

Development of the Solar Power Chain Link Fencing Machine

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Abstract: Fences can be defined as arrangement that provides an obstruction, enclosure, or a boundary, made up of posts or stakes linked together by boards, wire, or rails. The chains run vertically and are bent into a zigzag pattern so that each "zig" hooks with the wire immediately on one side and each "zag" with the wire immediately on the other. The manufacturing of chain-link fencing is called weaving. Preparing zigzag shape wire is a quite challenging task and cannot be done using basic mechanisms. So here we design a smart mechanism to automatically bend wires in order to get zigzag shaped wire for mesh. These wires can then be linked together to create chain link or meshes.

For this system we make use of a wire bobbin to supply raw wire to the system, a D.C. motor with shaft connected to a unique mechanism that achieves our bending requirements. The system is a small yet complex system that achieves the task with ease.

Keywords: Wire Fence, Motor, Solar panel

I. INTRODUCTION

For ages it has been a common practice to mark/designate one's property by fencing around it. As the time changed so did the techniques involved in fencing. In early age the fences used to be of stones. A century ago the fencing was dominated by use of steel and wood. In modern times though, there are many fencing techniques available which can be implied as per the requirement. Of many such techniques a well-known and diversely implied one is the chain link fencing. Its implication can be found at borders, alongside the highways, in industrial production lines and for domestic purpose. It was the industrial revolution that influenced the production of chain link fencing machines; the inspiration was taken from cloth weaving machine. For production of chain link fencing the manual, semi-automatic and automatic machines are used. The machine under development is focuses on small scale business model and at places where instant fencing is required.

1.1 Objective of the Project:

- ❖ To understand the basic principal of the our project
- ❖ Describe the construction and working of various parts of our project
- ❖ Development of the working model of the our project
- ❖ To reduce time spent on this activity.
- ❖ To analyze the technology according to needs and capabilities.

1.2 Problem Definition:

- ❖ In the Hand operated chain link fencing machine is more time consuming and more labour is required due to cost of process increase.
- ❖ Using the Hand operated chain link fencing machine more fatigue of workers.

1.3 Scope of Project

- ❖ To cut down the cost employed using motorized operation.
- ❖ Decreasing the operational cost by further introducing new solar power chain link fencing mechanisms.
- ❖ To decrease labor costs by advancing the motorized operation of machine.
- ❖ To consume low electricity solar power.

II. LITERATURE REVIEW

D. Pons, G. Bayley, R. Laurenson, M. Hunt, C. Tyree, D. Aitchison carried out research on “Wire Fencing: Determinants of Wire Quality” in this they studied about Knotted wire fences which are fabricated on specialized machines. The input material is typically galvanized steel wire. However, the quality of the input wire used by the Fence Producer is beyond control of the Machine Manufacturer. In this problem is that wire strand breakages have been identified during fabrication and subsequent field erection. [1], Dirk J. Pons, Gareth Bayley, Christopher Tyree, Matthew Hunt and Reuben Laurenson Aitchison carried out research on “Material Properties of Wire for the Fabrication of Knotted Fences” in this they studied about the materials properties of galvanized fencing wire, as used in the fabrication of knotted wire fences. A range of physical properties was inspected: tensile strength, ductility in tension, Young’s modulus, three point bending, and bending span. [2], Sebastian Balos , Vencislav Grabulov, Lepasava Sidjanin, Mladen Pantic carried out research on “wire fence as appliqué armoring this they studied about the behavior of wire fence. In this wire fences used was made from commercial high-strength patented wire and the supporting frames were made of mild steel L-profile were tested. [3]

Nurudeen A. Raji, Oluleke O. Oluwole carried out research on “Influence of Degree of Cold-Drawing on the Mechanical Properties of Low Carbon Steel” in this they studied about the Influence of Degree of Cold-Drawing on the Mechanical Properties of Low Carbon Steel. A 0.12%w C steel wire cold drawn progressively by 20%, 25%, 40% and 50% was checked. The influence of the degree of cold drawing on the mechanical properties of the carbon steel material were studied using the tensile test, impact test and hardness test experiments in order to replicate the service condition of the nails. [4], Arshpreet Singh, Anupam Agrawal was studied about Comparison of deforming forces, residual stresses and geometrical accuracy of deformation machining with conventional bending and forming in this they studied about the Deformation machining.

Deformation machining is a combination of thin structure machining and single point incremental forming/bending. [5], Junichiro Tokutomia., Kenichi Hanazaki, Nobuhiro Tsuji , Jun Yanagimoto carried out research on Change in mechanical properties of fine copper wire manufactured by continuous rotary draw bending process in this they studied about The mechanical behaviors of Cu–Sn alloy wire specimens processed by the newly proposed method of rotary draw bending are systematically investigated, It was found that during draw bending, the Vicker hardness(HV) was lower than that of the specimen subjected to wire drawing, particularly on the inside of the bend, and it was confirmed that the softening induced by plastic deformation is promoted by increasing the compressive residual energy.[6]

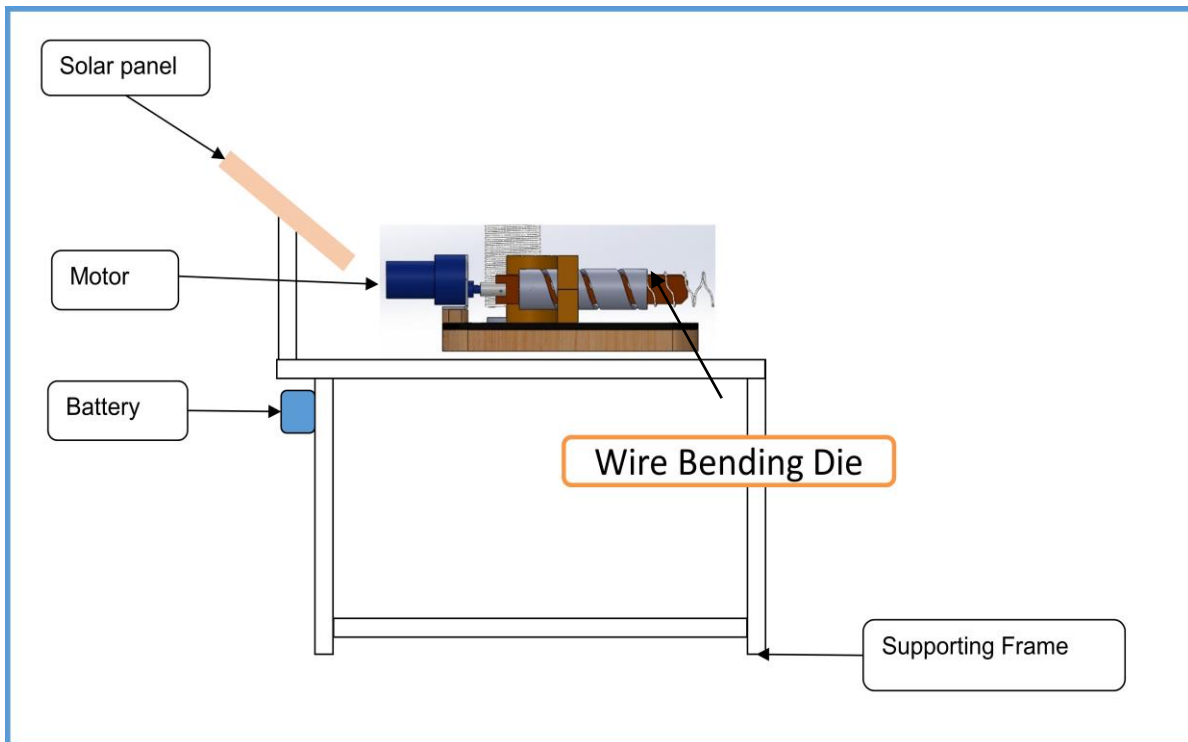
Christina Umstatter carried out research on “The evolution of virtual fences “in this they studied about virtual fences. A virtual fence can be defined as a structure serving as an enclosure, a barrier, or a boundary without a physical barrier. [7], Siavash Rezazadeh and Jonathan W. Hurst carried out research on the Optimal Selection of Motors and Transmissions for Electromechanical and Robotic Systems With regard to the important role of motors and transmissions in the performance of electromechanical and robotic systems, this paper intends to provide a solution for the problem of selection of these components for a general load case. [8]

III. DEVELOPMENT OF THE PROJECT

3.1 Parts used in the Project

- ❖ Solar Panel: 8 Watt, 12VDC
- ❖ Motor: 12vdc, 40 watt
- ❖ Wire Bending Die: 1.25 inch Dia.
- ❖ Battery: 12vdc, 3amp
- ❖ Square pipe: 1 inch

3.2 Diagram of the Project



3.3 Working of the Project:

When the D.C. geared motor is powered it rotates thus rotating the rectangular rod attached to its shaft. Now this rectangular rod is fixed to rotate inside a hollow round tube. Milling operation is performed on this tube to achieve a spiral shaped cut out on this hollow tube. So now as the rectangular rod rotates inside this hollow tube. We now take the wire end from the bobbin and hook it on the inside rod through the hollow tube slot. We now turn on the machine. As the motor runs, the rod turns inside the hollow tube. As the hollow tube is cut out in a spiral shape, the wire moves with the rod spiralling around it and moving outwards. So now we get a zig-zag shaped wire coming out of the other end. Thus the system provides a fast and easy way to develop zigzag wires for chain link or mesh making.

IV. ADVANTAGES, DISADVANTAGES AND APPLICATION OF THE PROJECT

4.1. Advantages of the Project:

Advantages of the project as per following like as:

- ❖ Reducing the cost of operation, due using motorized machine
- ❖ There eco-friendly operations etc.
- ❖ The maintenance machine is simple.
- ❖ The improving fence wire bending quality and reducing physical effort for the operator as compared to hand operated machine.

4.2. Disadvantages of the Project:

Dis-advantages of the project as per following like as:

- ❖ This type machine various sizes wire mesh, various sizes wire bending die is required due to initial costing higher.

4.3. Application of the Project:

Our project should use for following various applications like as:

- ❖ The wire mesh is used for compound in farms, home.

4.4 Future Scope:

The project has covered almost all the requirements. Further requirements and improvements can easily be done since the as per requirements is mainly structured or modular in nature. Improvements can be appended by changing the existing modules.

4.5 Conclusion:

It is observed that, this model of solar chain link fencing machine is more cost effective and gives the effective results in meshing operation. As it runs on the non conventional energy source i.e. solar energy, it is widely available at free of cost. In now days where world is moving towards the finding the new ways for the energy requirement, it can be a better option, who economically challenged and facing electrical problem like load shading now days.

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