



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

MOTORIZED RICE TRANSPLANTER

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ABSTRACT

Agriculture is the most important sector of Indian economy. Rice being the major crop cultivated in India, a huge amount of workforce is engaged in rice production. The common practice of rice cultivation is manual transplanting of seedlings. Besides being costly, cumbersome and time consuming it is very labor intensive task. To mechanize the transplanting system several attempts have been made to design and fabricate transplanting machines. Due to the high price of an automated paddy transplanter it becomes impossible for a small scale farmer to purchase a non-subsidized automated paddy transplanter. An attempt has been made to fabricate a compact and electric driven paddy transplanter which is effective as well as cheap. Selection of an efficient power transmission system and a suitable mechanism to drive the planting claw is given due consideration in its design. The objective of this project is to design a paddy transplanting mechanism to transplant rice seedlings by small scale farmers motorized in the country.

Keywords: Rice cultivation, fabricate transplanting machines & Seedling

1.1 INTRODUCTION

Transplanting is one of the major process for establishment of paddy in India. In this method seed is sown in one place and seedlings after they have grown a little are transplanted to another. This is done in order to get higher yields and less weeding. Transplanting of rice is highly labour intensive and it may require 250- 350 man-hours per hectares. Seedling are prepared in nurseries where they grow for 15-20 days. After these seedling are been prepared, these are been transplanted manually by labour. The orientation of the labour at the time of transplanting is hazardous for their health. With manual transplantation the cost of production of rice also increases. With the help of a motorized Rice Transplanting Machine, the transplantation cost as well as time will decrease with increase in efficiency. A rice transplanter is a specialized transplanter fitted to transplant rice seedlings onto paddy field. Mainly two types of rice transplanter i.e., riding type and walking type. Riding type is power driven and can usually transplant six lines in one pass. On the other hand, walking type is manually driven and can usually transplant four lines in one pass. But both of them little cost so many of them transplant by manually. If we rice transplanter manually, it takes lot of time to plant large plants. So we use mechanical transplanting machine. Mechanical transplanting of rice is the process of transplanting young rice seedlings, which have been grown in a mat nursery, using a self-propelled rice transplanter.

1.2 OBJECTIVE

This mechanism is to help the farmers to reduce their dependency for more manpower during monsoon period. Reduce the time consumption to transplant the seedlings from nursery to field. Increase the yield by planting the seedlings in uniform spacing.

1.3 WORKING METHODOLOGY

The base frame for housing the components is fabricated with the help of square tubes and channels by metal cutting and metal joining process called welding. The driven wheel connected by DC motor rotated the crankplate. The wheels are mounted to the frame with the help of shaft supported by the base frame. The drive plate for activating entire system is mounted at the center portion of the frame with the help of bearing supported ends in order to attain friction free rotation. The planting arm mounted shaft is attached at the front end portion of the frame and this shaft is eccentrically coupled to the disc with the help of connecting rod. The disc mounted shaft is coupled with drive plate shaft with the help of chain drive arrangement. At the front end portion of frame, a seeding tray is placed. At the rear end portion of a hand lever is placed for its activation purposes.

When the seeding is arranged in the tray as per the requirement and the setup is properly mounted on the field, the motorized force is applied on the setup which tends to move the setup linearly as well as rotation is experienced by the drive shaft. The rotation obtained is transferred to the planting arm by means of rotating disc which is eccentrically coupled to the arm mounted shaft. This tends to pick the seedlings placed on the tray to plant on the field.

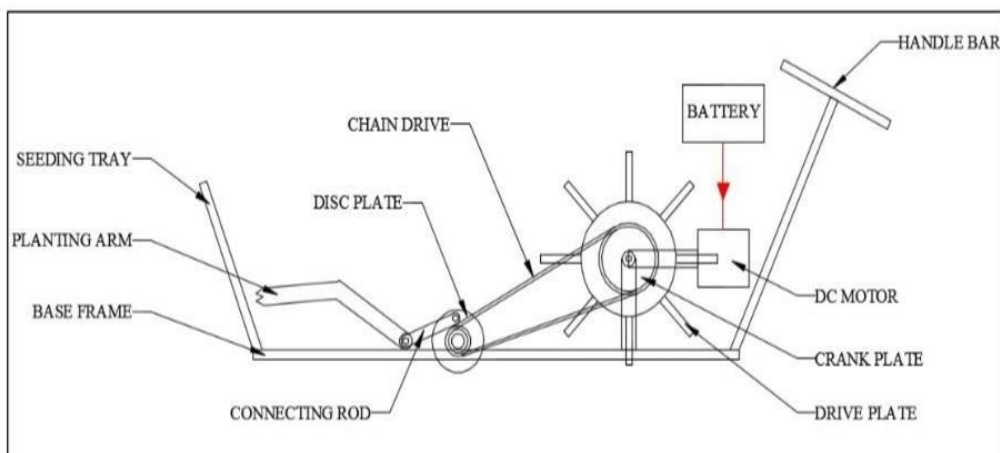
1.3 COMPONENT DESCRIPTION

In this chapter the important pieces used in the development of motorised rice transplanter are discussed. In this machine various components are used and its detailed information are given below.

2. MOTORISED RICE TRANSPLANTER COMPONENT DETAILS

DC MOTOR
BATTERY
CHAINDRIVE
SHEET METAL
DISC
FRAME
SHAFT
METAL STRIP
BEARING

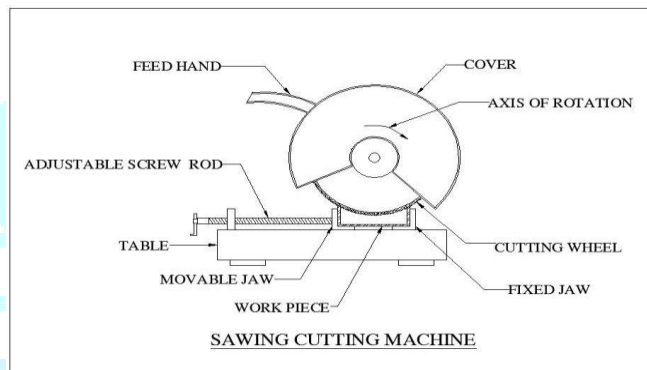
3.LAYOUT



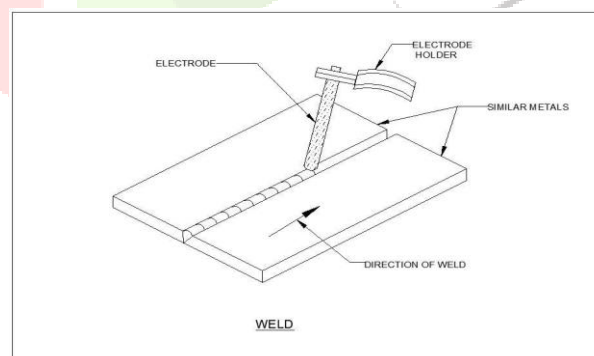
4. MANUFACTURING PROCESS

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.

Cold saws are saws that make use of a circular saw blade to cut through various types of metal, including sheet metal. The name of the saw has to do with the action that takes place during the cutting process, which manages to keep both the metal and the blade from becoming too hot. A cold saw is powered with electricity and is usually a stationary type of saw machine rather than a portable type of saw. The circular saw blades used with a cold saw are often constructed of high speedsteel. Steel blades of this type are resistant to wear even under daily usage. The end result is that it is possible to complete a number of cutting projects before there is a need to replace the blade. High speed steel blades are especially useful when the saws are used for cutting through thicker sections of metal.



Welding is a process for joining similar metals. Welding joins metals by melting and fusing 1, the base metals being joined and 2, the filler metal applied. Welding employs pinpointed, localized heat input. Most welding involves ferrous-based metals such as steel and stainless steel. Weld joints are usually stronger than or as strong as the base metals being joined. Welding is used for making permanent joints. It is used in the manufacture of automobile bodies, aircraft frames, railway wagons, machine frames, structural works, tanks, furniture, boilers, general repair work and ship building.



Several welding processes are based on heating with an electric arc, only a few are considered here, starting with the oldest, simple arc welding, also known as shielded metal arc welding (SMAW) or stick welding. In this process an electrical machine (which may be DC or AC, but nowadays is usually AC) supplies current to an electrode holder which carries an electrode which is normally coated with a mixture of chemicals or flux. An earth cable connects the work piece to the welding machine to provide a return path for the current. The weld is initiated by tapping ('striking') the tip of the electrode against the work piece which initiates an electric arc. The high temperature generated (about 6000°C) almost instantly produces a molten pool and the end of the electrode continuously melts into this pool and forms the joint. The operator needs to control the gap between the electrode tip and the work piece while moving the electrode along the joint.

Drilling is a cutting process that uses a drill bit to cut or enlarge a hole of circular cross-section in solid materials. The drill bit is a rotary cutting tool, often multipoint. The bit is pressed against the work piece and rotated at rates from hundreds to thousands of revolutions per minute. This forces the cutting edge against the work piece, cutting off chips (swarf) from the hole as it is drilled.

5.SETUP PHOTO



6. MATERIAL

S.No	DESCRIPTION	QTY	MATERIAL
1	DC MOTOR	1	ELECTRICAL
2	BATTERY	1	
3	BEARING	16	STAINLESS STEEL
4	FRAME	AS PER REQUIREMENT	MILD STEEL
5	SHAFT	AS PER REQUIREMENT	MILD STEEL
6	METAL STRIP	AS PER REQUIREMENT	MILD STEEL
7	SHEET METAL	1	MILD STEEL
8	CHAIN DRIVE	1	STAINLESS STEEL
9	DISC	1	MILD STEEL

7. RESULT & ANALYSIS

From the study it was found the transplantation of younger aged seeds were done easier than other rice transplanted. The time taken is reduced and which makes easier. Here the work for labour is easier because it runs with the wheels. There is less damage by uprooting or writing of mat for transplanting. It also contributes in yield and yield attributing characteristics. It has proper row to row and plant to plant spacing.

8. CONCLUSION

A rice transplanter is a specialized transplanter fitted to transplanter rice seedling onto paddy field. Mainly two types of rice transplanter i.e., riding type and walking type. Riding type is power driven and can usually transplant six lines in one pass. On the other hand, walking type is manually driven and can usually transplant four lines in one pass. Machine transplanting using rice transplanters requires considerably less time and labour than manual transplanting. It increases the approximate area that a person can plant from 700 to 10,000 square metres per day. However, rice transplanters are considerably expensive for almost all Asian small-hold farmers. Rice transplanters are popular in industrialized countries where labor cost is high, for example in South Korea. It is now also becoming more popular in South Asian countries because, at transplanting time, labour shortage is at peak levels.

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