

INDUSTRIAL INSTALLATIONS USED IN THE SELECTION OF FOOD PRODUCTS

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ABSTRACT: The paper describes the use and operating principles of the main industrial facilities for sorting products and raw materials used in the food industry.

KEY WORDS: *Installations, sorting, food industry*

1. INTRODUCTION

The sorting machines are intended to obtain uniform products and to clean the product of impurities after the crushing operation.

The classification of sorting machines is done according to different considerations, namely: - size difference (sieves and sieves); - aerodynamic properties (cascade separator and pneumatic separator); - difference in shape (trios);

2. CONSTRUCTIVE TYPES

2.1. *Sorting machines by size difference*

Sorting is done by sieving granules of different sizes on the surfaces of sieves or sieves by passing products (fruits, eggs) through openings or holes of a certain size, in a standardized machine.

a). *Sieves and sieve.*

Sieve and flat sieves, which are made of sieve and round, square or elongated mesh, perforated in a zigzag or parallel pattern.

Oscillating flat screens, made of a wooden or metal frame, suspended by rods, in the joints, which allow the oscillating movement of the screen frame.

The oscillating circular screen has a circular shape and is fixed in a frame that is supported by rods in certain joints. The movement is performed by means of an eccentric.

The vibrating sieve consists of a package of three or more superimposed sieves, the large mesh sieve being at the top, on which the rejection with the largest size is retained. The movement of the sieves is done from a vibrating mechanism.

b). *Fruit standardizing and sorting machines.*

1.). Standardized machine with perforated strips.

It consists of several strips placed end to end, slightly inclined on a metal frame, so built that it can be adjusted in height with the help of telescopic supports. The product is transported from the loading area, where the belt has small holes, to the discharge area, where another belt has large holes. A collector is mounted under each strip, in which the four categories of fruit are collected. The belts are driven by an electric motor and a transmission unit.

2). Disc standardizing machine.

It consists of two disks, set in rotation by a transmission system. Mounting the discs on the moving frame of the machine is done through corners, so that, during the rotating movement, to form a free space, the height of which increases in the direction in which the discs rotate. During rotation, the fruit is moved in inclined planes above the channel so that it falls as the width of the channel exceeds the size of the fruit.

2.2. Sorting machines by aerodynamic properties

a). Cascading separator

It is used to separate light particles and dust from wheat. To increase the separation effect, several deflectors 1 (Fig. 1. a) are used to divert the material flow.

The product fed from the hopper 2, on the distribution roller 3, cascades from one deflector to another, crossing the ascending air current that is sucked by the fan through the suction mouths 4. The air, which entails light particles, enters the expansion chamber 5, where due to the expansion, those particles will be deposited that overcome the resistance of the air current.

The light particles are removed at the top 6 with the air, and the heavy particles are deposited on the self-adjusting flaps 7, which open when the pressure force of the particles exceeds the pressure difference between the outside air and the expansion chamber. Heavy particles are discharged through opening 8, and clean grains through opening 9. The air flow is regulated by means of the flaps 10. If

there are metal bodies in the mixture, they are retained on the magnet 11.

b). Pneumatic separator

Separate the particles from the mixture into several fractions, using an ascending air stream. The air fed through line 1, (Fig. 4.1 b) together with the mixture to be separated, hits the screen 2. When bypassing this screen, the air speed decreases, so that particles that weigh more than the air pressure can be deposited, they being eliminated through the lock 3, in the exhaust pipe 4. Next, the air stream is directed through the channels, upwards and, bypassing the vertical screen 5, enters the expansion chamber 6, where medium-weight particles (broken or dry grains) are deposited, which are then removed through the pipe 7. Light particles that have been entrained by the air are then evacuated through the duct 8.

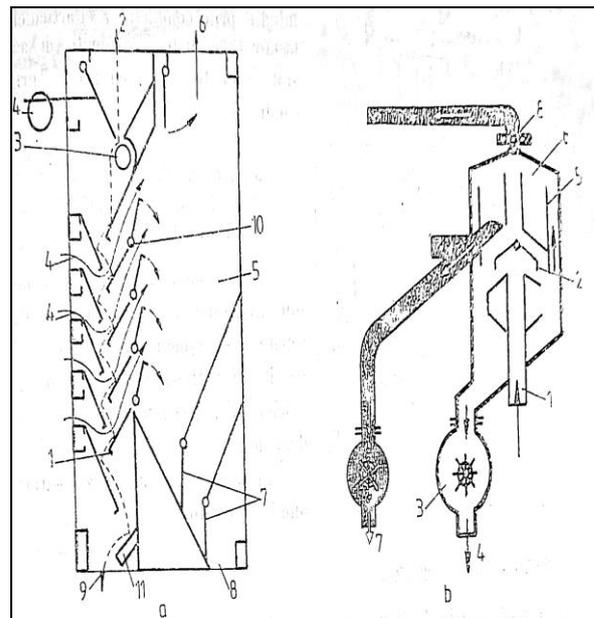


Fig. 4. Air current separator
a) in a cascade; b) pneumatic

c). Combined sorting machines by size and aerodynamic properties

1). Separator - vacuum cleaner

It consists of the site group 1, 2, 3, mounted on frame 4, provided with collectors.

The sieves are driven in the vibrational motion of the transmission system 5. The air, fed into the separator through the openings 6,

is distributed countercurrently in the grain mass and enters the supply area 7. Here it entails the light particles, eliminating them through the duct 8, after first being passed through the expansion chamber 9, for retaining, by deposition at the base of the chamber, heavy particles of impurities. Any foreign bodies that have passed into the clean grains are entrained by a stream of air drawn in through the opening 10. and are eliminated in the same expansion chamber 9. The separation on the site is done by sieving, as follows: - sieve 1 holds large bodies, strings, lumps of earth, etc .; - sieve 2 retains bodies slightly larger than the grain of wheat, such as peas, barley, maize, etc .; - sieve 3 keeps the wheat clean, eliminating small particles, very small seeds, etc. when sifting. (Figure 2)

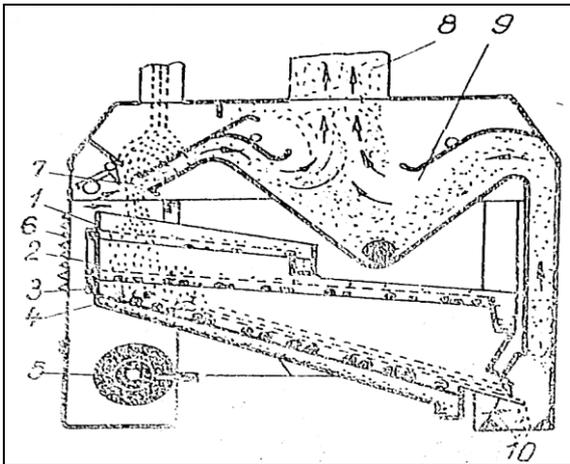


Fig. 2. Separator - vacuum cleaner

d). Combined sorting machines by size and shape

1). The fast triad

It is used for sorting impurities in cereals or for sorting peas. (Fig. 3.) The separating surface is a cylindrical jacket 1, with alveoli, mounted on the shaft 2. A conveyor auger 3 is mounted on the shaft 2, which collects the impurities in the gutter 3, removing them through the funnel 5. The mixture is fed through the funnel 6, and the clean product is evacuated through the funnel 7.

The drum and the auger are driven from the electric motor, through the transmission system 8.

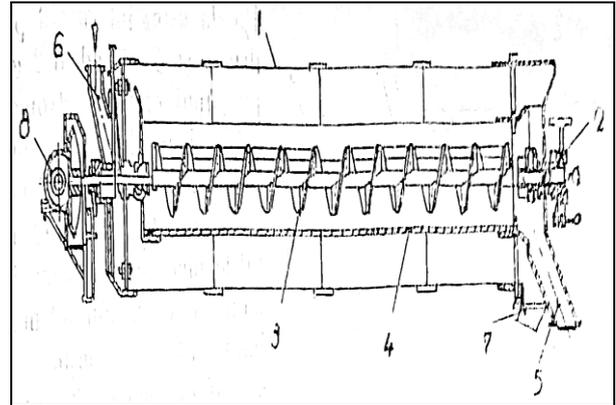


Fig. 3. Fast triad

e). Magnetic sorting-separating machines

Usually, in the mass of products subjected to separation by the previous processes, there are metal bodies left during transport. These metal bodies can damage the work surfaces of the machines in which the products are processed.

Electromagnetic separators are used to separate these impurities.

The separator (Fig. 4) consists of a continuous strip 1, which receives the mixture to separate. The strip is wound on cylinders 2 and 3. Cylinder 2 is subjected to an electromagnetic field, so that the strip is magnetized on the portion wrapped on this cylinder, retaining metallic impurities.

In the area where the tape exits the magnetic field, the impurities are removed from the surface of the strip, being removed through the funnel 4. The clean product is transported by the tape to the outlet 5.

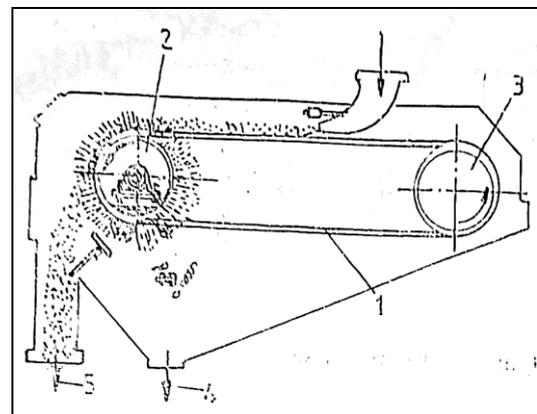


Fig. 4. Magnetic sorting-separating machines

3. CONCLUSIONS

1. Industrial sorting equipment is classified as follows:

- size difference (sieves and sieves);
- aerodynamic properties (cascade separator and pneumatic separator);
- difference in shape (trios);

2. The main industrial machinery used in the sorting of food products and raw materials are:

- sieves,
- sites,
- pneumatic separators, - magnetic separators.

4. REFERENCES

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