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HAND OPERATED WHEEL HOE WEEDER

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ABSTRACT

In India average of per year , an average of 1980 crore of rupees is wasted due to weeds and removing of soil. The total loss of our country 33 percent of its economy from Weeds. The Losses are due to some of the following reasons,the total loss of our country from crop diseases is 26% , 20 percent of total loss from Insects and Worms, total loss of 6% due to Rats and other animals.It has been Surveyed. Weeding is control by different ways like: mechanical and thermal weeding: flaming, biological and chemical control, and by farming pattern. It has problem for to successfully and completely remove weeds and other innocuous plants. This work involved the for removing small grass,weeding and remove soil in garden and farm.

The design and construction are developed by mechanical engineer or weeder from different concept and their different manuals. These tools are made up of knife blades,square blades like hoe tools are used.after discovering that tools,this tools are manufacture by mechanical engineers and labour If problem is created then this solution done by mechanical weeder. The Single Wheel Hoe or Weeder being manufactured is the instrument, which is used for weeding and removing small grass from farm and garden.Weeding can be done by in small rows because of its construction and design is small as per required.Weed is fastly remove by the small knife and square blades.This blades are thin and very tough.The handeling of this instrument is very simple because of manually power required and these done by pushing force of operator.

Keyword: Mechanical weeder.

I. INTRODUCTION

Single wheel weeding required in farming sector, it is used for removing weeds. This operation is mostly performed manually with cutlass or hoe that requires high labour power,it is very tedious and it is a time-consuming process. Weeding and hoeing is generally done in 15 to 20 days after sowing. The weed should be controlled and eliminated at their early stage. It is work at the farm for removing soil and seed. For removing soil or seed you can use square blade or knife blade.It is simple instrument for removing small grass ,seeds and soil.

Single wheel hoes are manufactured by different engineers at different countries from different material and different concept. Therefore there areminor differences in the design and materials between countries. This means there will be someminor differences in the design and materials between countries. This means there will be some of the photos in this concepts and there manuals, however, the fundamental design remains the same. Steam Weeding Ltd. also reserves the right to make changes and improvements to the design without prior notice.
Manual and mechanical techniques such as pulling, cutting, and otherwise damaging plants, may be used to control some invasive plants, particularly if the population is relatively small. These techniques can be extremely specific,minimizing damage to desirable plants and animals, but they are generally labor and time intensive.

Fig 1:-Single wheel weeder hoe

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Aim of Project

The aim of project is to design and manufacture single wheel weeder or hoe for removing weeds or small grass and loosening the soil.

Concept

In fig.1 shows the concept , Concept involved the development of mechanical weeder, after discovering that tools such as cutlass and hoes require high drudgery, time consuming and high labour requirement. As a solution to these problems, mechanical weeder was designed and developed. The mechanical weeder was made of two implements attachment eg. the primary cutting and secondary cutting. Primary cutting tool is knife edge blade and secondary is square blade.In first operation,primary blade looses the soil and then secondary blade removes the weeds.

Compared With The Traditional Methods Of Weeding On 1m X 1m Area Of Land

AREA	WEIGHT OF REMOVER WEED USING HAND PULLING(Kg)	TOTAL WIGHT OF REMOVED WEED USING WEED REMOVER(Kg)
1	0.05	0.06
2	0.03	0.04
3	0.07	0.07
4	0.10	0.10
5	0.08	0.08
Total	0.33	0.35
Mean values	0.066	0.7

Table 1: weeding test result on semi moisture land

II. PROCESS

Parts List and Tool List for single wheel weeder:-

- 1 of Toolbar Assembly with 2 wheel arms
- 1 of Steel Wheel with bronze bushing installed
- 2 of Steel Dust Caps (For wheel assembly)
- 3 of Cultivator Teeth
- 2 of Solid Wood Handles
- 1 of Tapered Dowel Rod
- Deluxe PLUS version only: 2 of 8” Sweeps (numbered S-100 and S-101)

Tools Required : (Tools Not Included)

- 1 of 3/16” Allen wrench
- 1 of 7/16”wrench
- 1 of 1/2” wrench
- 1 of 9/16” wrench
- 1 of Phillips Screw Driver

Assembly

- Fit a dust cap over both bearing hubs.
- Slide wheel into place between wheel arms
- Place 3/8”shoulder bolt through wheel arms and hub
- Install 5/16” nylon lock nut.

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- Tighten nut completely.
- Check to see if wheel turns freely. If yes, stop.
- If no, loosen nut slightly until wheel turns freely.

Cultivator Teeth (Tines) Assembly
Components Required:-

- 3 of Cultivator Teeth
- 3 of 3/8”x2” carriage head bolts
- 3 of Flange Nut

(Note that washers and nuts in the picture are no longer accurate)

Assembly

- Place 3/8”x2” carriage head bolt from bottom through the front hole of cultivator tooth and into the desired slot on the tool bar.
- Adjust to the desired position and secure using the Flange nuts.
- Tighten with a 9/16” wrench.
- Do not over-tighten. The cultivator teeth positions will be changed occasionally so it is important not to damage the fasteners.

Widest position of cultivators (wheel arm in highest position to level cultivator bottoms)

Wheel arms height is changed by loosening the two bolts that attach each arm to the frame (4 in total) and pivoting the arms up or down to the desired position. Re-tighten all four bolts, beginning with the 1/4” bolts.

Wooden Handle Assembly
Components Required:

- 2 of Wood Handles
- 1 of tapered Wood Dowel
- 2 of wood screws
- 4 of 1/4”x1-1/2 “carriage head bolts + fender washers, lock washers,and nuts.

III. ASSEMBLY

- Position handles to the outside of each toolbar handle mounting tab using the bottom 2 holes in each handle. (Logo should be facing outward on each handle) Place 1/4” x 1-1/2” carriage head bolts through toolbar handle mounting tab, and out through the handle.
- Fasten using the fender washer, then the lock washer, and then the 1/4” nut. Tilt each handle down to it's lowest position and tighten all four nuts.
- Place the tapered Wood Dowel into the holes between the handles (Slight tightness is common when installing the tapered Wood Dowel. A twisting motion will help seat the dowel into the holes.
- Both sides should bottom out against tapered dowel's shoulders)
- Insert a wood screw into the pilot holes in each of the handles at the location shown in the picture.
- Tighten both sides down snug with a Philips screwdriver, this secures the tapered Wood Dowel.
- If the handles position is too low for comfortable operation, loosen all four nuts and tilt both handles up equally at the same time. Re-tighten all four nuts.

Weeding Blade (Sweeps) Assembly

- Weed large open garden areas that have not yet been planted (seedbeds)
- Weed the garden paths between beds or rows of plants
- Weed right next to rows of seedlings or plants. (one side at a time, or both sides at once)

Components Required:
1 each of Weeding Blades S100 and S101 (#'s on cast arms between the rivets)
2 of 3/8”x1-1/4” square head bolts + Flange Nut.

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Path or Seedbed Weeding Options:

Position the weeding blades as shown below for various widths of cut. Move the front wheel up or down to make the blades nearly parallel to the ground. Select a cutting width that is narrow enough to let you push the wheel hoe at a steady pace. When weeding wide paths, select a width just over half of the path width and make two passes to weed each pathway.

Row Weeding Options (Centered Wheel):

To weed next to plants:

With a centered wheel you can only weed ONE side of the row at a time. Attach a single weeding blade as shown and work up one side of the plant row, then turn around and work down the other side.
The elevated tip of the weeding blade SHOULD brush the plants.
The sharp section of the blade (which contacts the soil) is 1" back from the tip to avoid leaf or root damage.

Row Weeding Options (Offset or Double Wheel): Cut your weeding time in half

Using the offset or double wheel option lets you weed both sides of a row of plants at the same time.
As stated in the single wheel instructions above, the elevated tips of the weeding blades SHOULD brush the plants.

IV. ADVANTAGES

- Simple in design and construction,hence it has less cost.
- Simple handeling so,any operator can be use this instrument.
- It can be use in row or single line.
- Only man power is required
- It has more ecofriendly instrument and simple for manufacturing

V. CONCLUSION

In conclusion, during observations after the handling and testing conclude that-:

- It has faster removing rate of weed .
- It cannot work easily where there was large size of stone or any obstacle.
- Improvement could be in their postures, thereby facilitating them to walk comfortably along the rows while weeding with this manual weeder.

Less labor can be required and it is less economical weeding.
No fuel required, Hence maintenance cost is very less.

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