SCIENTIFIC CULTURE, Vol. 12, No. 2.1, (2026), pp. 12481-12484
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DOI: 10.5281/zenodo.20720882
www.sci-cult.com

NEW DESIGN OF A MOIST DUST CLEANER

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Abstract
In the article, based on the analysis of the designs of devices for wet dust and gas cleaning, a new design of an energy-saving, compact blade-drum device with high cleaning efficiency is proposed. The advantage of this apparatus is that the installed blades receive rotational motion under the influence of the gas flow and drive the mesh drum into rotational motion. As a result, it ensures the continuous washing of the mesh.

Keywords: dusty gas, wet method, liquid, mesh, drum, blade, stream, fitting.

Introduction

Dedicated to identifying and analyzing enterprises producing dry construction mortars in Uzbekistan. It examines the definition, classification, and significance of dry mixtures in the construction industry. A general analysis of the construction materials market in Uzbekistan, demand-forming factors, and the specifics of local production are highlighted. The chapter theoretically examines the types of manufacturing enterprises, their role in market segmentation, technological capabilities, and competitiveness factors. Based on the research results, recommendations are provided for the development of the dry construction mortar industry in Uzbekistan.

Currently, there are wet-processing devices of various designs, such as RU2124926C1, gas purification device, FAR2584, Gas purification device.

This RU2124926C1 gas cleaning device consists of a body, gas inlet and outlet pipes, a moisturizing fluid bath, a horizontal hollow shaft, and a mesh-tube contact device attached to it [2].

The following disadvantages of the apparatus can be cited. The complexity of the device's design, the high hydraulic resistance of the gas flow entering the mesh pipes and inter-pipe space, the large size of the liquid droplets scattered through the holes formed in the shaft, and the small contact areas lead to a decrease in dust capture efficiency, while the fact that the gas intake is carried out **from only one part of the pipe indicates a large free volume in the device.**

A gas purification device FAR2584 has been created, which eliminates the aforementioned shortcomings. This device consists of a horizontal housing with a liquid bath, gas supply and exhaust pipes connected to it, rods attached to ring-shaped plates, a mesh contact device made of a cylindrical shape in the form of a mesh laid on them and installed inside the housing with the possibility of rotation onto a shaft, water injection nozzles mounted on the housing above it, and a pipe for removing contaminated liquid from the lower part of the housing [2].

The following disadvantages of this device can be cited. In the design of the apparatus, one end of the rods on which the mesh is wound is fixed to a ring-shaped plate, and the other end is fixed to a disk-shaped plate. The disc plate blocks the gas flow and turns it by 900. This, in turn, leads to an increase in hydraulic resistance and increases energy consumption. Furthermore, the rotational motion of the mesh drum is driven by an electric motor. This complicates the design of the device and leads to increased energy consumption.

Taking into account the technical indicators and the results achieved, the device closest to the invention is FAR2584.

The main purpose of the invention is to simplify the design of the apparatus, reduce its hydraulic resistance and energy consumption.

To achieve the goal of creating conditions for installing the mesh of the device's drum contact device, it is necessary to secure both ends of the horizontally positioned rods to the ring-shaped plates and install them on the shaft through supports, and to install a blade with a shovel along the diameter of the shaft at its end to ensure the rotational motion of the mesh drum mounted on the rods and increase cleaning efficiency [3].

Figure 1 shows the longitudinal section of the gas cleaning unit, Figure 2 shows the A-A section, Figure 3 shows the B-B section, and Figure 4 shows the blade view.

The structure of the device is as follows. The device consists of a cylindrical body 1, on which a shaft 4 and supports 5 and 8 are mounted via a bearing 9. A ring 6 made of a steel plate is installed on supports 5 and 8, to which steel rods 7 are fixed horizontally. A steel mesh 10 was laid on the rods 7, resulting in the formation of a mesh drum. A pipe 2 is installed in body 1 to direct the dusty gas into the device, and a pipe 3 is installed to remove the purified gas. To ensure the rotational movement of the drum on shaft 4 and to improve the contact of the dust gas with water, a shovel blade 11 is installed on the shaft along the section of the drum along the front part of the support 8 at the end of the mesh drum. The liquid supplied to the upper part of the mesh drum 10 through the distribution pipe 12 is sprayed using connecting rods 13. The sprayed liquid is collected in sludge bath 14. A pipe 15 serves to maintain a constant liquid level in the sludge bath 14, and a pipe 16 serves to remove the sludge from the device.

Here's how the device works. Dusty gas is supplied to the device through pipe 2 to the inner part of a steel mesh drum 10 mounted on bearings 9 via shaft 4. The liquid sprayed from the upper part of the mesh drum 10 through the distribution pipe 12 is sprayed along the entire longitudinal surface using connecting rods 13. As a result, the sprayed liquid hits the steel mesh 10 and further crumbles in the mesh wires, increasing the contact surface area. Some of the droplets form a liquid film on the mesh wires, while the remaining part enters the inner part of the drum through the mesh holes, i.e., into the cleaning chamber. The dusty gas moves through the device's cleaning chamber, comes into contact with droplets of crushed liquid, and dust cleaning begins. In its course, the purified gas flow strikes the blade blade 11 installed at the end of the mesh drum 10 and undergoes vortex motion; as a result, the contact between the liquid and the dust gas increases further, causing the mesh drum 10 to rotate depending on the gas flow velocity and the force generated by the resulting vortex flow. As a result, the dust contained in the gas is effectively captured, and the resulting dust is collected in the liquid mixture, the device body 1, and the sludge bath 14 located in the lower part of the mesh drum 7. Dust caught in the sludge bath precipitates under the influence of inertial and gravitational forces. The sludge bath also serves to wash and re-humidify the steel meshes laid on the rotating drum. The liquid in the sludge bath is maintained at a constant level using pipe 15. Pipe 16 or

The efficiency of the device for cleaning dusty gases is determined experimentally based on the dimensions of the steel mesh laid on the drum and the resistance coefficients formed depending on these dimensions. The flow rate of liquid through the hole of the connecting rods 13 that supply liquid to the steel mesh 10 in the drum is determined depending on the resistance coefficient of the hole. The number of rods 13 is selected based on the size of the drum and the degree of liquid spraying on the laid mesh 10 and the cleaning efficiency. The diameter and length of the mesh drum are determined experimentally depending on the flow rate of the dusty air supplied for cleaning and the cleaning efficiency of the selected mesh. The calculation of the resistance coefficients and bearing resistance coefficients was carried out by calculating the number of revolutions of the drum using the dust air flow, the speed of the dust air transmitted through the pipe 2 and the inclination angles of the blade installed on it α (Figure 4), the number of blades, the vortex forces generated when the gas strikes the blade surfaces, as well as the resistance coefficients of the blade surfaces and the height of the water level in the sludge bath. The rotational motion of the mesh drum is selected based on the condition that the liquid level in the formed sludge bath is not disturbed. The ratio of dust air and liquid flow rates supplied to the device, as well as the optimal values of the aforementioned main parameters of the steel mesh and the shovel blade, are selected through experimental studies based on the high cleaning efficiency of the apparatus.

Another advantage of this device is the ability to install it directly into the pipes that direct dust from industrial enterprises and equipment, which does not require a special space for the device [3].

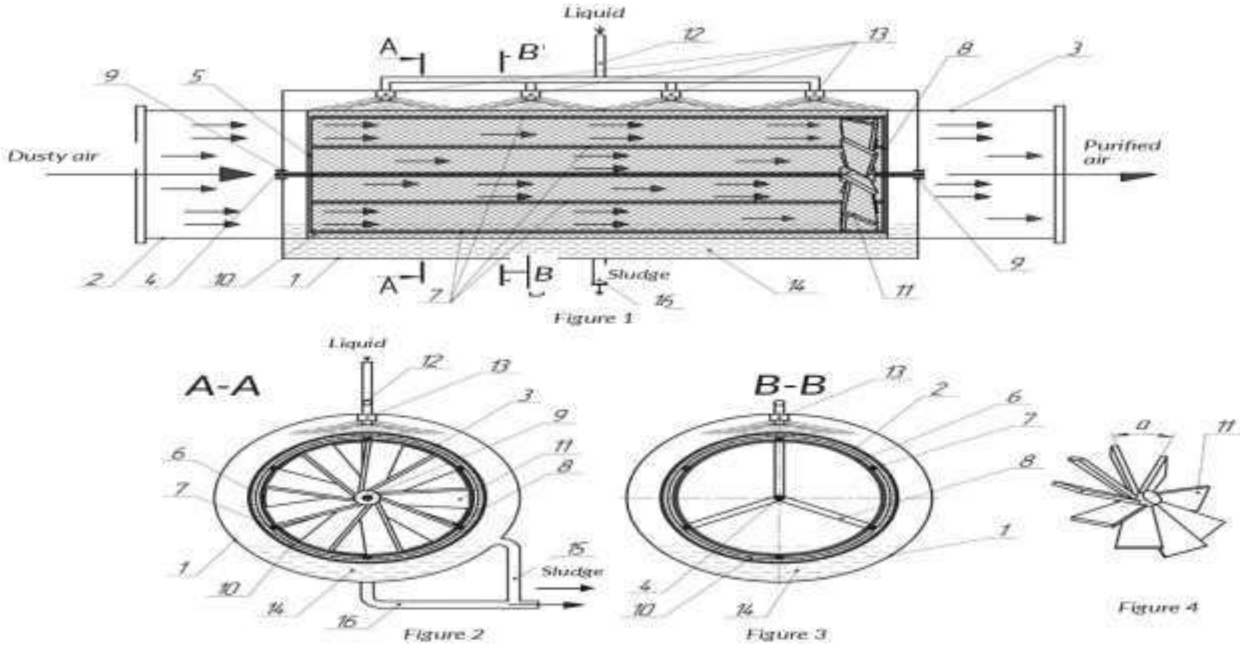

Figure 1 Figure 2 Figure 3 Figure 4

Conclusion. The article proposes a new design for an energy-saving, compact rotary drum device with high cleaning efficiency based on an analysis of the designs of apparatus for wet cleaning of dust and gases. The advantage of this apparatus is that the installed fans receive rotational motion under the influence of the gas flow and drive the mesh drum into rotational motion. As a result, it ensures constant washing of the meshes, which further increases the capture of liquid droplets by the installed blades and the contact of the liquid with the dusty gas.

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