CONSOLATION

Tractor mounted combine harvester with straw collector

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Rajpal (38), a farmer and a passionate innovator working on the development of farm machineries, has developed a tractor mounted, power take off (PTO) powered combine harvester, which also has the provision of collecting the straw. His machine is a low cost one as compared to available alternatives.

Born in a farming family, Rajpal is the eldest of seven siblings. He did not continue studies after higher secondary and took up farming to help his father. With the main occupation of the people in his village being farming, his interest naturally grew in farming and in the machines used for various farming operations. His other interests include sculpture making and painting for which he has won many awards as well. He is married and settled with his wife and five children.

His life's journey has been a mix of ups and downs. Since the family had financial problems,

he used to make his own toys and for his siblings using the waste material available. Rajpal recalls having made a wind mill and fan arrangement which could bring outside fresh air inside the house. He liked studying but could not continue due to financial problems, then again in many of his technical projects, arranging finance was difficult, and many of his ideas, remained at the idea level only. Notwithstanding problems, with time his interest in solving problems of farmers and for women farm workers by developing low cost technologies increased. His family has been always supportive of all his endeavours, which he greatly appreciates. He says his journey has been tough but at the same time very exciting and great learning experience for him.

Genesis

Most farmers in his region burn the leftover in their fields after harvesting. One year this led to a huge fire, which burn down many farms and a village. This made him think to develop a machine, which could harvest and store straw as well. He wanted it to be easily assembled and which could be attached to a tractor. While he was working on the harvester, he also noticed the drudgery involved in carrying a knapsack sprayer and worked on a wheeled sprayer, which was easy to manoeuvre in the field and also useful for small trees in addition to the field crops.

He started by having discussions with the famers about their requirements and whether the possibility of putting the tractor in front and combining all the three operation viz. reaping, threshing and winnowing, were desirable by them. He also planned the arrangement of the collection of straw at the storage space at the back of the machine. He went through a number of iterations, where he invested considerable savings and personal loans without much success. In 2013, he was able to come up with one such design, which could perform the desired actions of reaping, threshing and winnowing. However, the machine had stability and vibration issues due to which it was not tested in the field. He further worked on the machine to arrive at the present design.

The machine

This is a combine harvester cum thresher with straw collector, which can be used with a tractor of minimum 45 hp. The machine consists of three main units: harvesting unit, conveying unit and threshing unit. The machine can also collect straw separately. One acre of land can be harvested in 1 hour with fuel consumption of 4 lit per hour. It has been found suitable for wheat, soybeans, sorghum and maize crops.

This machine consists of harvesting unit, conveying unit and threshing unit together which can do three separate operations *viz.* reaping, threshing and winnowing as a single process. A simple reaper with folding mechanism has been used as harvesting unit and a conventional thresher as threshing unit. The crop gets cut and conveyed to the threshing unit where grains are separated from stalks and stored in a collecting tank. The straw chaff, after being cut into small pieces, falls from the thresher at back of the machine and gets collected into a separate tank. This is then used as animal feed. The leftover on the field is mainly the remaining dried stems and leaves of the crop with limited nutrients which is either cut and spread on the field or baled for feed/bedding for livestock.