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FABRICATION AND IMPLEMENTATION OF AUTOMATIC SEED SOWING MACHINE

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ABSTRACT
In the farming process, often used conventional seeding operation takes more time and more labor. The seed feed rate is more but the time required for the total operation is more and the total cost is increased due to labor, hiring of equipment. The conventional seed sowing machine is less efficient, time consuming. Today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. In the farming process, often used conventional seeding operation takes more time and more labor. The seed feed rate is more but the time required for the total operation is also more and the total cost is increased due to labor, hiring of equipment. This machine reduces the efforts and total cost of sowing the seeds and fertilizer placement.

KEYWORDS: Seed sowing; farming; microcontroller; automatic; steering mechanism.

I. INTRODUCTION
In the current generation most of the countries do not have sufficient skilled man power specially in agricultural sector and it affects the growth of developing countries. The main requirement of Automation is to reduce man power in our country; the buzzword in all industrial firms generally involves electrical, electronic component as well as mechanical part. Automation saves a lot of tedious manual work and speeds up the production processes. So it is a time to automate the sector to overcome this problem. In India there are 70% people dependent on agriculture. Seed has been an important agricultural commodity since the first crop plant was domesticated by pre-historic man. In this model seed sowing process is automated to reduce the human effort and increase the yield. The plantation of seeds is automatically done by using DC motor. The distance between the two seeds are controlled and varied using Microcontroller.

It is also possible to cultivate different kinds of seeds with different distance. When the system reaches the end of the field we can change the direction with the help of remote switches.

II. WORKING PRINCIPLE
It works on simple mechanism, a battery operated D.C. moter is used transmits the rotary motion to the shaft with the help of chain drive, and there is another connection of sprocket and chain to the seed meter for the rotary motion. When the farmer puts seeds into the hopper, seed drops into the seed meter which is control by the rack and pinion arrangement mounted on the assembly. As the seed meter rotates, seed drops in the seed pipe, which is connected to the furrow opener for the seeding; there is furrow closer for covering the seeds by soil. There is another connection of D.C motor connected to spur and worm gear for steering mechanism connection of front wheel which is guided by microcontroller unit with the help of Bluetooth device via mobile phone.

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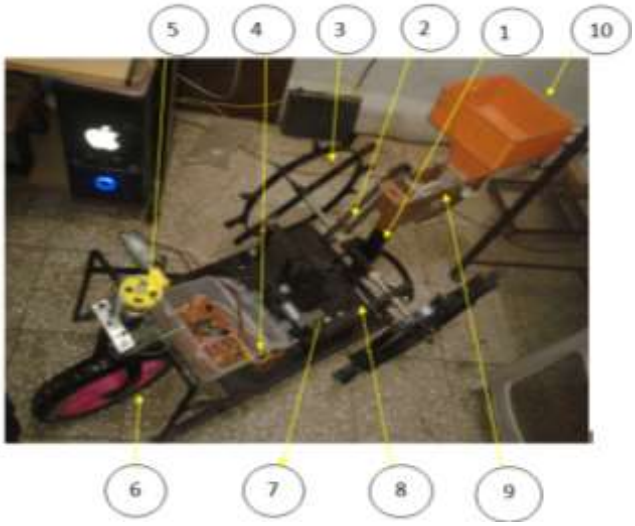

SRN O.	NAME OF COMPONENT	MATERIAL	COMP ONENT NO.
1	SEED PIPE	MILD STEEL	1
2	SECONDARY CHAIN DRIVE	SAE 3135	2
3	REAR WHEEL	STEEL	3
4	MICRO CONTROLLER UNIT	-	4
5	STEERING MECHANISM	-	5
6	FRONT WHEEL	RUBBER &PLASTIC	6
7	DC MOTOR	-	7
8	PRIMARY CHAIN DRIVE	SAE 3135	8
9	SEED METER	FIBRE	9
10	HOPPER	FIBRE	10

III. COMPONENT USE FOR FABRICATION

A) Seed Metering Mechanism

Seed metering mechanism is fitted at the bottom of the seed box to allow the desired quantity of seed. It consists of seed disk, cover of seed disk, seed tube and seedholes.

Fig No.01 Seed Metering Mechanism

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B) Seed Metering Disc

It consists of flat rod. It is bent and welded to circular shape. It has 8 holes around the circumference of the circle at equally spaced distance and it is used for sowing beans. The same circular rod having 5 holes equally spaced in its circumference can be used for sowing maize. The seed disc is fixed on the shaft of the ground wheel so that the motion of ground wheel provides the motive force for rolling of the seed disc.

Fig No.02:- Seed Metering Disc

C) Seed Holes on the Metering Disc

The holes are drilled on the circumference of the disc. The function of the hole is to collect the seeds from the hopper and transport it to seed pipe. The holes are in the shape of a cup.

Fig No.3. Seed Holes on the Metering Disc

D) Seed Pipe

It is made of mild steel having circular cross section. It received the seeds from the seed disc and transfers them to the furrow opened by the furrow opener. It assures the free flow of seeds to the furrow. The seed pipe carries a furrow opener to make the furrow for placing seed. The back side of the seed pipe has furrow closer to cover the seed with soil.

E) Furrow Opener

It is made of metal sheet. It is cut into triangular and curved shape. It is provided with a sharp cutting edge to cut the soil. The concave curved portion of the plough is forward and the convex part is backward. It is a two way plough like opener. The angle between two wings of the openers is 135º. It makes an angle of 45º with horizontal which facilitates the easy penetration into the soil. It cut the soil, lift up the soil above the wings of the opener and pulverize the soil and thorough the soil on both sides of the two way wings. It makes a furrow of 5 cm deep, which is the best depth for placing the seeds. The furrow opener is kept 15 cm in front of the seed pipe to avoid closing of seeds and soils.

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Fig No.4:-Furrow Opener

F) Furrow Closer

It is made of mild steel sheet. It is cut into the form of crescent shape. It is curved. The concave part is backside. The angle between wings is 135º. It facilitates the soil to cover the seed. The furrow closer is kept 15 cm at the backside of the seed pipe to avoid closing of seeds. It makes an angle of 60º with the horizontal so that it can take all soils in to the furrow.

Fig No.5:- Furrow Closer

G) Rear Wheel

The rim of the wheel is made from a flat metal plate made up of steel 30 mm wide and 5 mm thickness. It is bent and welded to form a circular form of 445 mm diameter. The periphery is fitted with 12 numbers of lugs at equal spacing. The lugs are of square form of 30 mm side. It reduces the slippage while moving in the field. The distance between the holes in the seed metering disc depends upon the diameter of the ground wheel.

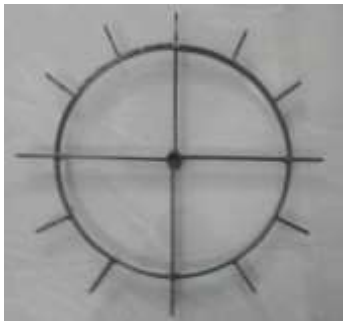

Fig No.6:-Rear Wheel

H) Chain Drives

In our project there are two chain drives one which used to control the flow rate of seeds and another which is used to transmit the power from motor to peg wheel.

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Fig No.7:- Chain Drive

I) D.C Motor

The D.C. motor is operated on 12V with 100 rpm. The graph shows torque speed characteristics of D.C. motor to full load. It is obtained by increasing armature voltage from 1V to 12V linearly. Current of DC motor is 100mA. As speed is increases then torque is also decreasing.

Fig No.8:- D.C. Motor

J) Micro Controller

It is the heart of our system. It is the main control block and all other blocks are interfaced to the Controller. The software fed into the controller is the main logic of our system. The completion and Implementation of our system wholly depends on this logic and finally worked by the controller. We have selected89C51 micro controller. Relay driver and display are interfaced to the various ports of 89C51.

Fig No.9:- Micro Controller

K) Steering Mechanism

In this project direction is provided by using steering mechanism. By using this mechanism proper direction is given to the robot. The farm is not the straight line and smooth. By using this mechanism obstacle problem is solved. If any obstacle is occurred like stone, trees etc. such path is establish by steering control

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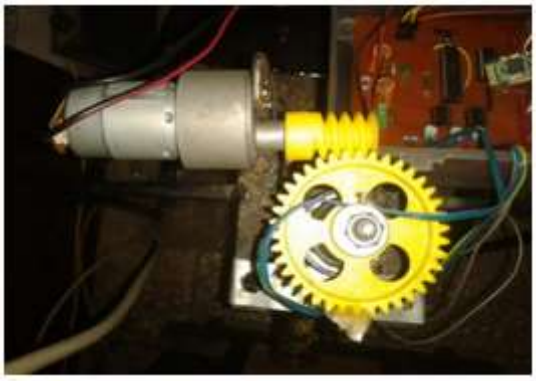

Fig No.10:- Steering Mechanism

IV. COST ESTIMATE

Sr. No.	**Parts Name**	**Cost In Rupees**
1	Motor (12V 100RPM)	1800
2	Steering Motor (12V 30RPM)	600
3	Microcontroller Programming Specification	4000
4	Microcontroller Components Specification	1500
5	Bluetooth Modulewith sensor range 10m	500
6	Battery (12V 9Ah)	1800
7	Fabrication Of Assembly With Components (body)	3000
8	Labour Cost	1500
9	Miscellaneous Cost	300
	TOTAL	**15000/-**

V. TESTING

Type of seed: - wheat
Capacity of hopper to carry wheat is 2.5kg

Sr. No	Distance Travelled (m)	Time (sec)	Distance between adjacent seed (inches)
1	01	5	1 to 2
2	02	9	1to 2
3	03	12	1 to 2
4	04	15	1 to 2
5	05	18	1 to 2
6	06	21	1 to 2
7	07	24	1 to 2
8	08	28	1 to 2
9	09	32	1 to 2
10	10	37	1 to 2

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Type of Seed:-Gram
Capacity of hopper to carry gram is 1.5kg

Sr. No.	Distance Travelled (m)	Time (sec)	Distance between adjacent seed (inches)
1.	01	3	5 to 6
2.	02	20	5 to 6
3.	03	30	5 to 6
4.	04	35	5 to 6
5.	05	39	5 to 6
6.	06	44	5 to 6
7.	07	47	5 to 6
8.	08	55	5 to 6
9.	09	59	5 to 6
10	10	64	5 to 6

For Wheat
10m = 100 gm of seeds
100m = 1kg seeds

For Gram,
10m = 50gm seeds
100m = 500gm seeds
200m = 1kg seeds required

Since, after taking the complete observation of two different types of seed we get the higher yielding as compare to conventional seed sowing machine. Approximate sowing capacity of the machine is found to be 12Kg per hour (Approx).

VI. ADVANTAGES & DISADVANTAGES

Advantages

1. These machines are adequately designed with auto seed feeding system planting channel for optimal growing conditions.
2. Adjustable seeding rate.
3. Seed monitor and hectare counter.
4. Spring loaded plunger for seed dropping.
5. No extra manpower required.
6. It is compact in size

Disadvantages

1. When seed is small in size we need manual effort for setting.
2. It is operated on battery supply, if any failure occurs whole system not work properly.

VII. CONCLUSION

The model has been proposed with the aim to establish a 12kg per hour capacity seed processing plant. As is evident from the financial analysis that the project is sound and estimated results are encouraging and hence the model may be considered for financing under the scheme of GOI for boosting seed production in private sector. The assembly is developed for cultivating ploughed land automatically i.e. less power is required. The blocking of seed problem is eliminated with the help of water pressure. So this model increases the efficiency and accuracy. The project consists of two different mechanisms. The first mechanism contains making an assembly of vehicle and its motion, whereas second mechanism is preparing a seed bed on ploughed land. The microcontroller is used to control And monitor the process of system motion of vehicle. It is controlled with help of DC motor and servo motor. This system also detect obstacle present in the path of the vehicle by infrared

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sensor. It is also used for sensing turning position of vehicle at the end of the land. Because of no man power requirement and high speed of operation, it has scope for further expansion.

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