

Design and Manufacturing of Pole Erecting Device

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ABSTRACT

The pole erection and installation is the challenging issues for any country, like India it is more. More labor requires erecting the pole by using rope and pulley. Also it causes casual accidents. In this paper we propose pole erecting device to be developed for rooting out conventional drawbacks. This project gives modification in the conventional lifting methods. Pole erecting device is mainly based on power screw linked with frame through bearings. With the help of 'pole erecting device a single person can lift and erect the heavy pole in a short span of time. In conventional method 12-14 people are required to do the work. This work is being done here by single person. The focused point is manual operation by handle. This paper emphasizes on the feasibility of developing cheaply pole erecting device. This proposed paper also increases scope for development of new devices. This is useful in the rural as well as urban region of our country. With some modification device can be used to lift even more heavy poles.

Keywords - Pole Erection, Power Screw, Bearing, Handle, Universal Joint.

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I. INTRODUCTION

The use of lift by the man can be traced back to the earlier ages. Man lifted heavy objects to a certain height by using a wooden pole rested at the center & applying effort at the other end. Thus we can lead to the benchmarks that ancient man was using some kinds of techniques to lift stones or tree trunks. Simple rope hoists were also used to lift the object to a particular height. Our knowledge of the earlier lift from the writing of the Roman architect engineer Vitruvius and Alexandria both of whom in the first century A.D. The simplest of these lift was no more than a single pole. One end was sunk or fixed to the ground. This beam was raised & held in the position by a part of back stays attached to its upper ends. The pulley v block which held the hauling line by a windless fixed to one side of the pole near its base. The windless can be used by working on the back stays to raise the beam into position.

II. OBJECTIVE OF THE PROJECT

There has been an increasing concern in recent years over the increasing number of electric pole installation and collapsing of poles due to various reasons. In this situation it becomes very important to reinstall or erect that collapsed

pole as soon as possible since most of the pole has the location near road side. So it becomes necessary to clear the traffic and erect the pole. But by using conventional methods it will take a lot of time to fully upward pole. Also more labors will require. For this there is need to design a device which will be able to do this work quickly and in less amount of time. Hence the main objective here is to design a Pole erecting device and also manufacture it. Main aim here is to reduce the man-power in installing pole manually. Using of any electrical components is avoided so that automatically cost is reduced and construction is simple.

III. SCOPE OF THE PROJECT

Device is useful since it can be used at the rural areas where there is no any electricity.

With further modifications the frame of device can be made foldable so that it will be easily disassembles and can be reassemble at the site of work. With the help of using a small electric motor at the handle we can also make it automatic and even less time consuming. By making lead screw adjustable we can use this device in a wide use of application where there is requirement of erecting different poles of differ range of weight.

IV. CONSTRUCTION & WORKING

4.1) Construction:

This pole erecting device basically consists of a supporting structure known as frame. Frame is a structure that forms part of an object and gives it its strength and shape. It supports all the mechanical elements. It carries whole assembly loads. It holds all the part of machine in its place and put them all together. A lead screw is attached to the frame which is main part of our mechanism. It used to erect the pole by making use of nut and handle. This construction results in very high mechanical efficiency and much less energy consumption for a given load. Universal joint is another most important component of design. The main concept of universal joint is based on design of gimbals, which have been in use since antiquity. Universal joint is a joint or coupling in a rigid rod that allows the rod to bend in any direction, and is commonly used in shaft that transmit rotary motion. It consist of a pair of hinges located close together, oriented at 90° to each other, connected by a cross shaft. It is not a constant velocity joint. It is used to transmit rotary motion of handle and convert into linear motion of nut. A handle is connect to universal joint through bearing. In our design handle is attached to frame through bearing and lead screw with universal joint.

4.2) Working:

Lead screw is the main part of the designed device. Whole working is based on lead screw and nut interfacing and it is the significant part of device. The connection of lead screw is made with handle through universal joint. At the beginning, the pole base is placed on clamp while unloading the pole through transportation vehicle. Operator gives manual torque to the handle. Actually handle has T shape that's why it facilitates the torque transmission to the handle. Also bearings at the opposite end of handle it makes easiness to rotation. Universal joint uses to transmit torque from handle to the lead screw. The universal joint is placed between handle and lead screw. Then nut starts moving upward towards the vertical part of frame as the nut is linked with screw. When the pole reach very close to the 90 degree, the C clamp separate from pole. Then make concreting at pole base and iron wire ropes attached to the ground to provide support forever.



Fig.4.2.1 Pole erecting device model

V. MERITS AND DEMERITS

5.1 Merits

- The complete cycle of pole erection can be done with the help of one or two labors against the current manual practice of 12 to 14 labors.
- Efficiency of machine is high i.e. the time required for erecting the pole using pole erecting device is very less as compared conventional methods. Machine takes very short time for pole erection.
- It eliminates the prevailing labor problem completely thus leads to project on time execution.

5.2 Demerits

- On failure of single component in the assembly whole system can stop working. Since of working all the components is based on one another.
- Restriction on the range of load capacity of pole.

VI. CONCLUSION

This project gives modification in the conventional lifting methods. With the help of 'pole erecting device a single person can lift and erect the heavy pole in a short span of time. In conventional method 12-14 people are required to do the work. This work is being done here by single person. This is useful in the rural as well as urban region of our country. With some modification device can be used to lift even more heavy poles.

As mentioned earlier the use of electric motor is avoided and all the parts used are only mechanical parts hence great cost reduction factor. Also electricity is saved

Wide scope of application: this equipment can be widely used in electric power telecommunication engineering, municipal engineering, landscaping planting engineering, construction engineering, solar photovoltaic power generation engineering, etc.

With further modifications the frame of device can be made foldable so that it will be easily disassembles and can be reassemble at the site of work

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