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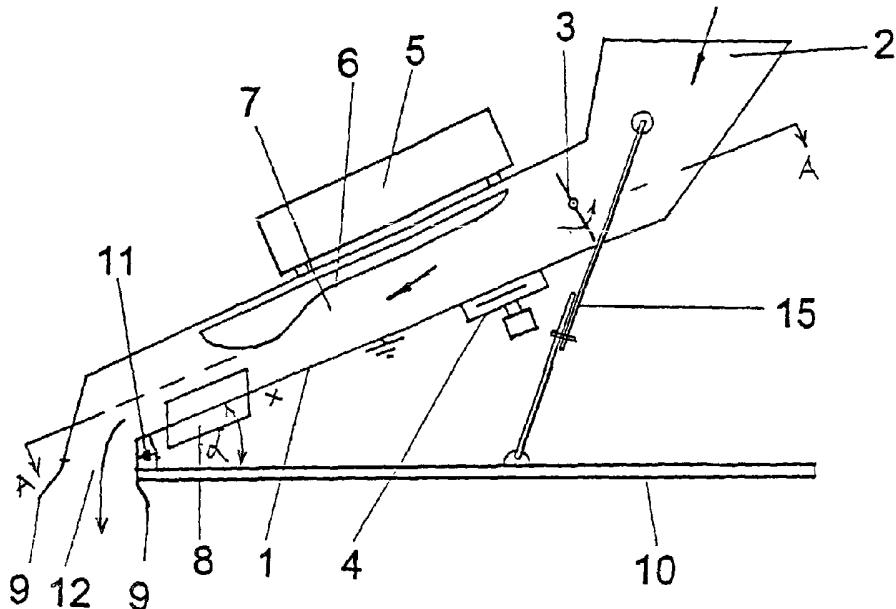
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(54) Title: SEED-TREATING EQUIPMENT WITH IMPROVED EFFICIENCY FOR INCREASING BIOLOGICAL VALUE OF SEEDS



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(57) Abstract: The invention relates to a seed-treating equipment with improved efficiency, which is suitable for increasing biological value of seeds, increasing physiological features, and reproductive ability of seeds. The seed-treating equipment according to the invention has a treating slide provided with a hopper (2) and an outlet (12) and electronics (5) serving treatment of seeds. The equipment is characterized by that, in upper part of a treating slide (1) there is an electrode (6) with an arched surface on at least one part joining electronics (5) producing high voltage and there are deflection plates (8) between the electrode (6) and an outlet (12) in the bottom of the treating slide (1).



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Seed-treating equipment with improved efficiency for increasing biological value of seeds

The invention relates to a seed-treating equipment with improved efficiency, which is suitable for increasing biological value of seeds, increasing physiological features, and reproductive ability of seeds.

There are various methods for improving biological value and improving and increasing physiological features of seeds. In the state of art method and equipment for increasing biological value of seeds, particularly agricultural seeds is described in Hungarian patent HU 186 569. The gist of the method is, that before sowing seeds are dipolarized in a high-voltage electric field then the seeds are kept for minimum three days under insulated conditions to fix dipolmoment. The equipment recommended has a condenser foil of high voltage within the treating area within the protecting cover. According to the invention the upper condenser foil consists of two strap condensers separated and arranged one after the other. It also has a treating table in connection with a vibrator. The equipment is arranged as trailer-like mobile unit.

Hungarian patent application P 96 02551 dated 28 November 1996 describes a method regarding improvement of quality and biological value of agricultural and horticultural plants, crops and products. The essence of the method is, to meet this demand in a cost-effective way by treating seed corns bioelectrically this way polarization is achieved by a more subtle way than the shock-effect used previously. The development of plants will be more bio-dynamical and vital making possible to sow untreated bio-trap lines with cultivating rows in the fields and by eliminating them use of chemicals can be achieved economically. The crops with improved biological value are cleaned super intensively by a hydrodynamic process on the surface eliminating remains of chemicals and they are further processed without chemicals and preservatives to naturally grown products of improved biological value.

An important condition of the application of the above mentioned methods is prevention of discharge, rearrangement and earthing of the seeds led through an electric field and electrically treated. It is difficult to ensure with the equipment in the state of art.

When working out the solution according to the invention we aimed to elaborate an equipment where polarization of the seed led through an electric field is more effective than with the equipment in the state of art and at the same time prevention of discharge, rearrangement and earthing is ensured.

When elaborating the solution according to the invention we realized, that in case we produce an equipment, that has a treating slide with hopper and outlet and electronics provide treating of seeds and in the upper part of the treating slide there is an electrode joining the electronics producing high voltage and the electrode has an arched surface at least on one part and there are deflectors in the bottom of the treating slide between the electrode and the outlet, then the set aim can be achieved.

The invention is seed-treating equipment with improved efficiency for increasing biological value of seeds, said equipment has a treating slide provided with a hopper and an outlet and electronics serving treatment of seeds. The equipment is characterized by that, in upper part of a treating slide there is an electrode with an arched surface on at least one part joining electronics producing high voltage and there are deflection plates between the electrode and an outlet in the bottom of the treating slide.

In a preferred embodiment of the equipment according to the invention, the outer surface of the electrode is plane on the upper part of the electrode and outwards arched, convex shaped on the bottom, preferably with a surface of a cylinder-jacket or cylinder parabola.

In another preferred embodiment of the equipment according to the invention, in the bottom of the treating slide preferably on both sides two deflection plates are symmetrically placed.

In a further preferred embodiment of the equipment according to the invention, in the bottom of the hopper preferably at the front of the treating slide a regulator valve preferably a butterfly-valve is placed. In a further preferred embodiment of the equipment according to the invention, a ventilator is located preferably below the treating slide.

In a further preferred embodiment of the equipment according to the invention, the treating slide joins a lower frame of the equipment partly by a hinge at the lower part of the treating slide partly by an adjustable support joining the upper part of the treating slide.

The solution according to the invention is set forth by the enclosed drawings as follows:

Fig 1 shows the section of the conceptual arrangement of the equipment according to the invention.

Fig 2 shows the top view of the treating slide.

Fig 3 shows a double arrangement of the equipment according to the invention with a collective hopper.

Fig 1 shows the section of the conceptual arrangement of the equipment according to the invention.

The equipment according to the invention has a treating slide 1 with slanted position, slanted preferably in 30° - 60° α angle, in the upper part there is a hopper 2 for dosing seeds. In the bottom of the hopper 2 preferably at the beginning of the treating slide 1 there is a regulator valve 3, preferably a butterfly valve providing dosing and

regulating flowing through of seeds. In the bottom of the treating slide 1 there is an outlet 12 surrounded by deflection shield 9 where seeds leave the treating slide 1.

In the upper part of the treating slide 1 the electrode 6 with arched surface is located joining the electronics 5 placed above the treating slide 1 on the outer side of the equipment. The outer surface of the electrode 6 is plane on the upper part of the electrode 6, preferably almost parallel with the bottom of the treating slide 1, the lower part of the electrode 6 is arched, with convex formation towards the lower surface of the treating slide 1. The arched part of the electrode 6 is preferably a cylinder-jacket of parabola surface, protruding towards the inside of the treating slide 1.

Below the electrode 6, in the bottom of the treating slide 1 preferably on both sides, symmetrically there are two deflection plates 8. The deflection plates 8 serve blocking of seeds flowing through the treating slide 1 in front of the electrode 6. The lower surface of the treating slide 1 is made of a conductor, preferably of stainless steel or copper and is joined earth potential. The ventilator 4 provided with eccentric blades placed below the treating slide 1 serves cooling of electronics 5 on the one hand and preventing seeds vaulting over and slight vibrating of treating slide 1 on the other hand.

The treating slide 1 joins the lower frame 10 of the equipment by the hinge 11 on the lower part of the treating slide 1 and by the adjustable support 15 joining the upper part of the treating slide 1. The upper support and positioning of the treating slide 1 takes place by the adjustable support 15 resting on the lower frame 10 of the equipment, which adjusts the suitable α angle of the treating slide 1 according to the seeds to be treated.

The equipment functions as follows:

The seeds to be treated are poured into the hopper 2 of the equipment, from which the seeds get to the treating slide 1 in the quantity set by the regulator valve 3. The

seeds start flowing down the treating slide 1 due to gravitation with a speed corresponding with the α angle set, with a slight laminar flow and move below the electrode 6. A slowly changing high voltage of 15-35 KV is put on the electrode 6. The earth potential of electrode 6 is connected to the lower part of the treating slide 1, so in this part of the treating slide 1 below the electrode 6 a strong electric field is created. The electric field is nearly homogeneous below the parallel part of the electrode 6, whereas below the outwards convex arched part the field is inhomogeneous.

Flowing through of seeds the electric field of electrode 6 is slowed down by deflection plates 8, which pile up seeds in accordance with the α angle of the treating slide 1 in front of the arched surface of the electrode 6. So seeds slow down in the strong inhomogeneous field, it takes them longer time to go through. It increases the efficiency of treatment, because the inhomogeneous field and slower flowing increases polarization, arrangement in the seeds, making it stronger, more effective. The seeds flowing through the deflection plates 8 get out of the treating slide 1 through the outlet 12 surrounded by deflection shield 9.

Fig 2 shows the top view of the treating slide. The location of the deflection plates 8 placed in the bottom of the treating slide 1 can be seen well in the figure. They are symmetrically placed in front of the outlet 12 on both sides of the treating slide 1. The hopper 2 and the regulator valve 3 are also indicated in the figure.

Fig 3 shows a double arrangement of the equipment according to the invention with a collective hopper. In this arrangement two treating slides 1 are applied, which face each other with their hoppers 2 as it can be seen in the figure and above them there is a central hopper 13 placed. Dosing of the seeds takes place from the central hopper 13. The seeds are divided into two parts from the bottom of the central hopper 13 with the help of the deflection shields 14 into the hopper 2 of the two treating slides 1. The arrangement seen in figure 3 makes possible piling up heaps, that is the output of the through flow is doubled. The treating, through flow output can be increased in

given case fourfold with applying additional treating slides 1 located perpendicularly. The manifold increase of through flow output makes possible treating seeds of big quantities from harvest without causing delay in works. Applying two or in given case four treating slides 1 makes possible continuous treatment of seeds, piling up heaps, so treatment of seeds can be well fitted into the processes of crop handling. The central hopper 13 of the seed treating equipment with joint collective hopper can be suspended on the conveyor belt.

In a preferred application of the equipment according to the invention electric field is necessary for the treatment of seeds, but it is not allowed to charge up the seeds. Electric field promotes polarization, setting dipolmoment in the seeds. The principle is, that the seed should be polarized, but not charged up. In case of earlier solutions this was ensured by letting seeds through between two condenser plates, in the present case according to the invention it is ensured by the strong inhomogeneous field.

In case of the equipment according to the invention the seeds are placed into a slanted trough to the treating slide 1, where regulated α angle is set so, that flow of the seeds is on the border of laminar flow. The seed slides down in the treating slide 1 and this slide ensures, that the seeds are placed properly, but they can not form vaults. For the continuous flow of seeds steps must be taken to avoid forming vaults. To achieve this preferably a vibration is applied. It is sufficient to vibrate, move slightly the bottom of the treating slide 1, applying in given case a ventilator 4 ensuring continuous cooling of the electronics 5 and vibrating of the bottom of the treating slide 1 as well.

In case of the equipment according to the invention polarization of seeds is promoted by the fact, that while the seed is flowing down the slide, it meets not homogeneous field only, but homogeneous and inhomogeneous field intermittently. It is achieved by the fact, that the electrode 6 which is in fact the plate of a polarizing charging condenser, is not plane, but has a curve towards the end of the treating slide 1, the

section of which is a circle or a parabola. To increase the affect a blockage is formed at the end of the treating slide 1 by the deflection plates 8 piling up the seeds. This effect turns the seeds in front of the curve of the electrode 6 in the inhomogeneous field, so the polarization of the seeds become more effective.

In a preferred embodiment of the equipment according to the invention insulation of the polarizing surfaces, electrode 6 and the bottom of the treating slide 1 in the inhomogeneous field before piling up and before leaving of seeds must be carefully ensured. It is ensured by insulated deflection plates 8 and foils. If insulation is not ensured, then the seed discharges, polarization rearranges, therefore insulation must ensure fixing of the arranged state.

Sliding speed of seeds is regulated by the regulator valve 3 in the front part of the treating slide 1. The base position of the treating slide 1 is 30 ° but it can be slanted to 60-70 °. In a preferred embodiment in the bottom of the treating slide 1 there is a vibrator, preferably at the hopper 2, preventing vaulting and ensuring free flow of seeds by shaking them steadily.

The electric treating field in the treating slide 1 is partly homogeneous, partly inhomogeneous, the formal factor of which is shaped in accordance with the favorable polarization required by the seed. Therefore it is made possible, that not only the parallel vertical electric field lines impact the seed, but the turning moment of electric field of radial direction has an effect as well due to the curve in the inhomogenous electric field. It is ensured by the upper curve of the top of the treating area as this way the seeds can be located to the ideal polarization. In the seed positively charged ions pile at the plant embryo and negatively charged ions pile at the other peak. To achieve proper polarization it is not necessary to increase strength of the charge, but to achieve the proper density of charge, that is the more charge should be imposed on the individual seeds. During seed treating the density of the field should correspond with the number of seeds.

The advantage of the solution according to the invention is that increasing of the biological value of seeds and increasing of their reproductive ability are achieved in a more favorable way. While treating the seeds in an electric field, a periodically changing field is applied resulting in 'swinging' the seeds not shocking. It is more favorable biologically than shocking, treatment is softer, adjusting more properly to the biological properties of seeds.

When applying the equipment according to the invention the seed treated can be located more properly, so the effect of electric treatment is more definite regarding biophysical value increasing effect (*Biodonator effect*).

When applying the equipment according to the invention dipole creation is more effective in the seed, the seed becomes less charged. The seeds treated this way have an additional energy supply granting seeds and the plants growing from them the ability to be more resistant, develop more dynamically, and adds a so far unknown factor, the efficiency of photosynthesis is improved or increased. All these facts add up to an additional biological value, which is one of the main target areas of development of biology.

A further advantage of the equipment according to the invention is, that effect is achieved by electric treatment and no chemicals are used, there is no forced gene manipulated effect. Here there is no such effect, as it is absolutely nature-identical and a biochemical process is controllable bio-physically.

CLAIMS

1. Seed-treating equipment with improved efficiency for increasing biological value of seeds, said equipment has a treating slide provided with a hopper and an outlet and electronics serving treatment of seeds, *characterized by that*, in upper part of a treating slide (1) there is an electrode (6) with an arched surface on at least one part joining electronics (5) producing high voltage and there are deflection plates (8) between the electrode (6) and an outlet (12) in the bottom of the treating slide (1).
2. Equipment according to claim 1 *characterized by that*, the outer surface of the electrode (6) is plane on the upper part of the electrode (6) and outwards arched, convex shaped on the bottom, preferably with a surface of a cylinder-jacket or cylinder parabola.
3. Equipment according to claim 1 or 2 *characterized by that*, in the bottom of the treating slide (1) preferably on both sides two deflection plates (8) are symmetrically placed.
4. Equipment according to any of claims 1 to 3 *characterized by that*, in the bottom of the hopper (2) preferably at the front of the treating slide (1) a regulator valve (3) preferably a butterfly-valve is placed.
5. Equipment according to any of claims 1 to 4 *characterized by that*, a ventilator (4) is located preferably below the treating slide (1).
6. Equipment according to any of claims 1 to 5 *characterized by that*, the treating slide (1) joins a lower frame (10) of the equipment partly by a hinge (11) at the lower part of the treating slide (1) partly by an adjustable support (15) joining the upper part of the treating slide (1).

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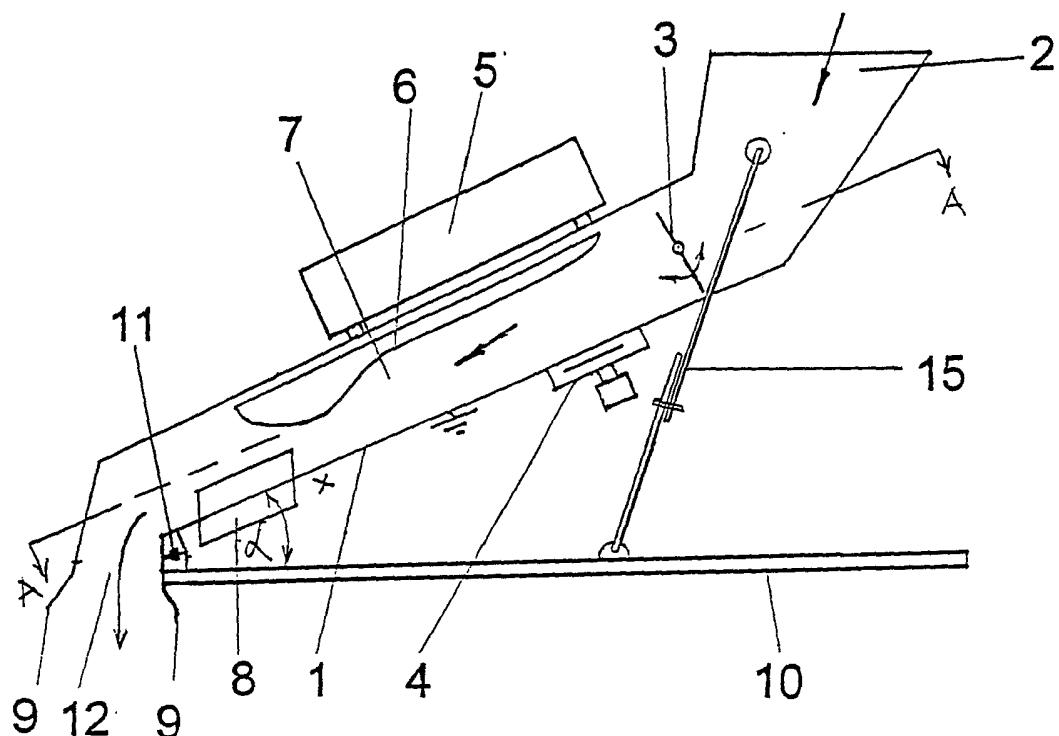


Fig. 1

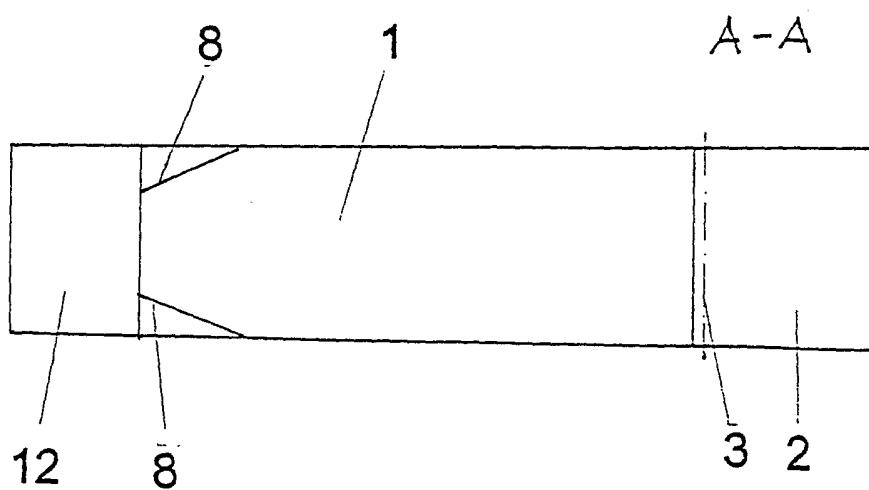


Fig. 2

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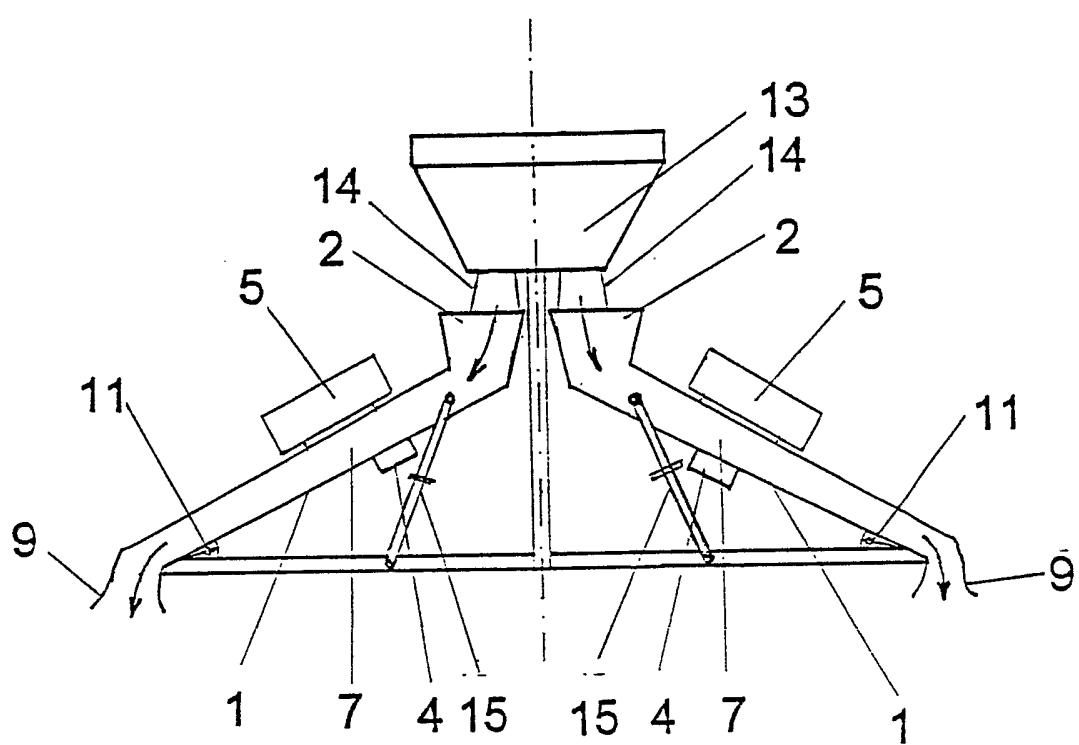


Fig. 3

INTERNATIONAL SEARCH REPORT

International Application No
PCT/HU 02/00170A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01C1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 84 00872 A (SERF LAJOS; NEMEDY ILONA; THUROCZI MARIA) 15 March 1984 (1984-03-15) cited in the application page 3, line 13 -page 3, line 34 page 7, line 19 -page 8, line 4; figure 1 ---	1-6
A	GB 1 090 011 A (TECHNOIMPEX MAGYAR GEPIPARI KU) 8 November 1967 (1967-11-08) page 1, line 36 -page 1, line 65; figure 1 ---	1-6
A	DATABASE WPI Section PQ, Week 197926 Derwent Publications Ltd., London, GB; Class P11, AN 1979-F6812B XP002234687 -& SU 622 430 A (UKR AGRIC MECH ELEC), 18 July 1978 (1978-07-18) abstract; figure 1 ---	1-6 -/-

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Date of the actual completion of the international search 13 March 2003	Date of mailing of the international search report 09/04/2003
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/HU 02/00170

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Information on patent family members

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