

Beam Engine powered circular sawing machine

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Abstract. In this project, the output of a Beam Engine is used to drive a circular saw to cut timber. Here, instead of the rotating fly wheel, it is intended to have a rotating circular saw. This rotating circular saw is used to cut timber. Circular saws driven with electric power are a common feature. But in places where electricity is scarce, or absent, it is difficult to operate these equipments. But since the Beam Engine powered saw runs on fuel, it can be operated even in places where electricity is totally absent. A beam engine is a design of stationary steam engine [1]. A stationary engine is an engine whose framework does not move [2]. Usually, a stationary engine is used not to propel a vehicle but to drive a piece of immobile equipment such as a pump or power tools [4]. In a beam engine, the piston is mounted vertically, and the piston rod does not connect directly to the connecting rod, but instead to a rocker or *beam* above both the piston and flywheel. The beam is pivoted in the middle, with the cylinder on one side and the flywheel, which incorporates the crank, on the other. The connecting rod connects to the opposite end of the beam to the piston rod, and then to the flywheel [1].

1. Introduction

The motivation for this project comes from the ME 637 course that I had taken during the spring 2006 semester at Wichita State. A beam engine is a design of stationary steam engine [1]. A stationary engine is an engine that does not move [2]. Usually, a stationary engine is used not to propel a vehicle but to drive a piece of immobile equipment such as a pump or power tools [4]. The idea evolved at this point, using the beam engine to drive a circular saw to cut timber.

2. Development of idea, discussion and significance

As mentioned earlier the motivation for this project being the course ME 637, the course required each student to submit a project using the Pro-E modeling tool and the instructor emphasized that the project should be creative and something new. This made me think about something new and finally I arrived at the Beam Engine idea. The word “power tools” caught my attention and I just started to think why not I use a beam engine to drive a circular saw to cut timber. While electric powered saws are a common feature as also diesel and gasoline powered saws, a saw that works on the principle of a beam engine is something that I thought of. This saw, which can run either on diesel or gasoline, can be used in places where electricity is sparse or absent.

Working principle

When the piston in the cylinder reciprocates, it imparts an oscillating motion to the rocker arms, as shown in figure 1 on page 2. This oscillating motion of the rocker arm is converted into rotary motion by the crankshaft. The crankshaft, which is connected to the circular saw, makes the circular saw rotate. This rotary action of the circular wood saw is used to saw timber or wood blocks. There is a small table attachment for supporting the wooden block. The wooden block is placed on the table and pushed towards the rotating wood saw, which results in the sawing action. The main advantage of this machine is that it can be used in places where electricity is not economical or in places where electricity is absent

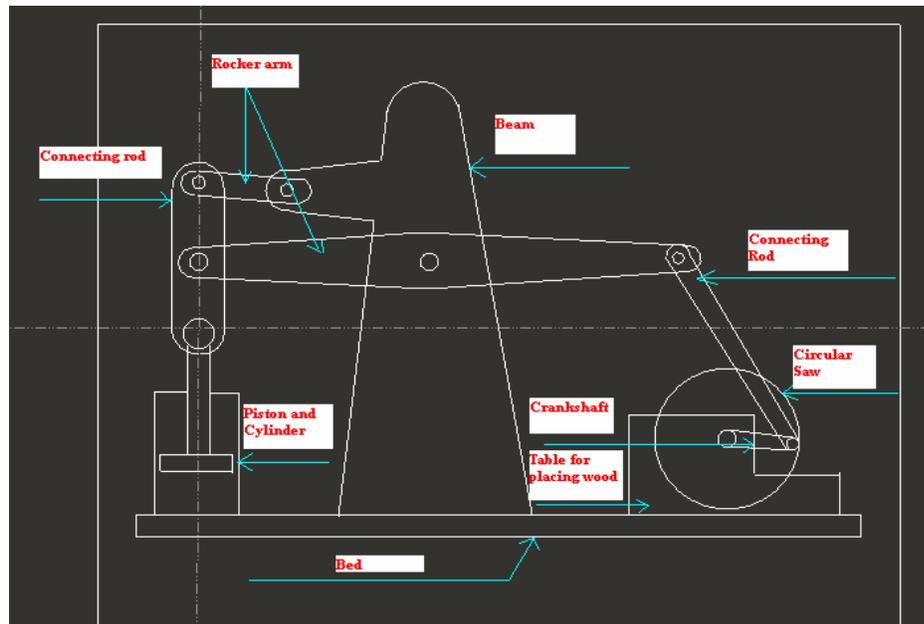


Fig 1. A schematic of a beam engine powered circular sawing machine [3]

3. Conclusions

This being a creative project, there are no particular instances of this type of machine being available in the commercial market. But the aim of this project is to show that this type of machine too is an option for wood working industry in remote places in the absence of electricity. Further improvements include using reduction gears, to vary the speed of the circular saw, having an adjustable bed with slots for adjusting the table length, so that even large sizes of timber can be sawed by varying the distance of the table and the size of the circular saw.

4. Acknowledgements

The credit for this project also goes to the ME 637 course co-coordinator, Dr. Behnam Bahr, Professor and Chair, Department of Mechanical Engineering and course instructor Moontasir Hanief. I am thankful to them for being helpful and supportive throughout the duration of this course.

5. References

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- [2] <http://www.answers.com/topic/stationary-engine>
- [3] <http://www.keveney.com/unkbeam.html>
- [4] http://en.wikipedia.org/wiki/Stationary_engine