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CONVEYOR DEVICE FOR CONVEYING NON-HOMOGENEOUS LIQUIDS

The present invention relates to a conveyor device for conveying non-homogeneous liquids such as liquid manure, swill, sewage sludge or fecal matter.

DE 20 2013 100 179 U1 discloses a filling device that is used for filling a slurry tanker. It has a housing with an intake connection and an outlet connection as well as a suction wheel mounted on a driven shaft in the housing, such that a cutting blade that works together with an opposing blade is provided in the area of the intake connection. Any solids that are too large can be pulverized in this way, to thereby prevent damage to downstream compressors or pumps. However, unpulverized solids can repeatedly result in blockage and then require uncoupling of the suction hose connected to the conveyor device.

DE 196 43 729 A1 discloses a pump having a housing which has an antechamber with an intake opening and a main chamber with a discharge opening. In addition, a rotary pump mounted on a driven shaft is provided in the main chamber. Furthermore, a size-reducing device that works together with a collecting box is provided between the antechamber and the main chamber. The size-reducing device consists of a rotating cutting element that works together with a cutting plate, wherein the cutting plate has through-openings, which form a connection between the antechamber and the main chamber.

Therefore, the object of the present invention is to improve the handling of the conveyor device.

This object is achieved according to the invention by the features of claim 1.

Advantageous embodiments of the invention are the subject matter of the additional claims.

The conveyor device according to the present invention for conveying non-homogeneous liquids, such as liquid manure, swill, sewage sludge or fecal matter consists essentially of

- a housing having an antechamber with an intake opening and a main chamber with an outlet opening,
- a suction wheel mounted on a driven shaft in the main chamber,
- a size-reducing device provided between the antechamber and the main chamber, and

— a collecting box having a discharge opening is provided in the antechamber for foreign bodies that cannot be pulverized.

Since a collecting box is provided in the area of the antechamber, solid bodies that cannot be reduced in size can be collected up to a certain amount and then conveniently discharged from the conveyor device through a discharge opening. This makes it unnecessary to connect and disconnect the suction connection to the intake opening of the antechamber.

The size-reducing device also consists of at least one rotating cutting element that works together with a cutting plate, wherein the cutting plate has a plurality of openings, which form a connection between the antechamber and the main chamber. A particularly efficient cutting effect is achieved by the fact that the openings in the cutting plate are arranged in a helical pattern around an axis of rotation of the at least one rotating cutting element. The cutting plate is preferably a wear plate made of a steel, and it is also advantageous if the at least one cutting element is mounted on the driven shaft of the suction wheel in a rotationally fixed mount, so that no additional drive is necessary for the cutting element.

The collecting box is preferably situated beneath the size-reducing device, so that any solid bodies that cannot be reduced in size will enter the collecting box under the force of gravity and will not further interfere with the flow through the openings in the cutting plate. The shaft on which the suction wheel is mounted is connected to a drive motor for driving the shaft, said motor preferably being situated outside of the housing and formed by an electric motor or an internal combustion engine.

Additional details regarding the invention will be explained in greater detail below on the basis of the following description and the drawings, in which:

Figure 1 shows a three-dimensional sectional diagram of the conveyor device;

Figure 2 shows a sectional diagram of the conveyor device, and

Figure 3 shows a top view of the size-reducing device.

The conveyor device shown in Figures 1 and 2 for conveying non-homogeneous liquids, such as liquid manure, swill, sewage sludge or fecal matter has a housing 1, which includes an antechamber 2 with an intake opening 3 and a main chamber 4 with a discharge opening 5. A suction wheel 7 is mounted on a driven shaft 7 in the main chamber 4. The drive for the shaft 6 is provided by a drive 8 located outside of the housing 1.

In addition, a size-reducing device 9 which has at least one rotating cutting element 11 that works with a cutting plate 10 is provided between the antechamber 2 and the main chamber 4. The cutting plate 10 is preferably a wear plate made of steel and is shown in a view from above in Figure 3, which illustrates a plurality of openings 12, which form a connection between the antechamber 2 and the main chamber 4. The openings 12 in the cutting plate 10 are arranged in a helical pattern around an axis of rotation 13 of the at least one rotating cutting element 11. The at least one cutting element 11 is preferably connected in a rotationally fixed mount to the driven shaft 6 of the suction wheel 7, so that the axis of rotation 13 also corresponds to the axis of rotation of the shaft 6.

The antechamber additionally has a collecting box 14 with a discharge opening 15 for foreign bodies that cannot be reduced in size. The collecting box 14 is located beneath the size-reducing device 9, so that any foreign bodies that cannot be reduced in size are conveyed by gravity to the collecting box 14, from which they can be discharged at an appropriate time through the discharge opening 15.

Patentkrav

1. Transportindretning til transport af inhomogene væsker, såsom gylle, ajle, kloakslam eller fækalier, med

- et hus (1), der omfatter et forkammer (2) med en indsugningsåbning (3) og et hovedkammer (4) med en fraføringsåbning (5),
- et sugehjul (7), som er monteret på en drivbar aksel (6) og anbragt i hovedkammeret (4),
- en sønderdelingsindretning (9), der er tilvejebragt mellem forkammer (2) og hovedkammer (4), og som i det mindste omfatter et roterende skæreelement (11), der virker sammen med en skærepIade, hvorved skærepladen (10) er udstyret med et antal åbninger (12), som repræsenterer en forbindelse mellem forkammeret (2) og hovedkammeret (4), og
- en opsamlekasse (14) for fremmedlegemer, der ikke kan sønderdeles, hvilken opsamlekasse er anbragt i forkammeret (2) og omfatter en tømningsåbning (15),

kendetegnet ved, at åbningerne (12) i skærepladen (10) er arrangeret i et spiralformet mønster rundt om rotationsaksen (13) for det mindst ene roterende skæreelement (11).

2. Transportindretning ifølge krav 1, **kendetegnet ved, at** skærepladen (10) er fremstillet af en slidplade af stål.

3. Transportindretning ifølge krav 1, **kendetegnet ved, at** det mindst ene skæreelement (11) rotationssikret er forbundet med den drivbare aksel (6) for sugehjulet (7).

4. Transportindretning ifølge et eller flere af de foregående krav, **kendetegnet ved, at** opsamlekassen (14) er anbragt neden under sønderdelingsindretningen (9), således at eventuelle fremmedlegemer, som ikke kan sønderdeles, på grund af tyngdekraften når ind i opsamlekassen (14).

5. Transportindretning ifølge et eller flere af de foregående krav, **kendetegnet ved, at** akslen (6), som holder sugehjulet (7), er koblet til et drev (8) til drivning af akslen (6).

6. Transportindretning ifølge krav 5, **kendetegnet ved, at** drevet (8), der er koblet til akslen (6), er beliggende uden for huset.

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Fig. 1

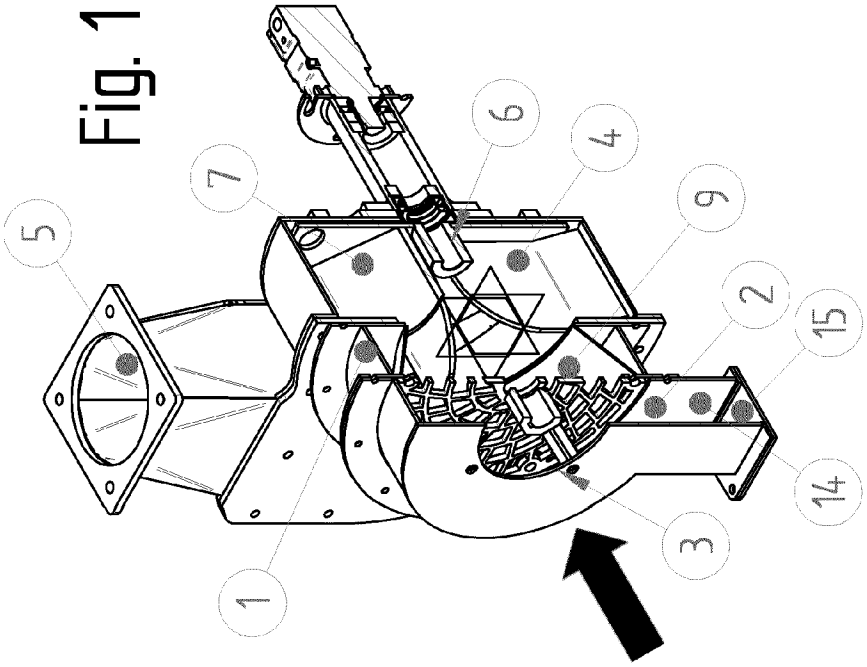

Fig. 2

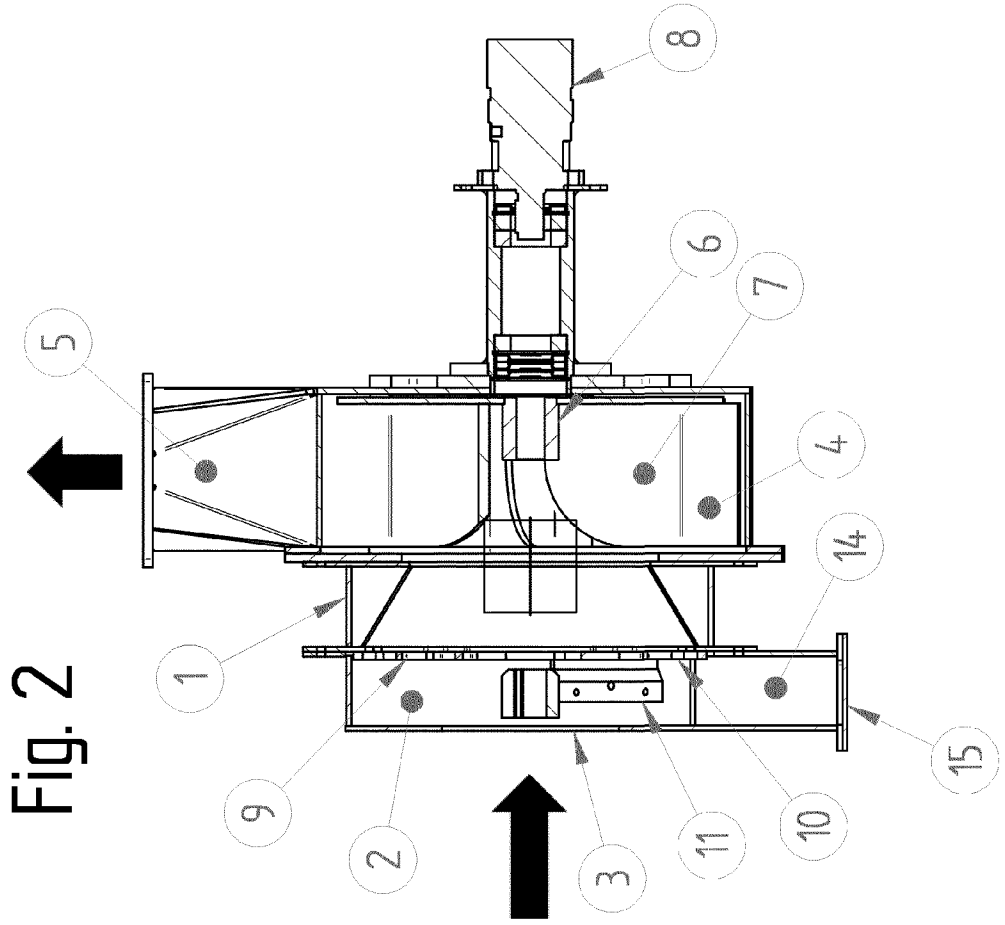

Fig. 3