

Design and Fabrication of Submersible Pump Lifting Machine

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Abstract

This project report deals with study and development of mechanism for submersible pump lifting. Human society is developing with rapid momentum and achieved success for making its livelihood better. The current study mainly aimed to develop the machine which reduce the human effort and stresses on human body. It is the most important source of employment for the majority of the work force in the country. Approximately 38% of the total labor force was engaged in agriculture in 1999. Among that highest percentage was in agriculture sector. Releasing of the work force of agriculture sectors than other is important to develop the country. To release the work force of the farmer, mechanization plays a big role. To feed growing population is a huge challenge. Mechanization of submersible pump lifting machine will lead to time consuming with releasing of work force from other work. The objective of this project was to design a submersible pump lifting machine mechanism to lift the submersible pump from bore well by small scale farmers in the country.

Keywords: Submersible pump, lifting, bore well, mechanization

INTRODUCTION

In submersible pump lifting process, there is need to bend in back and that creates the stresses in back bones, so as to reduce these stresses as well as for more labor saving, this gear train mechanism is designed and this is manually operated.

With the help of this submersible pump lifting machine, two persons can lift the submersible pump over 300ft. In same time which else would require with many labors. It is about ten times efficient than usual method. It lifts the submersible pump in a systematic manner and there is no need for line makers, etc. It is affordable to all farmers as it has fairly low cost.

Bore wells are deep and the submersible pump is at the bottom of the long bore well pipe. Conventionally, the bore well pipe and pump are lifted out of the bore well using pulley block. This is very time

consuming and laborious work. The bore well pipe lifter and transportation machine gives more than 3m/min transfer rate which makes the mounting and dismounting of the submersible pump in bore wells very fast and very easy. So that the total integrated information and steps to be followed during bore well installation and lifting is to be focused. In the ancient days, these process carry out with the help of chain pulley mechanism. This method is traditional method and very time consuming. This chain pulley mechanism also require no. of labors to carry out the process.

LITERATURE REVIEW

Despite of widespread mechanization in the farming, farmers stills perform manual tasks involving lifting, carrying, lowering of objects either by necessity or by choice. Most of time, the load handled by them is very much above their physical capability. Physical capability of workers varies

individual to individual. The limitations of physical capabilities are complex and interrelated. Each is dependent upon personal characteristics. The performance of manual lifting submersible pump from bore well tasks imposes high degree of cardiovascular strain, increased heart rate, blood pressure, muscular fatigue and musculoskeletal disorders

In the rural area, farmers having bore well for irrigation purpose. Nearly about all the farmers having at least one bore well in their farm. If the motor occurs the problem then these motor is need to be lifted from the bore well. For lifting, the motor force required to lift is more because the motor is to below 300ft. in the bore well. From these level lifting force required in large amount, for that purpose, 8–10 people are required it means to much human effort is required.

CONSTRUCTIONAL DETAILS

In submersible pump lifting, machine is used to lift submersible pump from the bore well. It consists of a gear arrangement to transfer motion to the arms through links.

The various components of the machine are:

- Gears
- Shaft
- Plates
- Frame
- Handle
- Channel
- Bearings

Gear

There are two gears. The small gear as a driver which is mounted on the handle. The bigger gear is connected to shaft. Motion is transferred from small gear to big gear as gear train.

Shaft

The big gear is mounted on the shafts through which power is transmitted to the

rope. The shafts are fixed on the frame with the help of bearing.

Plates

Plates are fitted to another side of shaft for the purpose of wounding the rope.

Platform

It serves as the base of the frame. It is made up of sheet metal.

Frame

It carries whole assembly of mechanism.

Handle

It is used to pull the mechanism. The mechanism is propelled using handle as the main sprocket is mounted on the handle.

Bearings

Pedestal bearing is used to provide support for a rotating shaft with the help of compatible bearings and various accessories .Housing material for pedestal bearing is typically made of cast iron or cast steel. This type of bearing is fitted with the help of nut and bolt.

Channel

Channel used is C type channel. Material of the channel used is mild steel. Channel is the main part in the formation of frame; channel is connected with the help of welding to assemble the frame

OBJECTIVE

- The main purpose behind this project is to lift the pump and motor to minimize time and human efforts with very simple and convenient mechanism.
- The additional benefit of this project is to lift anything fall down in the bore (child, any object).
- Easy to lift pipe and motor by reducing human efforts and time with lower cost

WORKING PRINCIPLE

In these system, we used gear mechanism. It can be operated with handle or motor as per comfort for user. Here gear train is used. As per gear can rotate the pipe connected to that also lift.

EXPERIMENTAL SETUP

For the assembly of whole machine we performed the following steps.

- Preparation of the drawings of the individual elements
- Surveying available standard parts in the market
- Manufacturing of the remaining parts
- Manufacturing of frame
- Assembly of the main shaft and gear mechanism
- Assembly of the gears
- Assembly of the gear on the frame
- Joining of the handle



Figure 1: Working model.

NEED AND SCOPE

In figure 1, we operated bore well pipe lifting mechanism manually. The mechanism was fixed. Set up time was more. Pulley and chain arrangement was used. Time consumed was more. Maintenance cost was more. Manpower was more. It required more space. Now,

due to new modification it is easy to operate

CONCLUSION

As per the above discussion, we concluded that how overcome the problem in conventional bore well pipe lifting machine. Easy to lift pipe and motor by reducing human efforts and time with lower cost. Machine is also useful in lifting any object fallen in the bore well. Future scope of proposed research work is in automation.

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