane detritus for?
6. This illustration is only a proposal for a possible harvester that can perform all these functions. Do you think it can actually be built? Why or why not? Do you think it will cost more than a typical harvester? Why or why not? What might you as the inventor/manufacturer do to convince farmers to purchase this new product?



Answer Key:

1. Protein rich tops are removed from the stalks so that they can be converted into animal feed.
2. These are contaminants to food-grade sugar. It is important to remove dirt and rocks in the field so that it doesn't have to be done at the mill. It saves time and energy.
3. Billets of that size are easy to transport to the mill. Once at the mill, they are a good size to fit in the chopper/crusher mechanisms.
4. The leaves are stripped from the stalk to be used instead of being ejected onto the field and essentially wasted.
5. The leaves can be used to make ethanol, a renewable fuel source. Most of the fuel in Brazil is ethanol-based. Since the leaves are currently burned after harvest, this also helps reduce pollution in the atmosphere. Of course, the juice is squeezed from the stalks to make sugar crystals.
6. Answers will vary, but the design of such a machine is sound and could be produced in the near future. Convincing farmers to purchase what will undoubtedly be a more expensive tractor would necessitate farmers being able to sell cane detritus to offset their costs.

