Manual wood cutting machine[9]

ENERGY NATIONAL THIRD

Karuna Kant Nath (40) is a carpenter and has studied till the fourth standard. He has a small furniture shop at Gharara Dallang Ghat village of Darrang district of Assam, where he lives with his wife and daughter. He has been engaged in carpentry since 1976.

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Genesis Karuna Kant needed to saw wood frequently in order to make furniture. However, he was unable to pay the cost of getting this done in the nearby saw-mills. Sawing the wood manually, on the other hand, took up a lot of time and effort. Then the idea of developing a manual device that would saw without using electricity or any other fuel took root in his mind. This was in 1995. Around this time, when he went to the forest to fetch some wood he noticed a couple of wood–cutters using a big saw to cut wood. The sight of the woodcutters moving the saw up and down in order to cut the big log inspired him. He felt that if he placed springs at both ends of the saw in place of the woodcutters, he would no longer have any difficulty in sawing the wood manually.

Though he was enthusiastic about developing this idea, his financial circumstances did not allow him this luxury. Nor was his family receptive to it. Forced to push this idea to the back of his mind, he carried on with his modest business of making furniture. But time and again the idea kept haunting him till one day he decided to look at it from a completely different perspective. He decided that if his friends could find money within their small incomes to waste in useless activities like gambling and drinking, he could also set aside some from his limited income to invest in a useful activity such as developing the manual wood cutting machine.

Spurred by this decision, he started experimenting with his idea and developed various prototypes through trial and error. The first model was not satisfactory, but things began to take shape from the second model onwards and since then he has made several modifications to improve the design of his machine.

The Innovation
The manual wood cutting machine is an energy saving device that works on the principle of inertia of motion. The machine can be used to cut big logs as well as wood for furniture .

Details of the latest prototype

Construction details
Wood has been used as the structural material. Some parts are made of steel and RCC. The height of the machine ranges from 5-10 ft. It consists of two wooden columns on which steel channels are fitted, a Bed, two Fly wheels made of composite material i.e. steel and RCC, two connecting rods made of wood, cutting

blade, flexible clamp made of iron and eight Ball bearings.

Design and Functioning

Two steel channels are fitted on the two wooden columns within which the vertical up- down movement of the bed through the bearings is possible. Two composite flywheels are fitted on the top of the machine through the two wooden columns and two connecting rods made of wood are attached to the flywheels. The other end of the connecting rods is fitted with the bed. Cycle tubes are connected to the bed to store energy during the reciprocating movement.A flexible clamp is provided with the bed to hold the wood being cut, depending on its thickness. These link mechanisms are done in such a manner that the vertical movement of the connecting rods causes a rotary motion of the wheels and a vertical linear motion of the cutter. A cutting blade is fitted on the middle of the machine vertically.

During the operation, wood is placed on the bed and the vertical movement of connecting rod is achieved manually either by the movement of the hand or leg with little effort. This is possible because of the movement of the flywheel that gets rotated with the additional force of inertia. Consequently the blade fitted in the middle of the machine cuts wood as a result of its linear motion.

The flywheels used by Karunakant are unique in their application as well as composition-they are made of iron and RCC. Though the concept of composite flywheel has become a buzzword these days in the field of research and development, Karuna Kant has applied it successfully without having any formal knowledge of the concept. Another unique feature of the system is the arrangement of its bearings (i.e. the support bracket for sliding) which makes the up-down movement of the bed through connecting rods possible and facilitates a two-dimensional movement in the system.

Advantages

Compared to existing options such as an electrical saw mill or manual labour, the manual wood cutting machine of Karunakant has a number of advantages. It costs only Rs.12, 000 as compared to an electrical saw mill which costs Rs.1,00,000. In addition there are no running costs as it does not require any power supply as compared to the saw mill which requires a 10 HP motor. The cost of cutting wood as well as the time required is less than that needed if manual labour is used. In addition, it is quite efficient and easy to operate, thus reducing drudgery. It especially assumes relevance in the current scenario where the government has banned the setting up of new power saw mills which forces people to wait for long hours at saw mills to get their wood cut.

Current status

NIF in coordination with Grassroots Innovations Augmentation Network- North East (GIAN-NE)has sanctioned an amount of Rs. 72,500 from its Micro Venture Innovation Fund towards the commercialization of the machine. NIF has also filed the patent application for the machine.