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THE COMBINED MAGNETIC SEED TREATER

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The MAGNETIC SEED TREATER (combined) is comprised of two independently energized ELECTRO-MAGNETS for producing a Unipolar or Bi-polar Magnetic Field. A POLARITY-CHANGING DEVICE has been incorporated for increasing the suitability of the Machine in handling General Studies on Bio-magnetics. An enclosed easily detachable cylinderical housing, having a closable access opening and carrying a fixed cylinderical Solid Iron Core for making the Magnetic Field more uniform over a specified area for better treatment of seeds, has been placed between the pole-pieces and connected with an electrical drive-motor through a set of pulleys for low and steady r.p.m. of the housing. An electrical timer has also been added for further sophistication in controlling treatment time. Another device controls the angle of the pole-pieces to keep the seeds in the desired field region which otherwise might go out of it due to their elevation on account of varied frictional forces.

INTRODUCTION

Motivated by some foreign references, work on the project of designing and assembling of a Magnetic Seed Stimulater was taken up in July, 1977 and the job was completed by September, 1977, and a Machine (a small laboratory unit) was ready for calibration and other physical tests. After a few laboratory tests it was thought to re-design the unit for still more varied types of studies through a few minor changes in design, and as such the present unit was designed and assembled.

DETAILS OF THE DESIGN AND TECHNICAL DATA OF THE MACHINE:

After making certain modifications the machine was redesigned for such seeds as not exceeding in size than Maize and having densities of the order of Maize, Wheat, Okra, Raddish seeds etc. This unit was fitted with pole-pieces having a field-area (10 x 20 cm^2) sufficient to handle a reasonable quantity

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(10 x 20 x 1 cm^3) of seed for laboratory/field trials. The magnetic pole-cores were made of soft iron (a cheap and easily available metal) to increase the efficiency of the electro-magnet and to avoid errors due to appreciable retentivity. In addition to this arrangement a demagnetising provision was made in the machine for still better and sure results.

A cylinderical magnetic core was used for making the field radial, keeping it uniform over the specified area, this again was made of soft iron for the desired results. This core was kept fixed through a suitable mechanical fittings to avoid any distorsion in the magnetic field.

The energizing field coils were made of enamelled copper wire capable of producing different intensities of magnetic fields and were made plug-in-type for easy replacement by other field generators for generation of fields upto a maximum field of the order of 0.1 tesla sufficient for various types of studies. Field generators were mounted in such a fashion that they could be set in any position through $\pi/2$ rad. rotation, thus enabling the seed treater to arrange its field area at any desired position needed for treatment of seeds of different densities. The electro-magnets were fed by two independent heavy duty rectifiers capable of handling 120 WDC energy at 12 Volts maximum. This made the unit to operate at its maximum field ratings with very low generation of heat energy, thus keeping the unit practically at constant temperature during treatment of seed (some- thing very much desirable).

These rectifiers operated at 220 VAC and as such were directly fed from main-power-line of 220 VAC alongwith the small ¼h.p. drive motor, having 220 VAC input, which drove the mechanism rotating the treatment drum at 20 r.p.m., a reasonably slow speed.

The drum chosen was made of plastic, to avoid generation of eddy currents, causing development of additional complex electric field, heat energy, and distorting magnetic field. This drum was further fitted with controlled wipers to wipe away any stray electric charges which could be developed due to seed friction.

Provisions were also made for injecting any gas or liquid into the drum for treating seeds thus increasing the capability of the machine to handle other

studies. The drum was evenly threaded to make the seed tople and orient in direction while being treated.

The drum alongwith the cylinderical magnetic core was made detachable through a very simple lever control for any inspection/repair/setting or replacement of drums of different meterials for a number of various studies. The seed in-take-side of the housing was made of transparent plastic, thus enabling the operator to have a clear view of the inner portion of the seed treater for all sorts of corrections.

An electrical timer was added to have a time record of the treatment. These components/arrangements (1. drive motor; 2. field energizers; 3. timer etc.) were so connected that they could be operated independently as well as simultaneously through a mains' single switch or through their respective independent switches, thus enabling the operator for any type of desired operation.

Another remarkable feature of the design is its simple and easy assembling technique i.e. the frame has been made of angle-iron pieces held in place through bolts. All these arrangements have made the unit very reliable and sophisticated for many scientific studies on Bio-magnetics.

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